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SIMEON DE WITT,
T. ROMEYN BECK,
JAMES G. TRACY.

PART I. CONTENTS.

CONTENTS.

PLATES.

ERRATA.

Page 15, line 24, dele species.
16, line 8, for " oppose to," read *contradict.*

ERRATA in Professor GREEN's Communications.

Page 121, line 2, for " three," read *four.*
131, line 20, for " Gallea which have," read *Galea which has.*
131, line 2 from bottom, for " a,' read *an.*
136, line 18, for " young," read *a variety.*
136, line 25, dele. The nodulous melania there stated to be the perfect appearance of the M. Canaliculata, is described by Mr. Say as M. Armigera.

ERRATA in Mr. BUTLER's Discourse.

Page 186, line 15, for " the languages," read " the modern languages."
197, line 4, from bottom of page, for " attack," read " attacks."
199, line 5, from bottom of page, after " estimate," insert " of."

APPENDIX.

Page 35, line 6 from the bottom, for "interior," read *anterior.*
36, line 28, for " atmosphere," read *apparatus.*
44, line 13, add *jun.* to S. Van Rensselaer.
46, line 13 from the bottom, for " 1829," read 1821.

Catalogue of the Library.

No. 4, for "2 vols." read 1.
No. 76, for " 14th," read 18th Congress.
No. 77, for " 3 vols." read 2, and add documents for 1803.

List of Donors.

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TRANSACTIONS

OF THE

ALBANY INSTITUTE.

VOL. I.—PART I.

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TRANSACTIONS

OF THE

ALBANY INSTITUTE.

JUNE, 1828.

Advertisement.

The Albany Institute is composed of two Societies, which for various periods of time have existed in this city—*the Society for the Promotion of Useful Arts in the State of New-York*, and the *Albany Lyceum of Natural History*. Circumstances not necessary to be explained, led to an union of effort and property between their members and other citizens, and as a necessary consequence, to an enlargement of the objects of investigation. The present title of the association was adopted, under the idea that it would comprise the pursuit, both of science and literature, in their most extensive sense.

It has been deemed advisable to commence the publication of some of the papers read before the Society. The members do not flatter themselves that they will greatly add to the general stock of knowledge—they may hope, however, that their efforts will tend to disseminate a taste for it.

Art. I. *Table of Variations of the Magnetic Needle, copied from one furnished by the late* Gen. Schuyler to S. De Witt, Surveyor-General.

Presented 27th April, 1825.

I now present to the Institute, for the purpose of having it preserved, what I consider an interesting document. It is a Table shewing the changes in the variation of the magnetic needle at Boston, Falmouth and Penobscot, from 1672 to 1800, embracing a period of 128 years, copied from a paper furnished me by the late General Schuyler. The difference of variation between the two epochs appears to be 5° 53′, giving a little more than two and three quarters of a minute for the mean annual variation, or the rate at which the north point of the needle approached the pole from the west, during that period.

As long as I can remember, the surveyors in our country, in retracing old lines, have allowed at the rate of three minutes per year, and acquiesced in the correctness of that rule till the year 1805.

Some time after I settled in Albany, which was in 1785, I established a true meridian, on which I occasionally set a compass for the purpose of observing the variation of the needle; and from these observations I found no reason for departing from the old rule until 1807; when to my surprize I found that a sudden change had taken place in the direction of the needle. And, in order to ascertain its extent, I examined a number of lines, which had been run before. Among others, the courses of the Great Western and Schenectady Turnpike Roads, which in 1805 had been surveyed by Mr. John Randel, junr. then attached to my office. The result was as follows:—

1805, July 30,	Great Western Turnpike Road,	N. 61° 45′ W.
1807, Sept. 4.	do.	N. 61° — W.
1805, July 30.	Schenectady Turnpike Road,	N. 35° 20′ W.
1807, Sept. 4.	do.	N. 34° 35′ W.
Making a difference on each of		00° 45′

Shewing that in about two years and a month, the needle had changed, contrary to its former direction of annual variation, about forty-five minutes of a degree. An examination of several other lines confirmed this result.

A view along the meridian, which I had formerly established, having for several years been obstructed by buildings, I made observations assisted by Mr. Randel, on the 1st, 2d, 3d, & 4th October, 1817, with a good transit instrument, for the purpose of drawing a meridian line across the public square in this city; the particulars of which are contained in the 2d part of the 4th volume of the Transactions of the Society for the Promotion of useful Arts.—The needle was then found to point 5° 44′ to the west of north. An observation made on the 1st August, 1818, shewed it to be 5° 45′, and on the 24th of the present month of April (1825) between 9 and 10, A. M. it was exactly 6° 00′; all which shews that there has been since 1817 a retrograde motion of the needle of about two minutes per year—whether this is general or local, I have not had the means of ascertaining. Mr. Joseph Henry, a member of the Institute, surveyed a farm in the town of Coeymans, not many days ago, which had been run by the late John E. Van Alen, one of the best surveyors of our country, in 1798, and the variation was found to be one degree, as nearly as could be ascertained, in the same way; that is, from the north to the west.

It will be recollected that in 1806, a total eclipse of the sun, of uncommon duration, took its range over our country. May I be permitted to escape the charge of advancing an absurdity, in suggesting the *possibility* that the lunar effluvia conveyed to the earth by the rays of the sun, on that occasion, might have had an agency in producing the phenomenon I have described.* Be that as it may, there appears to be something remarkable in the coincidence of these occurrences.

* In a Memoir which I had the honor of reading before the Institute some time since, on "the Functions of the Moon," which will probably appear in some future publication of our Transactions, I have extended my remarks in relation to the *probability*, that the eclipse of 1806, had an effect on the polarity of the magnetic needle.

A TABLE, Exhibiting the Variation of the Compass in Boston, and the parts adjacent, from the earliest accounts of it to the end of the 18th century, agreeable to actual observations—By JOHN WINTHROP, Esq. Hollis Professor of the Mathematics, at Harvard College, in Cambridge.

Years.	*Variations at Boston.*	*Diffe.*	*Variations at Falmouth.*	*Diffe.*	*Variations at Penobscot.*	*Diffe.*	*Mean annual diffe. between each.*
	° ′	° ′	° ′	° ′	° ′	° ′	′
1672	11.15		12.		12. 8		
78	11.	0.15	11.45	0.15	11 53	0.15	15
89	10.30	0.30	11.15	.30	11.23	30	30
1700	10.	30	10.45	.30	10.53	30	30
5	9.45	15	10.31	.14	10.39	14	14 1-3
10	9.32	13	10.12	.19	10.25	14	15 1-3
15	9.18	14	10. 3	. 9	10.11	14	12 1-3
20	9. 5	13	9.50	.13	9.58	13	13
1725	8.57	8	9.36	.14	9.44	14	12
30	8.37	20	9.22	.14	9.30	14	16
35	8.23	14	9. 8	.14	9.16	14	14
1742	8.	23	8.45	.23	8.53	23	23
45	7.56	4	8.41	. 4	8.49	4	4

1750	7.42	14	8.27	.14	8.32	17	15
57	7.20	22	8. 5	.22	8.13	19	21
61	7. 7	13	7.52	.13	8.	13	13
1763	7.	7	7.45	. 7	7.53	7	7
70	6.45	15	7.31	.14	7.39	14	14 1-3
75	6.32	13	7.17	.14	7.25	14	13 2-3
1780	6.18	14	7. 3	.14	7.11	14	14
85	6. 4	14	6.49	.14	6.57	14	14
1790	5.50	14	6.35	.14	6.43	14	14
95	5.35	15	6.21	.14	6.29	14	14 1-3
1800	5.22	13	6. 7	.14	6.15	14	15 1-3
128 years difference	5.53		5.53		5.53		

Mean annual diff. 0° 2′.45″.28‴.7⁗.3′′′′′ the same the same

or, 0.2′7578125

From 1672 to 1700	the mean annual difference	is 2′.67871428	which in 11 1-2 years, amounts to	3048	Mean of all the periods, 31′.43″.
1700 to 1725	do.	is 2.52	do.	28.59	
1725 to 1750	do.	is 3.	do.	34.30	
1750 to 1775	do.	is 2. 8	do.	32.12	
1775 to 1800	do.	is 2. 8	do.	32.12	

ART. II. *On the* LUMINOUS APPEARANCE *of the* OCEAN, *by* Lieut. THOMAS R. INGALLS, U. S. Army, Corresponding Member.

Read March 26, 1828.

This beautiful phenomenon, which once bore the poetical title of "phosphorescence of the ocean," has more recently I believe rested between two solutions: that it is caused by animalculæ, or by the ovula of fishes. The writer in a recent foreign periodical, inclines to the former opinion—viz. that the luminous appearance of the ocean is caused by animalculæ. As I have been for some time inclined to the opposite view of this subject, I am induced to submit an account of some observations made a few years since in the humble pursuit of science.

In the practice of sea bathing at night, in a southern latitude, I had of course noticed and admired the beautiful sparkling of the water when agitated or resisted—but the myriads of bodies of whatsoever sort which emitted these corruscations, were alike invisible and impalpable. On one occasion however I struck my arm against a small soft mass, which immediately emitted a flash of two or three inches in diameter. But the mass eluded my attempts to secure it, as it was invisible the moment it parted from its accidental contact with my arm. This occurred several times afterwards, and I began to think I perceived a sensation of warmth whenever I struck one of these bodies, though aware how liable I was to be deceived by the almost irresistable association of light and heat in the mind. A very large one ultimately convinced me I was not deceived; the sensation being on this occasion perfectly distinct—grateful—and continuing for a minute or two after the touch.

The masses of marine ovula, left by the tide to heat and hatch on the beach, I had long before observed through the whole process of vivification. First, a transparent mass of jelly—next marked by a white opake speck a little distant from the centre—third, this spot fringed with a red border, of the colour of arterial blood; next, a kind of irregular pulsation, accompanied by the developement of certain white contractile fibres, and the extension of several large red lines, in radial directions from the focal opake speck—the appearance of a black speck, ultimately a defined head—and finally, I have seen the rising tide shake out from the mass, the perfect animal, apparently in the full possession of life; certainly exercising the important function of apprehension of danger.

The identity of this ovulum, with the luminous bodies I encountered in the water, appeared probable, from their size, consistency and abounding in the same regions. It was soon after ascertained: for on a night when the sea was somewhat agitated, I observed the same corruscations in the waves breaking on the beach, and succeeded in obtaining several of the illuminating bodies, by the light of their own flashes. They appeared, as I expected, identical.

When examined by candle-light, to overcome the glare of their brilliancy, and at the same time observe their action more clearly, the power of illumination appeared to reside in a similar focal point to that described as the place of the first phenomena of vivification; and the flashes which could be procured by irritating the mass with the end of a pencil, diverged from this point in lines similar in magnitude and direction, to the large red ones, mentioned in that process. I regret, that it did not occur to me to electrically insulate one of these bodies, and endeavour to obtain shocks; but I was too much occupied with the question above stated, to avail myself of the means in my hands, of making some interesting experiments on the theory of life.

The existence of those large corruscating bodies in the ocean, has been before recorded, and there is, I believe, a paper on this subject, by Dr. Mitchill, published ten or twelve years ago; but it is thought some parts of the observations are not on record, and they are now submitted in the hope of being in some small degree useful—or pardoned if superfluous.

The conclusions I formed on this subject were, that in this instance a luminous appearance in the ocean was produced by marine ovula; and by a rule of philosophising, all such appearances not proved to proceed from another source, and not inconsistant with this cause, are fairly assignable to the same origin.

Watervliet Arsenal.

Art. III. *On the* Geographical Botany *of the United States.*
By Lewis C. Beck, M. D.

Part I.

Read March 26, 1828.

The science of Geographical Botany has for several years received distinguished attention from many celebrated European botanists. Linneus, the founder of the system which has immortalized his name, made the first contributions to this interesting department; but it is since his time that the facts which have been collected, have been moulded into form, and that their practical application has been pointed out. In the accomplishment of this great work, the researches of Wahlenberg, of Humboldt, and of Robert Brown, are conspicuous. These have been succeeded by others in various parts of Europe, and vegetable geography has now become a subject of general interest to all who are engaged in investigating the products of vegetation.

Hitherto these efforts, on the other side of the Atlantic, have not been seconded by any corresponding ones in our country; and for all the facts that we possess concerning the distribution and history of its vegetable productions, we are indebted wholly to the works of foreigners. But in these, many incorrect positions are advanced and many interesting facts entirely overlooked. This will appear less strange when we reflect, that the numerous additions which have been made to our Flora during the last ten years, are only to be found scattered through numerous scientific journals and the transactions of scientific societies, which perhaps seldom meet the eye of foreign botanists.

Satisfied that a more complete examination of the Geographical Botany of the United States, would amply repay the labour necessary for its completion, I devoted myself to the task—under the full conviction, that in every science, the humble though laborious business of collecting facts must precede the establishment of general principles. The result of these investigations I am now induced to present, in the hope that, should they be without interest to the genenral reader, they may at least be of some value to the planto-geographer.

As an introduction to my remarks, it is necessary to premise—that the territory at present claimed by the United States, extends from the 25th to the 54th parallel of north latitude, and from the 67th to the 124th degree of west longitude from London; its extreme length being 2780 English miles; its greatest breadth 1300 miles, and its area about 2,300,000 square miles—That this immense territory is traversed by two great chains of mountains, in a direction approaching to north and south: the Alleghanies on the east side, and the Rocky Mountains on the west; the former varying in height from 2500 to 4000 feet, the latter reaching the height of 12,000 feet—thus dividing the whole territory into three regions, the eastern, the western, and the middle; the latter comprising the great basin or valley of the Mississippi.

By an inspection of the earth's surface, it is found that those plants which possess the lowest degree of organization, are most extensively disseminated. Those which are placed on the very confines of vegetable life, and are almost blended with inorganic nature, are distributed every where upon the earth, when circumstances favourable to their production occur. Of this number we may mention the Fungi, the Algæ and the Lichens, which are found in countries the most distant from each other, and at different distances from the equator. "Europe and New-Holland," according to Robert Brown, "have a number of Lichens, almost indeed two-thirds of those which have hitherto been discoverd in New-Holland, of the same species with those that exist in Europe. Of the hepatic and frondose Mosses, nearly one-third belong equally to New-Holland and to Europe. And with respect to the Algæ, not only Confervæ, but Fuci, are common to the most distant seas. *Laminaria Agarum*, *Lam.* for instance, is found in Greenland, in Hudson's Bay, in Kamschatka, and in the Indian Ocean. *Halydrys siliquosa*, *Lyngb.* *Sphærococcus ciliatus*, *Ag.* and many others, have a distribution equally extensive." (*DeCandolle and Sprengel's Elements of the Philosophy of Plants*, p. 265.)

So far as we are acquainted with the Cryptogamous plants of our own country, they offer no exception to the remarks just offered. Not only do the Fungi, the Algæ and the Lichens of the different parts resemble each other, but many of the Hepatici and Mosses are found from one extreme of the continent to the other. But it should be remarked, that the Cryptogamous plants of the United States are as yet very imperfectly understood, and hence no sure data are furnished for examining their distribution. This will be sufficiently apparent when it is stated, that the number of these plants enumerated in the second edition of Muhlenberg's Catalogue, in

1818, is less than 900, including the Filices.* If any reliance is to be placed on the comparative number of Phenogamous and Cryptogamous plants in other countries, probably some thousands will be added to the above list when our botanists direct their attention to the investigation of this class of plants. It should be mentioned that L. de Schweinitz has already added a great number to the list of Hepatic Mosses and to the Fungi.† Future examinations will bring to light a proportionate number of neglected species belonging to the other orders, and will justify the conjecture which has been made.

Passing by, therefore, for the present, these neglected objects of the vegetable kingdom, I shall confine myself exclusively to the Phenogamous plants, of which probably, the greater part, indigenous to the United States, are already known and tolerably described. Still it cannot be doubted that a considerable number have escaped notice, as many parts of the country have been quite imperfectly explored.

The section of country included within the limits of the United States and Territories, as defined previous to the cession of Louisiana and the Floridas, has been examined with considerable care, and its botanical productions are enumerated and described in various local and general Floras. The most important are those of Walter, Catesby, Clayton, Michaux; and of the more recent ones, those of Bigelow, Barton, Mühlenberg, Pursh, Elliott, Nuttall, Eaton and Torrey. On looking over these Floras, we find that they are chiefly devoted to such plants as have been found east of the Alleghanies, though the general works contain descriptions of many species found west of that range. In addition to this, a few local catalogues have been published of plants found in particular parts of the western region. Such are a catalogue of plants found near Cincinnati, in Dr. Drake's Picture—a catalogue of plants found near Louisville, in Kentucky, by Dr. M'Murtrie, in his sketches of Louisville. A list of plants in the neighbourhood of Cannasarga river, (Cherokee country) published in the 1st volume of Silliman's Journal—Contributions to the Botany of Illinois and Missouri, by the author of this essay, in vols. 10, 11 and 14 of the same work, &c.

* These, however, were with few exceptions, found in Pennsylvania.

† Schweinitz's manuscript, containing an account of 1373 Fungi, found in Upper Carolina, was edited by Schwaegrichen in 1823, under the title of "Synopsis Fungorum Carolinæ Superioris," in a thin volume, 4to; and it is not a little singular to observe, how many of these are common to Europe as well as America. *Hooker's History of American Botany.*

So far as my information extends, the following tracts, included within the limits under consideration, have not yet been examined with that attention, which is necessary to a complete developement of their botanical productions, viz. The ranges of mountains in the Eastern States, as well as the extensive range of the Alleghanies, throughout their whole course from north to south—the savannahs, of the Southern States—the vast praries of Ohio, Indiana and Illinois—and the shores of the large lakes upon a part of our Northern Frontier. From these, the acute and enterprising botanist would draw treasures, more than sufficient to compensate him for the difficulties and dangers, which he must necessarily encounter.

The cession of Louisiana to the American government in 1803, was an event no less interesting to the naturalist than to the statesman. Previous to that time, the only knowledge we possessed of the productions of that extensive and various country, were a few scanty notices contained in the works of travellers ; most of which were not calculated to give the botanist that kind of information which he desired. Since the event just mentioned, however, several naturalists of experience have explored that interesting territory, and have published the results of their explorations. Among these should be particularly noticed the names of Bradbury,* Nuttall and Pursh ; and more recently, Drs. Baldwin and E. James, who were attached to the several expeditions of Major Long. I should also particularly mention the Florula Ludoviciana, published by Mr. Rafinesque, in 1817. A notice of such species as were discovered in this region, up to the year 1818, will be found in the valuable work of Mr. Nuttal. Of the remaining ones, the only account that we have is to be found in the different journals of the expeditions and in various American periodicals.†

* For the botanical discoveries of Mr. Bradbury, see his travels in the Interior of America.—*N. Y. Medical Repository*, vol. 17, and the Appendix to Pursh's Flora.

† Catalogue of plants collected during a journey to and from the Rocky Mountains, during the summer of 1820, by Edwin P. James. *Transactions of the American Philosophical Society.* N. S. vol. 2, p. 172.

Description of some New and Rare Plants from the Rocky Mountains, by Dr. E. James. By John Torrey, *Annals N. Y. Lyc.* vol. 1, p. 30.

Description of some New Grasses, by the same. *Ann. N. Y. Lyc.* vol. 1, p. 148.

Some account of a collection of Plants, made during a Journey to the Rocky Mountains, in 1820, by Dr. Torrey. *Ann. N. Y. Lyc.* vol. 2, p. 161—contains a notice of 481 species.

Mr. Nuttall's Travels in the Arkansa, and his description of New Plants from the Arkansa. *Jour. Acad. Nat. Sciences*, Philadelphia, vol. 2, p. 141—179. vol. 5, p. 132.

Catalogue of the Plants collected during the second expedition of Major Long. By L. De Schweinitz. *Jour. 2d Expedition.*

But in this extensive territory, botanical investigation has been thus far confined chiefly to the banks of the larger streams; nor have even these been examined throughout successive seasons. The mountainous tracts—the vast plains—and the whole southern and western part, have been in a good degree neglected. The discoveries of Mr. Nuttall and Dr. James, are a sufficient surety of the abundant harvest still unreaped at the base of the Rocky Mountains; on the head waters of the Arkansas and Red River, and on the confines of Mexico and California.

For information concerning the vegetable products of our North West Coast, we are indebted chiefly to Prof. Pallas, Mr. Menzies, and to our own countryman, Meriwether Lewis; who, during his celebrated expedition, brought from the mouth of the Columbia, many new and interesting objects. It is a subject of congratulation, that Mr. Douglass, under the patronage of the London Horticultural Society, has devoted two or three years to the examination of the botany of this part of the United States, and has made many valuable discoveries; and among others, that of a new species of Pine, which is said greatly to excel any that has been hitherto known on this continent. We anticipate the early publication of his Flora, which must throw much light upon the geographical botany of this continent.

The Floridas, previous to their cession to the United States, were visited by the elder Bartram. Since that time, a few additions to their Flora have been communicated by Mr. Nuttall;* but they have not by any means been thoroughly explored.

Such is the extent of which the various sections of the United States have been botanically investigated. How much still remains to be done, may be gathered from the following facts:

The number of Phenogamous plants enumerated by Nuttall in his Genera of North American Plants, published in 1818, is about 3230. This, however, includes several species which are peculiar to Canada, Labrador, and Hudson's Bay. If we deduct these, and then add such as have been discovered within the limits of the United States, since the year 1818, the number of species at present known will not be far from 3500; and this from a country whose area is about 2,300,000 square miles.

In France, whose area is about 200,000 square miles, La Marck and De Candolle enumerated, in 1806, 4688 species, of which 1472 were Cryptogamous and 3216 Phenogamous; but a few less than were known to be natives of the United States in 1818.

* *Silliman's Journal*, vol. 5, p. 286.

I regret, that I have not at present the means of extending this comparison to the Floras of other countries. This deficiency, I hope to be able hereafter to supply.

The plants of the United States are distributed into 93 of the natural orders of Jussieu, of which the most numerous are the Corymbifera, Gramineæ, Cyperoideæ, Leguminoseæ, Rosaceæ, Amentaceæ, and Labiatæ, in the order they have been named; and which, together, possess about 1400 species. Of the remaining orders, few contain above 50 species, and nearly one half less than 10.

The general distribution of these plants through the different sections of the United States, will next claim our attention; though we must premise, that the materials for that purpose are still quite scanty.

In Torrey's Compendium of the Flora of the Northern and Middle States, published in 1826, are enumerated 1900 Phenogamous species, and there is about the same number of Indigenous species in Eaton's Manual. The territory, included in this enumeration, is north of the 38th degree of north latitude, and east of the eastern boundary of Ohio.

From a patient examination of the North American Flora of Pursh, 1814, and Elliott's Sketch of the Botany of South Carolina and Georgia, I find that the number of species in the Atlantic States south of the 38th degree of N. latitude, is about 2300 species.

By a comparison of these Floras, I find also, that 650 species are peculiar to the Northern States as above designated, and about 1050 peculiar to the territory south of the 38th degree; and of about 800 or 900 species heretofore noticed west of the above, from 200 to 300 are peculiar to that region. I use the term *peculiar*, because they appear to flourish best, and be most at home there; not that the line is in every case *exactly* upon the limits just assigned.

From these statements it may be inferred, that from 12 to 1300 species are more or less common to the Northern and Southern regions on the Atlantic coast; and that of the plants found west, 5 or 600 species are also common to the Atlantic region. Some of these have a very extensive range of locality. I shall notice a few of the most striking examples.

Dulichium spithaceum. Richard. This glumaceous plant is found in the moist sandy soils and on the banks of streams in Georgia, and passing through the Carolinas, it is met with in Virginia, at Philadelphia, and as far north as Boston. It is met with in similar situations through the Middle States, and as far west as Missouri: having a range, therefore, of 1000 miles north and south, and of the same extent east and west, and I am inclined to believe it will be found as far west as the base of the Rocky Mountains. It is moreover peculiar to the United States, and exists in situations which oppose to the opinion that it has emigrated from place to place.

Cephalanthus occidentalis, *Lin.* Has a range equally extensive. It grows also in the swamps, ponds, and margins of streams, and does not appear to undergo much change in its appearance. Found as far west as the Canadian fork of the Arkansas.

Mitchella repens, *Lin.* with its fragrant flowers, is found in the shady forests of Canada, and in similar situations through the Northern Atlantic States, and as far south as Georgia. Also on the Arkansas, and in the Cherokee country.

Dodecantheon media, *Lin.* (American cowslip,) though not so common at any given place, has an extensive range from east to west. We find it in Pennyslvania, Ohio, Missouri, and specimens were collected by Captain Lewis at the mountainous sources of the Missouri; and within the Rocky Mountains, by Dr. James.

Tradescantia virginica, *L.* extends through the Atlantic States, from Pennsylvania to Georgia—westward through Ohio, on the western shores of Lake Michigan, and through the Prairies of Illinois and Missouri. It is also found in the Cherokee country.

The history of the genus Trillium, which, with a single exception, belongs to North America, is highly interesting in connexion with the view we are taking. Some of the species, as *T. grandiflorum*, *Salisb.* *T. erectum*, *Pursh*, have a range of the widest extent. T. grandiflorum is found in the mountains of Georgia and Carolina; in Virginia and Pennsylvania; near Albany, New-York, and in the western part of the latter state; becoming more abundant through the moist prairies of Ohio, Indiana and Illinois.

Other species of this genus have a more limited range, and others again, though not found in the Northern Atlantic States, are seen in Carolina and Georgia, and passing west of the Alleghanies, are found again on the banks of the Arkansas and Missisippi. Such are the sessile species, of which two have already been described, and the number of which will undoubtedly be increased.

The observation just made, brings me to the consideration of another point of much interest to the planto-geographer; and it is, that the Southern Atlantic States, and the more northern and western sections of the United States, have many common species and genera which are not found elsewhere; and this too, as I hope hereafter to show, is entirely independent of any great similarity of climate.

This appears to be more particularly applicable to the natural families, Compositæ, Leguminosæ, and Euphorbiaceæ. Of the former we may enumerate the following genera, viz. *Chrysocoma, Hemenopappus, Eclipta, Galardia* and *Silphium.* Of the Leguminosæ—*Psoralea, Indigofera, Petalostemon, Dalea, Amorpha* and *Schrankia.* Of the Euphorbiaceæ, we may enumerate *Styllingia, Croton* and *Jatropha.* These genera have scarcely a single representative in that portion of the Northern States which is east of the Alleghanies. Their northern limit on the Atlantic is the 34th or 35th° N. L. but they are found westward, on the banks of the Mississippi, the Arkansa, the Platte, and the Missouri, in some cases, as far north as the latitude of 41°. To this catalogue I might add the Reed or Cane, *Miegia macrosperma, Pers.* which to the east is confined to East Florida and the lower part of Georgia, but at the west is found on all the streams, as far as the Platte—In other cases, particular species of genera, which are widely distributed, follow the same law—Of this number are *Verbena stricta, L.* and *V. aubletia, Lin. Coreopsis crassifolia; Ait. Scutellaria cordifolia,* and others.

But there are also striking peculiarities in the vegetation of the different sections of the United States, which should not pass unnoticed. To the Southern Atlantic region belongs the splendid *Magnolia grandiflora,* the beautiful yellow Jessamine, *Gelseminum nitidum;* several species of *Styrax, Marshallia, Erianthus,* and *Chamærops;* the *Sabal pumila,* (false palm;) *Olea americana,* (American olive;) *Ixia celestina, Pursh, Heliotropium indicum* and *europeum; Jussiuea grandiflora; Chiococca racemosa; Pinkneya pubescens,* &c. &c.

The botanist will at once observe in this region, the out-crops, if I may so term it, of a tropical vegetation; and we find the same, or closely allied, species, in South America and in the West India Islands. Hence the richness of its foliage and its flowers, and the greater number of species found here. In the latter respect, the

United States forms no exception to the observation which applies to other parts of the globe, viz: that in approaching the tropics the vegetable forms become not only more rich in their colouring, and more luxuriant in their growth, but also that the number of the species is greatly increased. To confirm what has just been said, I need only repeat, that Mr. Elliott, in his Flora of South Carolina and Georgia, enumerates as found in these two states alone, about 300 more Phenogamous plants, than belong to all the Northern and Middle States. It may also be added, that of 619 genera, described by Elliott as belonging to South Carolina and Georgia, 132 are not found in the Flora of the Northern States; and that of 592 genera enumerated in Torrey's Compendium, 73 are not found in the work of Elliott, though some of these occur in Virginia.

Proceeding to the North, the species just cited as characteristics of the Southern vegetation, gradually disappear; and as we reach Virginia, we meet with other forms indicative of a more northern region. This may be said to be the neutral ground between the north and the south, and does not assume the decided character of either.

As we reach Pennsylvania, New-Jersey, and New-York, a change in the aspect of the forests is observable. The *Pinus rigida, L.* (pitch pine,) *Pinus strobus, L.* (white pine,) *Pinus canadensis, L.* (hemlock spruce,) which in the south are confined to the mountainous ranges, and then stinted in their growth, rise to their native height on the lowlands. The same may be said of the *Pinus alba, Aiton,* (white spruce,) *Pinus nigra, Aiton,* (black spruce,) and *Pinus microcarpa, Lamb. P. pendula,* (red and black larch.) Here, on the banks of streams, in marshes and elsewhere, are the *Thuya occidentalis, L.* (white cedar,) *Betula papyracea, Mich. B. populifolia, Aiton,* (white birch,) *Betula lenta, L.* (black birch,) and *Betula excelsa, Aiton,* (yellow birch,) which, if found at all in the Southern States, are confined to the Alleghanies. Of the smaller trees, the Willows are also peculiar in this respect. Of from 40 to 50 species, at present known as belonging to the United States, not more than six are found much south of Pennsylvania; and Mr. Elliott remarks, that the *Salix nigra, L.* (black willow,) is the only species which is found in the low country of Carolina, except the exotic, *S. babylonica,* and the *S. vitellina,* which are occasionally cultivated in gardens. Among other plants, peculiar to the Northern Atlantic region, may be named *Xylosteum ciliatum, Pursh, Diervilla canadensis, Rhodora canadensis;* several species of *Ribes, Celastrus,* *scandens, Scheuchzeria palustris;* several species of *Epilobium, Pyrola* and *Hudsonia,* which are not represented in the Southern region, if we except a single species of *Epilobium,* found on the mountains.

In passing to the west from the Alleghanies, new vegetable forms appear, though a similarity of latitude prevails. This difference becomes striking as we cross the Mississippi. In the forests we now find an abundance of the *Celtis crassifolia,* (hack berry,) *Acer negundo,* (ash leaved maple,) *Quercus macrocarpa,* (over-cup-oak,) *Asimina triloba,* (papaw,) several species of *Aesculus,* (buckeye,) viz: *Ae. flava, pavia, macrostachya,* &c. the coffee tree, *Gymnocladus canadensis, Gleditschia triacanthos,* (honey locust,) *Juglans olivæformis,* (peccan,) and *J. nigra, Cercis canadensis,* (red bud;) and on the banks of streams, *Salix longifolia, Populus angulata,* (cotton wood.) These, although not all peculiar to this section, form prominent features in its vegetation. Among the more rare productions of the Western forests, we may also mention the Yellow Wood, or Bois d'arc, *Maclura aurantiaca, Nutt.* extending westward to the banks of the Little Missouri, and which is so extensively employed by the natives of that section. Among the more humble plants, the splendid *Rosa rubifolia, R. Brown,* which is abundant on the margins of prairies, may be adverted to; as also several species of *Monarda, Penstemon, Oenothera and Nuttallia, Troximon glaucum, Nutt.* and *T. marginatum, Collinsia verna, Mahonia aquifolum, Nutt. Glycyrrhiza lepidota, Nutt.* (wild liquorice,) found at St. Louis, on the Platte river and Rocky Mountains, and several species of *Verbena,* &c. &c.

This varied and interesting vegetation, continues until we reach the chain of mountains which traverse the Western part of our continent, on which, among many alpine plants which are found on the mountains in the Eastern part of this continent, in Europe, and in Asia, are some which are peculiar. But, as has been remarked, our knowledge concerning this tract, is still too limited to warrant any general remarks or comparisons.

It would be interesting to notice the features of the vegetation in the states on the Gulf of Mexico, viz: Alabama, Mississippi and Louisiana, and to compare them with those of Georgia and South Carolina; but we are still in want of materials for this purpose. Yet, as far as I can judge from a catalogue published under the directions of Mr. Cornelius, a great similarity prevails; and it is probable, that this continues westward to the mountains of Mexico.

In tracing the peculiarities of vegetation of the portion of the United States west of the Alleghanies, one circumstance should be remembered, as having a marked and powerful influence. It is, that this territory is watered by a magnificent stream, which holds a southerly course, through 20 degrees of latitude, to the Gulf of Mexico—that this stream is fed by numerous tributaries from various parts of the Rocky Mountains on the west, and from the Alleghanies on the east, which pour into it the waters of the western part of New-York, as well as those of the mountains of Oregon. When we reflect what a vast number of plants flourish on the banks of these various streams, and that seeds are carried by the waters, and become fixed in the banks at other and distant places, we should not wonder if an uncommon uniformity of vegetation prevailed throughout this extensive region;—uncommon, when compared with tracts of similar extent in other parts of the globe. An attention to this prominent feature in the geography of the western part of the United States, will also account for the fact mentioned by many travellers, that certain tropical forms reach a more northern latitude here than on the coast—and for the want of which, erroneous views have been entertained concerning its climate.

I have purposely omitted to notice, until the present time, the vegetation upon our mountainous tracts. It is now well established, that "vegetation, in ascending above the level of the sea, undergoes modifications, analagous to those which attend its progress from the line to either pole. With this distinction, that in the last case, the phenomena succeed by almost imperceptible gradations, while they crowd upon and follow each other in rapid succession, on the ascent of mountains. The height of 4 or 5000 yards in the hottest parts of the globe, produces changes as distinct as the 2000 leagues or more, which lie between the equator and the polar regions." *(Mirbel, in the 2d volume of Brande's Journal.)*

Observations of this kind, however, have been greatly extended by Humboldt and Bonpland, and by Decandolle. It has been estimated by the latter, that in the climate of France, 180 or 200 yards of elevation, act upon the mean temperature nearly in the ratio of a degree of latitude.

In our own country, the observations upon the vegetation of the mountains have not, heretofore, been conducted with all the accuracy necessary to a full developement of this subject. But as far as can be judged from the materials which we possess, the same remarks will apply. It has already been stated, that in South Carolina and Georgia, various species of Pine, which in this latitude are found on the low lands, are there confined to the summits of the mountains. Drs. Bigelow and Boot, found on the summit of the White Hills, in lat. 44° 15′ N. at 6000 feet above the level of the sea, natives of Lapland, Greenland and Labrador; as *Epilobium alpinum*, L. *Empetrum nigrum*, L. *Ledum latifolium*, Ait. *Menziesia cærulea*, Swartz, *Rubus saxatilis*, L. *Diapensia, Lapponica*, &c. So also those who crossed the Rocky Mountains, witnessed the same changes of vegetation.

The botanical examination of high mountainous tracts, whether in tropical or temperate regions, is therefore of extraordinary interest; as it affords, within a small compass, striking illustrations of many leading facts in geographical botany. At the base, vegetation is thrifty, the species are numerous and similar to those of surrounding regions—Upon ascending, these forms become stinted in their growth, and gradually disappear. Others succeed, still more dwarfish and hardy, and in their turn give place to the few representatives of the polar regions, which continue to the limit of eternal snow. In such a journey, therefore, the traveller passes as it were, in quick succession, from the equator to the poles.

A great peculiarity in the vegetation of the United States, and which strikes the traveller as well as the botanist, is the number and variety of its Forest Trees. This will be fully exhibited when we remark, that the single genus of Oak, comprehends within the United States, more species than Europe reckons within the whole amount of its trees. But this subject, together with a notice of the distribution of the Grasses, and other families of plants, will be noticed more in detail hereafter.

ART. IV. *On some Modifications of the* ELECTRO-MAGNETIC APPARATUS. *By* JOSEPH HENRY.

Read October 10, 1827.

The subject of Electro-Magnetism, although one of the most interesting branches of human knowledge, and presenting at this time the most fruitful field for discovery, is perhaps less generally understood, in this country, than almost any other department of natural science.

Our popular lecturers have not availed themselves of the many interesting and novel experiments with which it can so liberally supply them; and, with a few exceptions, it has not as yet been admitted as a part of the course of Physical Studies pursued in our higher institutions of learning. A principal cause of this inattention to a subject offering so much to instruct and amuse, is the difficulty and expense which formerly attended the experiments—a large galvanic battery, with instruments of very delicate workmanship, being thought indispensable. But this bar to the advancement of Electro-Magnetism no longer exists; several improvements having been made in the principles and arrangement of the apparatus, which tend considerably to simplify its construction and use. Mr. Sturgeon, of Woolwich, who has been perhaps the most successful in these improvements, has shown that a strong galvanic power is not essentially necessary, even to exhibit the experiments on the largest scale. On the contrary, he has proved that it may be almost indefinitely diminished, provided the magnetic force be proportionately increased. On this principle he has constructed a set of instruments, with large magnets and small galvanic elements, which from their size and the facility of their operations, are well calculated either for the private study or the public lecture room.*

Mr. Sturgeon's suite of apparatus, though superior to any other, as far as it goes, does not however form a complete set; as indeed it is plain that his principle of strong magnets cannot be introduced into every article required, and particularly into those intended to exhibit the action of the earth's magnetism on a galvanic current, or the operation of two conjunctive wires on each other. To form therefore a set of instruments, on a large scale, that will illustrate all the facts belonging to this science, with the least expense of galvanism, evidently requires some additional modification of the

*Annals of Philosophy, New Series, vol. 12, page 375.

apparatus, and particularly in those cases in which powerful magnets cannot be applied. And such a modification appears to me to be obviously pointed out in the construction of Prof. Schweigger's Galvanic Multiplier:* the principles of this instrument being directly applicable to all the experiments in which Mr. Sturgeon's improvement fails to be useful, and to those only can it be successfully applied. The following description of the figure in *Plate* I. will render my meaning sufficiently clear.

Fig. 1, is an apparatus on the plan of the Multiplier, to show the deflection of a large magnetic needle. It consists of a coil of wire, A B, of an oblong form about ten inches in length and one and a half in width, with a small galvanic element attached to each end; the coil is formed of about twenty turns of fine copper or brass wire, wound with silk, to prevent contact, and the whole bound together so as to have the appearance of a single wire. The attachment of the zinc and copper is more plainly shown in Fig. 2, which represents a coil of only two turns of wire: on the left side of the figure the plates are soldered directly to the ends of the wire of the coil; on the right, the plate of zinc Z, is attached to the part of the wire ending with copper on the other side, while the plate of copper on the right corresponds to the zinc on the left. By this arrangement, we can instantly reverse the direction of the currents, and deflect the needle either to the right or left, by merely holding a tumbler of acidulated water so as to immerse one or the other of the double plates into the fluid. The arrows at B, formed of two pieces of card, are intended to show the direction of the currents, and they should point in the course of the wires going from the copper. N S, is the needle, about nine and a half inches long, made by binding together several watch springs, touched separately, so as to form a compound magnet; at the end are two balls of pith, to shew the movement of the needle more plainly. This instrument is complete in itself, and we receive the full effect of the instantaneous immersion of the galvanic element.

Fig. 3, represents a modification of De la Rive's ring on a large scale. A B, is a coil about nine inches by six, with a small cylinder of copper, enclosing another of zinc, without bottoms, soldered to its extremities, which end at *c*, the whole being suspended by a fibre of raw silk, so as to swing freely in a cup of acidulated water. When this apparatus is made sufficiently light, it invariably places itself, after a few oscillations, at right angles

*See Green's Electro-Magnetism, page 80.

to the magnetic meridian. W and E, are two pieces of card, with letters on them, to show which side of the coil will turn to the east or west: they may be properly placed by recollecting that the current from the copper to the zinc has a tendency to circulate in a direction contrary to that of the sun.

Fig. 4, is designed to show the action of two conjunctive wires on each other; A B, is a thick multiplying coil, with galvanic plates attached, in the same manner as shown in Fig. 2; *c d*, is a lighter coil, with a double cylinder, precisely similar to Fig. 3, and suspended within the other by a fibre of silk, passing through a glass tube, *(a)* the end of which is inserted into an opening *(b)* in the upper side of A B; *e f* are two wires supporting the glass tube. When the cylinder *g* and the plate C are placed in vessels of acidulated water, the inner coil will immediately arrange itself so that the currents in both coils will circulate the same way: if the vessel be removed from C, and D placed in the fluid, the coil *c d* will turn half-way round and again settle, with the currents flowing in the same direction. Instead of the cylinder, a separate battery of greater power may be used, by suspending the inner coil, as shown in Fig. 9; *h h* are cups with mercury—the upper wire should turn on a fine steel point.

Fig's 5 and 6, are front and side views of a modification of an instrument, described by Mr. Sturgeon. It consists of a dipping needle, surrounded by a multiplying coil, turned edgewise, but in all other respects similar to that of Fig. 1. If, when the needle is placed in the magnetic meridian, and the coil in the plane of the dip, a galvanic current be passed through it in a direction opposite to that of the sun, the north end of the needle will turn up, as in Fig. 7; but if in the contrary direction, it will turn down, as Fig. 8. If the coil be placed at right angles to the dip, as shown in the dotted lines, and the current passed in the first mentioned direction, the needle will not alter its position, but will be more firmly fixed in it: if passed in the contrary direction, it will turn half-way round and dip with its south end. The quadrant *q* permits the coil to be readily placed, either in the plane of the dip or at right angles to it.

Art. V. *Notes on Mr. Pickering's "Vocabulary of Words and Phrases, which have been supposed to be peculiar to the United States," with preliminary Observations. By* T. Romeyn Beck.

Read March 18, 1829.

Before a Society composed like the present, it is not necessary to enlarge on the importance of preserving the English Language, whether spoken or written, in its pure state. In what that purity consists, may be the subject of discussion and controversy, but it evidently will resolve itself at last, into that idiom which is in use among the best educated and most enlightened portion of the community. This remark indeed applies to every country, the language of which is not encumbered by dialects. Individuals may be partial to certain words; may deem their omission improper, and may argue that their place cannot be supplied—that no other will convey their precise ideas. But if general custom has dispensed with them, a few voices will not be sufficient to give them currency.

There is however a constant change in all this, agreeing with the mutations to which man and all human works are liable. The popular authors of the last century are no longer the most popular of this: new views are taken of men and things—new modes of expression are invented, and the ever restless and often original mind of man developes untried means by which to convey the ideas which occupy it in such varied profusion. Amidst this alteration, however, there are certain names inscribed on the pages of the history of every nation, to whom all their posterity must do homage and pay deference. The standard writers of a language are, like the guardians of a well ordered state, its preservers from anarchy and revolution. They must be read—and as far as imitation is allowable, must be copied; not with a servile devotion, but a generous emulation. The language they used has been found sufficient to give "a local habitation and a name" to the finest imaginings of poetry and the loftiest flights of oratory. No true admirer would willingly alter it—nor would the idea be tolerated, that it ought to undergo such a change as to render the study of their productions a labour, or even an effort.

Believing then that reason as well as patriotism conspire to teach the importance of a certain degree of stability to a language, it remains to inquire how far innovation, or, if we please, improvement, is proper—Whether the introduction of new words is proper—the revival of obsolete ones, or the remodelling of present ones. With my present object, it is not necessary to go largely into this; but an assertion may be hazarded, that it is apprehended deserves at least some consideration. The warrant to lead in making these changes should be committed to but few. It is not given to many among the host of writers either in this or any other country, fully and completely to understand the multiplied meanings of words; and particularly those which are either foreign or little in use. One of the characteristics of the English Language is its copiousness; and it may be as prudent as it is certainly advisable, first to ascertain the point where its phrases are incapable of expressing the ideas intended to be communicated. Fashion, or the superiority of some great name, sometimes exercises a pernicious influence in this respect. In the days of Dr. Johnson, he sanctioned the introduction of many words from the Latin—In our own time, French words and phrases are thickly strown through the pages of our general literature.

These remarks are only intended as a glance at some of the causes which influence alterations in a language, and as preliminary to a notice of some of the charges which have been made against the citizens of this country, of fostering and increasing innovations in the English Language, as at present in use among the leading writers of Great Britain. By English writers, these are styled *Americanisms*, and they have been noticed with the spirit that characterizes most of the literati of Great Britain when speaking of this country. Overwhelming ridicule and contempt are the elements which form the staple of their criticism, and although in many instances their accusation of coining new words has been found incorrect, by proof that their origin is to be found in some provincial dialect, or some antiquated author, they have seldom had the magnanimity to acknowledge their mistake. This however is merely an objection to the *manner*. The *matter* of their animadversions deserves more serious consideration. Just and necessary, and indeed indispensable, as it is, for us to cultivate all the feelings of an independent nation, yet it behooves us to recollect, that our language is a *derived* one—that our literature is, in one sense, a *foreign* one—and, above all, a living literature, assiduously cultivated in the parent state. The question is, will we conform to it, as it respects language, and thus preserve its harmony and purity, or, allow freedom of innovation. If we permit the last, we shall never arrive at a higher honor than to be placed among those who use dialects. We may, and probably shall, in a few years, present the spectacle of exceeding Great Britain in numbers; but the pride of this annunciation will not be heightened in the mind of any true lover of literature, by the fact, that the most populous nation is introducing words which are unknown to the other.

Views somewhat similar to these have induced several gentlemen in this country to select and notice such words as may be deemed to be improperly used. The utility of this is manifest, as it enables us to view them within a small compass, and properly to impress the necessity of their omission on our minds. Among the best, is to be mentioned the work of Mr. PICKERING of Salem, who in his *Vocabulary or Collection of Words and Phrases, which have been supposed to be peculiar to the United States,* at first read before the American Academy of Arts and Sciences, and afterwards published in a separate volume, has made a most valuable collection, and at the same time shown that in many instances, the charges of English writers are either unfair or unfounded. I have endeavored to familiarize myself with its contents, and occasionally have made notes on certain words noticed by him. These are now presented to the Institute.

To Captivate. "To take prisoner—to bring into bondage." This is the definition given by Dr. Johnson, who quotes Shakespeare, King Charles I. and Locke, as authorities. The Edinburgh Review however, in its notice of Bruce's Mineralogical Journal, published in 1810, says—"Other examples, proving the "alteration to which our language has been exposed, chiefly by "the introduction of *Gallicisms*, may be noticed in the rest of the "Journal, resembling expressions found in American newspapers, "where for *a ship taken* we read of *a ship captivated.*" Mr. Pickering seems to have been surprised at this charge, but he subsequently found the word in Belknap and Ramsay.*

I may add, that the word is used by Mr. Jefferson in the original draft of the Declaration of Independence. (North American Review, vol. 22, p. 392)—"*captivating and carrying them into slavery.*" It is undoubtedly now an obsolete word in the above sense with English writers, yet I have found it in so modern a one, as Dr. Adam Clarke. In his Reflections on the 42d chapter

* Pickering, p. 55.

of Genesis, he says, "The unnatural brethren who sold their brother into captivity are now about to be *captivated* themselves, and the *binder* himself, is bound in his turn."

Citess. This word is noticed by Johnson in the sense of "a city woman," but as peculiar to Dryden. During the stormy period of the French Revolution however, the British Critic, a government Journal, charged the Americans with introducing this new-fangled word into the English language. They were said to have coined it. The sole authority for this charge is the notorious Peter Porcupine, and he puts the authorship of the term on some violent partisans. All this might have passed in 1796, when men's passions were at the height of irritation, but what shall we think of a literary man, repeating the charge some twenty years or more thereafter? In the review of Inchiquin's Letters in the Quarterly, (vol. 10, p. 500,) it is deliberately stated that the Americans hesitated between *citizeness* and *citess* as the translation of *citoyennes.*

Considerable. Dr. Witherspoon animadverts on the manner on which this is used. "*He is considerable* of a Lawyer." It would seem, however, from the following remark, to have been formerly used in a similar way in England.

Speaking of a story of Ligon in a notice of "Southey's Chronological History of the West Indies," the Quarterly Review, (vol. 38, p. 229,) remarks, "*The story is what our old writers would have called considerable.*"

Creek. I mention this word only, to say that we are probably inveterate in diverting it from its old English sense—"a part of the sea which runs into the land."

Thus Milton, (Book 7, line 399,)

> Forthwith the sound and seas, each creek and bay, &c.

We certainly in legislative and other public proceedings, as well as in common language, mean by it a stream smaller than a river. Some of the quotations by Johnson under the word, would seem to permit the present application.

Fall. Autumn. This is certainly not an Americanism, although so charged on us. (Pickering, p. 91.)

Johnson quotes the following lines from Dryden,

> What crowds of patients the town doctor kills,
> Or how *last fall* he raised the weekly bills.

It is remarkable, however, that this is mentioned in one of the earliest accusations brought against this country for coining new words. It is contained in No. 96 of the Mirror, a periodical paper, published at Edinburgh in 1780, and to which Henry Mackenzie, Prof. Richardson, and a number of other Scotch literati, contributed. The article in question was written by Professor Richardson.

"A grave looking man (says he) who sat near me one day at dinner, said a good deal about the *fall*, and of events that should have happened before and after the *fall*. As he spoke also about *Providence and Salem and Ebenezer*, and as great deference was shown to every thing he said, and being as I told you, a grave looking man in a black coat, I was not sure but he might be some learned theologian, and imagined he was speaking about Oriental Antiquities and the fall of *Adam*. But I was soon undeceived. The gentleman had lived for some time in Virginia. By Providence he meant the town of that name in Rhode Island, and by the fall he meant not the fall of our first parents, for concerning them he had not the least idea, but as I suppose, the fall of the leaf, for (he adds) the word is used, it seems, in the AMERICAN DIALECT for autumn."*

Grade. A friend has pointed out to me the use of this word (in the manner charged by English critics as an Americanism,) in one of the Novels of Sir Walter Scott. It occurs in a dialogue between Lord Menteith and Captain Dalgetty. (Legend of Montrose, Chap. II.) The latter observes, "Why truly, an Irish Cavalier, being major of our regiment, and I having hard words with him the night before, respecting the worth and precedence of our several nations, it pleased him the next day to deliver his orders to me, with the point of his battoon advanced and held aloof, instead of declining and trailing the same, as is the fashion from a courteous commanding officer towards his equal in rank, though it may be his inferior in military GRADE."

To Guess. There is no word, for which New-Englandmen are more teased than this. Almost every English traveller notices it as an Americanism. Yet it is certainly more in the manner, in which it is applied—than because the word is not used.—Mr. Pickering quotes several examples in late works (p. 101.) Even

* Since reading this paper, Mr. M. H. Webster has referred me to Governor Pownall's *Topographical Account of the Middle British Colonies in North America*, London, 1776, in which the word is used. Speaking of the climate in the above portion of country, he says, "Its seasons are summer, "autumn, or what the Americans more expressively call the *fall* and win-"ter," and just below he quotes from Dr. Douglas' history, the following: "At the end of August, as the symptoms of approaching winter begin to appear, we call it the fall of the year." Page 44.

a scholar like Sir Wm. Jones, in an essay before the Society at Bengal, when speaking of a doubtful Arabic Couplet, says, "On the whole, I *guess* that the distich should be thus written. "*Asiatic Researches*, vol, 1, p. 4. I am indebted for this reference to Dr. Coxe. (Emporium of Arts, vol. 1. p. 91.)

Illy. The use of this adverb cannot be too frequently condemned, and it is to be regretted that a man of the eloquence and general accuracy in writing, of Mr. Clay, should have given it the sanction of his example, which he did on taking his seat as Speaker, in December, 1817. I have subsequently seen the word used, in some communication to the Legislature of New-York, but did not the time note, and I cannot now recall it.

Immigration. First used by Dr. Belknap. The Quarterly Reviewers do us the honour of approving its use. They say, (vol. 30, p. 39,) "The Americans have judiciously adopted this word from our old writers. It is one which we should not have suffered to become obsolete."

Locate, as a verb. "This word," says Mr. Pickering, "is not "in the English Dictionaries." It is however used. Cumberland in his Memoirs, (p. 318, Amer. Ed.) speaking of Dilly's Entertainments, says, "Here he (Boswell) *has located* some of the live-"liest scenes and most brilliant passages in his entertaining an-"ecdotes of his friend Samuel Johnson." And again, in the Edinburgh Review, (vol. 47, p. 88,) speaking of New South Wales, it is remarked, "that the banks of these rivers are fast filling with "settlements, those of the Hunter, the nearest to the seat of gov-"ernment, being, we understand, entirely *located*."

In the sense usually applied to the word in this country, it is certainly a technical one, with which we cannot dispense.

Mean used for *Means* by President Munroe in his speech, December, 1817—and criticised by Mr. Coleman. This may rather be called an impropriety than an Americanism. Means is now generally acknowledged as both singular and plural.

Narrate, as a verb. This word has never been directly charged as an Americanism, but has been quoted against us in italics. The Quarterly Reviewers in noticing Dr. McCrie's Life of John Knox, object to his using "the abominable verb *narrate*, which must (say they) absolutely be proscribed in all good writing." It is amusing, in the short space of three years, to find this verb used repeatedly by the same reviewers. In vol. 17, p. 304, speaking of Battel, they say, "*There can be little doubt that he believed what he narrated.*" And again, (vol. 18, p. 539,) "Mr. Sharpe's industry has traced some curious particulars of James Russel, who so coolly *narrates* his own share in this horrible transaction."—*Narrate* is also used by the Rev. Mr. Raffles in his Tour on the Continent. "To explain and *narrate* the story of these unparalleled wonders." (p. 279.) Also in the Foreign Quarterly Review, vol. 1, p. 92.

Nationality. Mr. Pickering says this is used by some writers in America—but although a new word, he has once met with it in the Quarterly Review *in italics*. It is used in the same way in the Edinburgh Review, vol. 6, p. 131. "It is therefore with peculiar regret that we are compelled to advert to the *nationality* of Messieurs Bory & St. Vincent." Dr. Webster also quotes it as used by Boswell.

Respectability. This is a modern word, not to be found in Johnson. It appears to have been used by Cumberland and Kett (*Webster*) and is adopted in the Edinburgh Review, vol. 17, p. 440. It is, however, I apprehend, in more common use in writing in this country than in England.

Sources, as a verb. This is used (certainly improperly) by Mr. Nuttall in his Journey to the Arkansa. (p. 158.) "The main south branch (the Canadian) sources with Red River." Mr. Nuttall is an Englishman by birth, but has been so long resident in this country, that by a species of argument very familiar to reviewers, it may hereafter be called an *Americanism*.

Starvation. This word is neither in Johnson, Webster, or Worcester's Johnson & Walker, and yet it is in general use. I have somewhere seen it mentioned, but cannot state the place, that this word was introduced by Henry Dundas, (afterwards Lord Melville) at the period of the Revolutionary War.

Tarry as a noun. This word is sometimes used in conversation, as "During my tarry in this place," but is not to be found in any dictionary which I have examined. In the London Courier Newspaper of July 7, 1817, it is mentioned that the "Duke of Wellington was on his arrival (at some place) received by a guard of honour, and the band of the 88th continued to play during his Grace's *tarry*, which was merely to take some refreshment."

Art. VI. *On the Uvularia grandiflora, as a remedy for the bite of the Rattlesnake. By* James G. Tracy.

Read February 29, 1828.

It has been long known that the Indians made use of a vegetable remedy for the bite of the rattlesnake, but there appears to be much uncertainty respecting the plant resorted to for this purpose, I believe no description has yet been published by which it can be distinguished.

The Commissioners for settling the boundary line between the United States and the British Possessions were engaged in August, 1820, in the survey of the Islands near the head of Lake Erie. Among their attendants, was a hunter, named Hank Johnson. This person is a white, who while a child, was captured, during the revolutionary war, by the Seneca Indians, in the western part of Pennsylvania. He has ever since remained among them; been adopted as one of the nation, and to which indeed his habits, dress and appearance conform, and he is now one of the chiefs of that part of the Senecas who reside on the Cattaraugus Creek. In the late war, he attached himself to the forces under the command of General Porter, on the Niagara frontier, and particularly distinguished himself at the battle of Chippewa and at the sortie from Fort Erie, by his strength, courage and fidelity, and in the former action, probably saved the life of Major Frazer, who being wounded, was carried by him on his back to a place of safety.

At the period abovementioned, one of the men in the employ of the commissioners was bitten by a rattlesnake, and Hank was applied to for assistance. He immediately collected some plants, and gave to his patient a decoction of the roots and leaves; and after chewing, they were also bound upon the wound. No other remedy was administered, and the man recovered.

Soon after this a dog, belonging to one of the party, was bitten severely by a rattlesnake in the head and tongue. Hank was absent at the time, and before his return, some hours after, the animal was excessively swollen, and apparently near dying. The same remedy was then applied, by pouring a decoction of the plant down his throat, and binding the roots and leaves on the wounds, and the dog very rapidly recovered.

On hearing these circumstances related by General Porter, W. A. Bird, Esq. and Major Frazer, (all engaged on the commission) and the plant minutely described by them, I had little doubt that it was the Uvularia grandiflora, and collected some specimens of that plant which those gentlemen examined. All of them pronounced it to be the same plant which had been so successfully used under their observation. Its identity was afterwards still further established by a specimen, which it was found General Porter had preserved at the time the cures were performed.

Those persons who are generally acquainted with the plants which are found in the northern states, will agree with me in opinion, that no person of ordinary observation could mistake the perfoliate uvularia for any other plant; and the height of this being described as two feet, determines it to be the U. grandiflora, which alone of the perfoliate uvularias reaches that height.

I therefore think that the concurring opinions of the gentlemen whom I have named, is conclusive proof that the plant I submitted to their examination must be the same with that which was made use of by Hank, and which is the

Uvularia grandiflora—*Smith.*
U. —— lanceolata—*Willdenow.*
U. —— perfoliata β major—*Michaux.*

a plant familiar to every botanist, and very generally diffused.

I am aware that the bite of a rattlesnake is not always fatal, even if the wound be entirely neglected, but there is every reason to believe that the usual remedy was resorted to on this occasion; and at a season of the year when the bite of a rattlesnake is known to be peculiarly dangerous, it is hardly possible that the man and dog could have both recovered without some powerful aid.

DESCRIPTION.

UVULARIA, corolla inferior, 6-petalled, erect; claws of the petals each furnished with a nectariferous cavity. Filaments very short, growing to the anthers; stigmata reflected, capsule 3-angled, 3-celled, 3-valved, valves septiferous in the middle; seeds many, subglobose, arillate at the hilum.—*Nuttall's Gen.*

U. *grandiflora*, leaves perfoliate, oblong, acute; petals smooth within; anthers somewhat obtuse; nectaries roundish.—*Smith Ex. Bot.*

U. *perfoliata* major.—*Michaux Fl.*
U. *lanceolata.*—*Willd. Sp. pl.*

Hab.—Shady hills, in fertile soil, and among rocks: from Canada to Carolina.

It has a general resemblance to Solomon's Seal: leaves alternate, smooth and perforated by the stem, which is forked near the top: bearing one, rarely two, drooping liliaceous yellow flowers early in May.

ART. VII. *An Examination of the Question, whether the Climate of the Valley of the Mississippi, under similar parallels of Latitude, is warmer than that of the Atlantic Coast? By* LEWIS C. BECK, M. D.

Read before the 2d Department, Sept. 1, 1823.

CLIMATE is a subject which has always excited the deepest interest, and claimed the most profound attention. This will not appear extraordinary, when we reflect how great a portion of our comfort and happiness is dependent on it. Notwithstanding this, it is as yet but partially understood; many of its laws have eluded the most diligent search of philosophers, and remain clouded in obscurity.

The fundamental principle, that the temperature of any climate depends chiefly on latitude or distance from the equator, is in the main correct. But there are also many known and unknown causes by which it is materially affected. Among the former, may be mentioned the peculiar configuration of the country, whether low or elevated, the extent of the continent, nature of the soil, whether cultivated or in a state of nature, the proximity of mountains, plains, forests, lakes, and seas, and the course of winds. These however will not account for many of the phenomena which occur, and hence they are only recorded as facts beyond our present knowledge of causes.

The influence of the causes above enumerated, which may be called *local*, has always been deemed by theorists much less considerable in the eastern, than in the western continent. Hence the opinion that their climates are materially different has received universal sanction. It is now, however, rendered certain, by the extensive observations and diligent researches of Baron Humboldt, that the difference is much less than has been usually stated.

Various other theories, concerning the climate of different continents and concerning that of different parts of the same continent have in like manner gained currency without any well attested facts to support them. And among these, not the least curious or extraordinary is that which I now propose to consider, viz.: that the climate of the Valley of the Mississippi is much warmer, under similar parallels of latitude, than that of the Atlantic coast. This was first advanced, as we shall presently discover, by Mr. Jefferson, and was afterwards advocated by Volney, Williamson, and others. The arguments adduced in its support appeared so plausible, that it was received as an axiom by almost all subsequent writers upon the western country. I must however remark, that Dr. Drake and Mr. Darby,* authors of great merit, have each combatted this theory, as opposed to fact and observation.

In common with many others, I adopted this opinion, in consequence of the high reputation of its advocates, and without the least examination of the facts upon which it rested. I always, however, considered it a phenomenon so curious and interesting as to deserve a more minute investigation, and a more ample explanation. Accordingly upon my removal to the western country, I determined to direct my attention to this subject, and during my residence there, I obtained more accurate information concerning its climate than has hitherto been published. On comparing the results of my observations with similar ones on the Atlantic coast, I was furnished with ample testimony to prove the similarity, in this respect between these two different sections of the United States. These observations and comparisons, it is my design now to unfold; but, previous to doing this it will first be necessary to examine, and expose the fallacy of, the arguments adduced in support of the superior temperature of the climate of the valley of the Mississippi.

It is, I believe, to Mr. Jefferson that we are originally indebted for this theory, in regard to the difference in the temperature of the climate in various parts of the United States. In his "Notes on Virginia," this learned author observes: "It is remarkable that, proceeding on the same parallel of latitude westwardly, the climate becomes colder, in like manner as when you proceed northwardly. This continues to be the case, till you attain the summit of the Alleghany, which is the highest land between the ocean and the Mississippi. From thence descending in the same latitude to the Mississippi, the change reverses; and, if we may believe travellers, it becomes warmer there than it is in the same latitude on the seaside. Their testimony is strengthened by the vegetables and ani-

* The former in his 'Picture of Cincinnati,' and the latter in his 'Emigrant's Guide.'

mals which subsist and multiply there naturally, and do not on our sea-coast. Thus, Catalpas grow spontaneously on the Mississippi, as far as the latitude of 37°, and reeds as far as 38°. Perroquets even winter on the Sciota in the 39th degree of latitude. In the summer of 1779, when the thermometer was at 90° at Monticello, and 96° at Williamsburgh, it was 110° at Kaskaskia."*

It appears, therefore, that the author depends for the proof of this position, *first*, upon the testimony of travellers, and *secondly*, upon the growth and existence of certain vegetables and animals. I shall examine each of these points somewhat in detail, in order to ascertain whether they really furnish any evidence in favor of the theory here advanced.

The early works upon that portion of country, now the western section of the United States, contain few observations concerning the climate, and none which at all assist us in the investigation of this subject. This will not be a matter of surprise, when we consider that they generally consist of the journals or narrations of travellers, who passed rapidly over the country, and who were scarcely able to give correct descriptions even of roads or rivers. It would be unnecessary at this time, to enumerate these different authors, or to quote their imperfect and unsatisfactory remarks. Suffice it to say, they furnish no data upon which the theory under consideration could have been founded. If Mr. Jefferson depended upon the oral testimony of travellers, which he did not deem proper to publish, as we have no means of examining it, we cannot be expected blindly to subscribe to its authenticity.

But our author further states that the testimony of these travellers "is strengthened by the vegetables and animals which subsist and multiply naturally" on the Mississippi, "and do not on the sea-coast." Although the fact here stated concerning animals and vegetables is undoubtedly correct, it is difficult to discover in what manner it warrants the inference which has been drawn from it. Different countries, and even different sections of the same country, have peculiarities in their botany and zoology, entirely disconnected with climate. Not only several species, but entire genera, which are found under the temperate zone on the eastern continent, have never been found in any part of the western, and vice versa. Thus also, many which are found on the Atlantic coast of the United States, have never been observed in any part of the valley

* Notes on the State of Virginia, page 125, London edition.

of the Mississippi, and hence it is not remarkable that the reverse is also true. Examples abound in every systematic botanical work.

Granting however for a moment to this fact, abstractedly considered, all the importance which Mr. Jefferson has ascribed to it, let us proceed to a particular notice of the plants and animals, which he enumerates as examples.

1. *The Catalpa.** This tree is said to be a native of Japan; and according to Mr. Nuttall, a botanist of great accuracy, is rarely to be met with decidedly indigenous, in the United States. He observes, that it "appears to have been introduced by the *aborigines;* hence its name is 'Catawba,' derived from a tribe of Indians residing on the Catawba river. In most of the *habitats* of this tree, given by the younger Michaux in his "*Arbres Forestiers,*" which I have visited, if existing at all, it had evidently been introduced. I am informed, however, by Governor Harrison of the indubitable existence of this tree in very considerable quantities in the forests of the Wabash, Illinois territory, where its wood is even split for rails; still even here it is extremely local, and I have never once met with it, either on the banks of the Ohio, the Mississippi, or the Missouri rivers, which I have ascended or descended thousands of miles. In the warmer states it does not appear to grow with any degree of vigour."† In Dr. James' account of Major Long's Expedition from Pittsburgh to the Rocky Mountains, we find the following remarks: "About half way between the mouth of the Cumberland and Tennessee, near the old deserted settlement, originally called Smithland, are several large Catalpa trees. They do not, however, appear to be native, nor have we here or elsewhere been able to discover any confirmation of the opinion, that this tree is indigenous to the United States."‡ I can also myself corroborate the facts stated by Mr. Nuttall and Dr. James; for although I have travelled over a considerable portion of the states of Illinois and Missouri, and ascended and descended the Ohio, Mississippi, and Illinois, I have never observed this tree except in situations where it was evidently introduced; such as the immediate vicinity of towns, villages, or settlements. From

* Catalpa syringæfolia, *Sims in bot. mag.* 1094.
Catalpa cordifolia, *Elliot. Bot. North Car. & Georgia, vol.* 1. p. 24.
Catalpa bignonioides. *Walt. fl. car.* p. 64.
Bignonia Catalpa. *Willd. sp. pl.* 3. p. 289.

† Nuttall's Genera of North American Plants, vol. i. p. 10.

‡ Vol. i. page 35.

this, however, no argument can be drawn in regard to the climate, for it flourishes also in the vicinity of Philadelphia,* New-York,† and Albany; the last of which is in latitude 42° 39′ N., about nine minutes north of the northern boundary of the state of Illinois. It is moreover cultivated with success in different parts of Europe.

But admitting as has been asserted by some authors, that this tree is indigenous to the United States, it can easily be made apparent that this affords no proof, that in the basin of the Mississippi the temperature of the climate is higher than on the Atlantic coast.

According to the younger Michaux,‡ "in the Atlantic states, the Catalpa begins to be found in the forests on the banks of the river Savannah, near Augusta, in Georgia; and west of the Alleghanies, on those of the Cumberland, between the 35th and 36th degrees of latitude. Further south it is more common, and abounds near the borders of all the rivers which empty into the Mississippi, or which water the province of West Florida." He further remarks: "I have been assured that it is particularly abundant on the Escambia or Conechu, which discharges itself at Pensacola. It is remarkable that the Catalpa should not exist in the lower part of the Carolinas and of Georgia and East Florida, which lie so near the country of its natural growth, and where stocks that have been planted for ornament about the houses shoot with extraordinary vigour."

In treating of this tree, Mr. Elliott, in his "Sketch of the Botany of South Carolina and Georgia," observes that it grows in the middle and upper parts of these states, along the margins of rivers.§

The Catalpa, therefore, if at all indigenous to the United States, is extremely circumscribed in its locality, and its appearance depends upon causes in no way connected with climate; for on the sea-coast it is not observed north or south of South Carolina and Georgia, whereas in the interior, it is found on the Wabash river, at least six or seven degrees farther north. Certainly there can be no similarity of climate between these two sections of our country.

* Barton's Compendium Floræ Philadelphicæ, vol. i. p. 9.

This author appears to favour the opinion that the Catalpa is found indigenous in the vicinity of Philadelphia.

† Torrey's Catalogue of the Plants of New-York, p. 11.

‡ See his North American Sylva, vol. ii. p. 63.

§ Vol. i. page 24.

2 *The Reed or Cane.** This plant which is also alluded to by Mr. Jefferson, is found in the greatest abundance on the alluvions of the Mississippi, where it forms the most impenetrable breaks, and extends to latitude 38° N. On the coast, it is not only more rare, but is confined to the most Southern sections of the United States. And hence it affords no correct criterion by which to judge of the climates of the countries in which it is found.†

3. *The Paroquet.*‡ According to Wilson, this bird is found *resident* on the banks of the Mississippi and Illinois rivers as far as latitude 42° north. East of the great range of the Alleghanies however, it is seldom observed north of the state of Maryland; although a few straggling parties have occasionally been seen in the valleys of the Juniata, and according to some, even twenty-five miles to the northwest of Albany, in the state of New-York.§ "But such accidental visits furnish no certain criteria by which to judge of their usual extent of range; those aerial voyagers, as well as those who navigate the deep, being subject to be cast away, by the violence of the elements, on distant shores and unknown countries."

The residence of this species in these northern latitudes, is a sufficient proof that it is a very hardy bird, more capable of enduring cold than most of its tribe. This is further corroborated by the fact that the celebrated ornithologist above named, saw them "in the month of February, along the banks of the Ohio, in a snow storm, flying about like pigeons and in full cry.||

The preference however, which this bird gives to the western countries, does not depend upon the superior mildness of the cli-

* Miegia macrosperma, *Pers. ench.*
Arundinaria macrosperma, *Mich. fl.*
Arundo gigantea, *Walt. fl. Car.*

† Dr. Drake, in treating of this subject in his valuable "Picture of Cincinnati and the Miami country," observes: "The reed or cane, which, I believe, has not been found east of the Big Sandy, was probably brought to this latitude by that river, together with the Licking and the Kentucky. Finding a saline, fertile soil, it became naturalized, as it no doubt would in the dry alluvial lands of the Potomac. There is certainly nothing in the coldness of the climate along that river to prevent it; for in the winter of 1796—7, in a part of Kentucky where the cane once grew luxuriantly and where it still exists, the thermometer between the 22d December and the 16th January, sunk many times below cipher, and once fourteen and a half degrees beneath that point, without destroying the vegetable." Page 120.

‡ Psittacus carolinensis. The principal facts concerning the history of this bird I have borrowed from Wilson's ornithology; a work too well known and too highly celebrated to need any encomium.

§ Barton's Fragments, &c. p. 6. introd.

|| I have myself seen in the month of March, on the banks of the Illinois, in latitude 40 deg. N. flocks of these birds flying about in the same manner, and that too when the weather was cold and unpleasant and during storms of snow and sleet.

mate, but upon other, though not less powerful causes. Among these are the rich and extensive alluvions of the rivers and creeks, and the deep and almost impenetrable swamps, which are covered with the sycamore or buttonwood,* the beech,† hackberry,‡ cypress,§ and the cockle burr ;‖ the fruits of which constitute its favourite food. To these may be added the number of salines or salt licks in the west, about which Mr. Wilson remarks, he never failed to see flocks of paroquets.

Hence it appears that food more than climate determines their choice of country: this is further proved by their local attachments. "Even in the states of Ohio, Kentucky, and the Mississippi territory, unless in the neighborhood of such places as have been described, it is rare to see them. The inhabitants of Lexington, as many of them assured me, scarely ever observe them in that quarter. In passing from that place to Nashville, a distance of two hundred miles, I neither heard nor saw any, but at a place called Madison's lick. In passing on I next met with them on the banks and rich flats of the Tennessee river; after this I saw no more till I reached Bayou St. Pierre, a distance of several hundred miles."

In addition to these facts, it may be mentioned that this bird was originally an inhabitant of the tropical regions, and must have migrated through the valleys of the Ohio and the Mississippi; and that it gradually ascended to the north as it acquired vigour to withstand the effects of the climate. From all these circumstances, I think it may be safely inferred, that the present residences of the paroquet establish no correct standard by which to judge of the comparative temperature of the climate on the sea-coast and in the basin of the Mississippi.

From all therefore that has been advanced concerning the arguments of Mr. Jefferson in favor of this theory, I think the following results are naturally deducible, viz:

1. That the earlier works upon the western country contain no facts from which any correct inferences can be drawn, in regard to the climate.

2. That the appearance of certain vegetables and animals in the valley of the Mississippi which are not observed on our sea-coast, may depend upon causes totally disconnected with climate.

* Platanus occidentalis, *Lin.*

† Fagus ferruginea, *Lin.*

‡ Celtis occidentalis, *Lin.*

§ Cupressus thyoides, *Lin.*

‖ Xanthium strumarium, *Lin.*

3. That the *Catalpa*, if indigenous to the United States, is only found so in the Carolinas and Georgia on the coast, and on the banks of the Wabash in the interior, six or seven degrees north of the former, and can establish no standard by which to ascertain the comparative temperature of the climate of these different sections : if introduced it proves rather the converse of Mr. Jefferson's theory, as it is found in the vicinity of New-York, more than three degrees north of the northern limit which he has assigned for it on the Mississippi.

4. That the *reed* is comparatively rare in the United States, except in the valley of the Mississippi, and that its occurrence here does not depend upon the superior mildness of the climate.

5. That the *paroquet* is found resident in the valley of the Mississippi as high as latitude 42° north, and that it is capable of enduring almost any degree of cold ; and that its preference to this region depends upon the greater abundance of its favourite food.

Proceeding in the history of this theory we come next to the observations of M. Volney, a French traveller, who visited the United States in the year 1795,*—a man of science and observation, who came hither to study our climate, laws and inhabitants, and "to try," as he expresses himself, "whether a sincere friend of that liberty, whose name had been so profaned, could find for his declining years a peaceful asylum, of which Europe no longer afforded him any hope." His work throughout bears the impress of genius ; but it is to be regretted that many of his opinions have been rashly adopted, and betray not only a limited knowledge of facts, but a great want of judgment and discrimination. He often exercises his ingenuity at the expense of truth, and bends the observations he made abroad to suit the theories which he had formed at home. Without citing other instances, his remarks on the subject now under discussion, will abundantly prove the correctness of these assertions.

By a reference to Volney's "View," we find as the text to one of his sections on climate, the following assertion, viz : "*The climate of the basin of the Ohio and of the Mississippi is less cold by three degrees of latitude than that of the Atlantic coast.*"† From the unqualified manner in which this is introduced, it might natur-

* View of the climate and soil of the United States of America, &c. by C. F. Volney.

† Page 142, London Edition.

ally be inferred that it either had been, or was about to be, most satisfactorily proved. But on the contrary, we are not a little astonished to find, that after observing, that "this is one of those singularities that deserve so much the more attention, as I do not know that it has ever yet been described with all its circumstances" the author adds, "for the principal fact I shall borrow the words of Mr. Jefferson in his notes on Virginia."

Subsequent to this quotation, which is contained in a former part of this paper,* and upon which I have animadverted at some length, M. Volney, "*as a traveller*," adduces testimony in confirmation of the assertion of Mr. Jefferson.

And here I would again observe, that we should receive with great caution the opinions of one who appears before us in this capacity, on the subject of climate, the elucidation of which not only requires attentive examination, but a lengthened series of observations. Prejudice, and preconceived and hastily adopted notions, often warp his judgment, and prevent him even from drawing correct conclusions from the *morceaux* of facts which he may chance to collect in the course of his tour. But lest the charge of illiberality should be made for the application of these remarks to the author under consideration, I shall present the "*principal results*" of the notes which he collected in his journey from Washington on the Potomac to Fort Vincents,† on the Wabash; and, in justice to him and to my readers, I shall use his own language.‡

"1796, May the 5th, the first strawberries at Annapolis, on the shore, and at the level of the sea.

"May the 12th, the first at Washington, where the land is somewhat higher.

"May the 30th, the first at Fredericktown, at the foot of Blue Ridge, about a hundred and twenty feet above the level of the sea.

"June the 6th, the first strawberries in the valley of Shenando, west of Blue Ridge, and perhaps three hundred yards above the level of the ocean.

"July the 1st, at Monticello the seat of Mr. Jefferson, the wheat harvest commenced on the lower slopes of South-west mountain, facing the south and south-east; while on their backs, having a north-west aspect, toward Charlottesville, it did not begin till the 12th or 14th.

* See page 35.

† Now Vincennes.

‡ Volney's View, pages 143—4—5.

"July the 10th, harvest at Rockfish gap, on the summit of Blue Ridge, at an elevation of eleven hundred and fifty feet. It was two days earlier in the valley of Staunton, about two hundred and thirty feet lower.

"July the 12th, harvest on Jackson's mountains, at an elevation of more than two thousand two hundred feet.

"July the 20th, harvest on the Alleghanies, at an elevation of two thousand six hundred feet.

"In this ascending line we find it uniformly more backward in proportion to the height of the level.

"On descending the other slope of the Alleghanies, that to the west, I found, that at Green Briar, situate in a low plain, it took place five days earlier, on the 15th of July.

"In the valley of the Great Kenhaway, at the mouth of Elk river, it began on the 6th.

"At Gallipolis, a French settlement on the Sciota, on the 11th.

"At Cincinnati, farther north, on the 15th.

"I found no wheat at Fort Vincents on the Wabash, where a preference is given to Indian corn, tobacco, and cotton, products characteristic of a hot country.

"On the first of July harvest had commenced at Kaskaskias on the Mississippi, as it had done at Monticello."

In the above quotation, the only fact that has any bearing upon this question, is one that is directly in opposition to the theory which it is intended to confirm, viz: that the harvest commenced at the same time, at Monticello, east of the Alleghanies, and at Kaskaskia, on the Mississippi; places which, as he afterwards observes, are both in the same latitude and at an elevation nearly the same.* The trifling differences in vegetation which he noticed as he ascended the Alleghanies will not appear at all surprising to those who are acquainted with the effect of elevation upon the temperature of a climate; and those still more trifling ones on the Ohio, are such as would naturally occur on a stream having a southern course. Indeed our author himself, in reviewing the phenomena which he has detailed, is not satisfied of their importance, and even admits that they can all be accounted for in the manner above mentioned. "Still I am far from denying," says he, "that in the western country several phenomena of temperature and vegetation occur, which neither the elevation nor the aspect is sufficient to explain. Among

* Page 146.

the first in rank of these phenomena, is one observed within these few years by botanists, which every day confirms; on comparing the places in which certain trees and plants grow spontaneously on the east and on the west of the Alleghanies, they have discovered that there is a general and uniform difference, equivalent to three degrees of latitude in favour of the basin of the Ohio and Mississippi; in other words, those trees and plants, which require a warm climate, and winters less cold and of shorter duration, are found three degrees farther north on the west of the Alleghanies, than to the east on the Atlantic coast: thus cotton, which succeeds at Cincinnati and Fort Vincents, in the latitude of 39°, has not yet been found capable of cultivation in the Carolinas farther north than 35° or 36°. It is the same with the catalpa, sassafras, papaw, pecan or Illinois nut, and many other trees and plants, a particular enumeration of which, would require more skill in this branch of natural history than I possess."*

As this is merely an extension of the argument of Mr. Jefferson, and as M. Volney not only confesses his partial knowledge, but evinces his total ignorance of plants, I should not have noticed his remarks, had he not insinuated that he was quoting the language of standard botanical authors. It will therefore be necessary to examine the history of those plants which are said to be found "three degrees farther north on the west of the Alleghanies, than to the east on the Atlantic coast."

1. *Cotton.*†—Botanists and agriculturalists inform us that this plant does not require a great degree of heat; and from the experiments that have already been made, no doubt remains that it may be cultivated in any part of the temperate zone. It is found to succeed not only in the states of Virginia and Maryland, but in the vicinity of the city of New-York, in latitude 40° 40′. Ascending to the north it becomes gradually more hardy, and at length is in a great measure, habituated to the climate, suffering however, as it does in all other situations when an unusual degree of cold prevails. Perhaps, indeed it will never constitute an article of commerce in any of the northern states,‡ but in all probability a sufficient quantity will be raised to supply the wants of the inhabitants.

* Volney's View, pages 146—7.

† Gossypium herbaceum, *Lin.*

‡ I have seen it cultivated in small quantities in different parts of Ohio, Indiana, Illinois, and Missouri, but it seldom arrives at maturity more than once in two or three years.

The reason why this plant has hitherto appeared to succeed better in the valley of the Mississippi is, that the inhabitants have paid greater attention to its cultivation, in consequence of the exorbitant price they were obliged to pay for it if obtained from the eastern or southern markets. Now, however, it is clearly demonstrated that under similar parallels of latitude on the coast, the climate is equally favourable to its growth.

2. *The Catalpa.*—This plant has already been noticed and nothing further need be added in this place.

3. *Sassafras.**—This is found abundantly in all the northern states, on the coast, and also in Canada.† Michaux observes, that "from Boston to the banks of the Mississippi, and from the shores of the ocean in Virginia to the remotest wilds of Upper Louisiana beyond the Missouri, comprising an extent in each direction of more than 1800 miles, the sassafras is sufficiently multiplied to be ranked among the most common trees."‡

4. *Papaw.*§—According to Pursh, this tree is found on the overflowed banks of rivers, from Pennsylvania to Florida. It is not uncommon in the bottoms which stretch along the rivers of the middle states; but it is most abundant in the rich valleys intersected by the western waters, where at intervals it forms thickets exclusively occupying several acres. In Kentucky and in the western part of Tennessee, it is sometimes also seen in forests where the soil is of luxuriant fertility, of which it presents an infallible proof.||

5. *Pecan.*¶—This tree is found on the banks of the Ohio, Mississippi, and other western streams,** and is peculiar to them; having never been found east of the Alleghanies. According to the younger Michaux, it is not seen east of Louisville on the Ohio. The elder Michaux learned from the French inhabitants, who ascend the Mississippi in quest of furs, that it is found on that river as far as the mouth of the Great Mackakity, which discharges itself in latitude 42° 51′.

* Laurus sassafras, *Lin.*
† See Pursh's Flora of North America.
‡ North American Sylva, vol. 2, p. 145.
§ Porcelia triloba, *Pers. Sym.*
Anona triloba, *Willd. sp. pl.*
Orchidocarpum arietinum, *Mich. fl. Amer.*
|| Michaux's North American Sylva, vol. 2, p. 34.
¶ Juglans olivæformis, *Lin.*
Juglans angustifolia, *Ait. kew.*
Juglans Pecan, *Muhlb.*
Carya olivæformis, *Nutt. Gen. pl.*
** See Pursh and Michaux, as before.

It appears, then, from the testimony of the botanical authors to which I have referred, that some of these plants are found as far north on the sea-coast, as in the valley of the Mississippi; and that the rest are peculiar to the latter, and consequently do not furnish a standard by which to ascertain the comparative temperature of the climate of these two different sections of our country.

M. Volney, in farther confirmation of his theory, proceeds to detail the facts which he collected concerning the comparative temperature of the different seasons. These however are so vague, disconnected, and unsatisfactory, as to render it unnecessary for me to combat the fanciful results he has deduced from them.

Dr. Williamson also adopts the opinion maintained by Jefferson and Volney, but unfortunately adds nothing in support of it.* I shall quote his remarks merely for the purpose of showing that it has received his sanction upon the bare assertion of those who preceded him, and without the slightest examination of the arguments which were adduced in its support.

"On the western side of the Apelachian mountain," says he, "where cultivation is hardly begun, the winters are much more temperate than near the Atlantic ocean. This difference is attested by numerous settlers; and it has been observed that paroquets winter on the river Sciota in latitude 39°. But I have not heard of their wintering in any part of the Atlantic states, to the northward of 36°; viz. in the Great Dismal of Tyrrel county in North Carolina. It has also been observed that tender plants thrive better in the western country, three or four degrees farther north, than in the Atlantic states."†

After the authors which have been mentioned, as the advocates of the theory under discussion, it is not surprising that it should have received the sanction of a majority of subsequent writers upon the western country. They do not, however, advance any new facts or arguments, and consequently do not deserve particular notice.

* Observations on the climate in different parts of America, compared with the climate in corresponding parts of the other continent, by Hugh Williamson, M. D. &c.

† Dr. Williamson here refers to Loskeil's History of the Moravian Missions. I have, however, carefully examined this work, and can find nothing in it to warrant the reference. The only remarks which have the least bearing on the subject, are as follows: "It is said that the farther you travel to the west, the more fruitful and beautiful the country appears, but it is for the most part uninhabited." (Part 1, p. 8.) And again, "The weather varies also considerably on the east and west of the Alleghany mountains. For in Pennsylvania the east wind generally brings rain; but never on the Ohio, where the east wind seldom blows, and never above twelve hours at a time." (Part 1, p. 10.)

I have thus examined in detail the arguments adduced in support of the superior temperature of the climate of the Mississippi, to that of the Atlantic coast, under similar parallels of latitude: This was not only essential to a full developement of the subject, but was due to the talents, ingenuity, and high reputation of the authors in whose works they are contained.

I come now to the second division of this essay, which is to prove that the climate of the Mississippi valley, does not materially differ from that of the Atlantic coast. This I shall endeavour to do, *first*, by a comparison of thermometrical observations; and *secondly*, by a comparison of the flowering seasons of plants.

As the temperature of a climate, although it depends chiefly upon the latitude, is more or less influenced by situation, elevation, and exposure, it may be proper to give some account of the natural formation of the different portions of country, which are the subjects of comparison. In doing this, I shall confine myself to a belt of about three hundred and fifty miles in width, bounded on the north by the parallel of latitude 43° N., and on the south by that of 37° N. This will not only embrace the territory east and west of the Alleghanies, whose climate is said to differ,* but also that in which the most correct observations have been made.

This belt is bounded on the east and west, by the Atlantic and Pacific oceans, and at nearly equal distances from these, is crossed by two chains of mountains, which form a great valley of nearly three thousand miles in extent. It is therefore naturally divided into five regions. 1. The eastern littoral. 2. The eastern mountainous. 3. The great alluvial. 4. The western mountainous: and 5. The western littoral.

The eastern littoral region is washed on the east by the Atlantic ocean, and is abundantly watered by streams which generally have a southerly course. It is from 150 to 250 miles in breadth. Its surface, although occasionally broken by ranges of hills, is in the main level. It is for the most part settled and cultivated, but still contains many extensive wastes and forests.

* Volney remarks that the difference of climate on the east and west of the Alleghanies, is attended with two circumstances of great importance, and which have not been remarked. The first is, that beyond the latitude of 35 and 36 deg. as you proceed southward, this difference ceases, and the temperature of the Floridas and the west part of Georgia, from the Mississippi to the river Savannah and the ocean, is subject to the same common law. The second circumstance is, that this excess with regard to temperature, ceases again almost suddenly between the latitudes of 43 and 45 deg. north, toward the great lakes.—Volney's View, p. 153.

The eastern mountainous region consists of ranges of mountains rising above each other, the highest of which is several thousand feet above the level of the sea: it divides the waters of the east and west, and forms the rampart or terrace between the first and third regions. Its breadth is from 70 to 100 miles. It is but very partially cultivated, being for the most part covered with vast and impenetrable forests.

The third region includes, as I have before remarked, the vast basin or valley, formed by the two ranges of mountains. The name of the Mississippi basin is perhaps the most correct, as almost all the streams which irrigate it, empty either directly or indirectly into this stream. This basin may be considered as one continued plain having but little elevation. The eastern portion, which is all that need now be described, consists of a part of the state of Pennsylvania and the whole of Ohio, Indiana, Illinois, and Missouri. It contains a great proportion of natural meadow, or what is termed *prairie land*, entirely destitute of timber. It is as yet but thinly settled and partially cultivated.

Of the two last, nothing need be said, my object being merely to compare the climate of the Atlantic coast with that of the valley of the Mississippi.

These brief and general topographical remarks, form a necessary preface to the more minute investigation of this subject.

Thermometrical observations constitute the most common, and perhaps the most correct method of ascertaining the temperature of a climate. But in order to obtain a true result, these observations should be made with great care and be continued for a length of time. Even after this, they form no criteria by which to judge of the climate of a country, unless we know at what elevation, under what circumstances, and in what manner, they are made. Without a knowledge of these facts every thing is vague and unsatisfactory. It is on this account that we are unable to employ many thermometrical tables which have been kept, and which in other respects appear correct. Hence a very limited number of places, particularly in the valley of the Mississippi, can be used in this comparison. I regret, moreover, that I have not been able to procure sets of observations made under the same parallels of latitude east and west. In order to make up for this deficiency it will be necessary to resort to a method, which, although somewhat arbitrary, is less liable to objection than any other. It has been adopted by Baron Humboldt, in his celebrated work on the Geography of plants by comparing the climates of the old and new continents. With a certain place in North America, whose mean annual temperature is known, for example, Natchez (31° 28′ lat. 18.2°* mean temp.) the author makes a two fold comparison, viz. he first compares with this place one in the old world, which lies under the same degree of latitude; the mean temperature of this last, compared with that in North America, gives them the difference of temperature. Secondly, he compares with it a place in the old world, which has the same mean temperature, and this comparison then gives the difference of latitude between the two places. But as we cannot easily have for such a comparison, places in the old continent, whose mean temperature, or geographical latitude, agrees exactly with the given places of the new continent, the author has, in each of these comparisons, made use of two places in the old continent, from which the geographical latitude or the mean temperature of the place is determined, that is to be compared with one in North America. He must then, in order to institute a comparison with Natchez, first fix upon a place in the old continent which lies under 31° 28′ of latitude, and the mean temperature of which should be known; to obtain this, he compares Funchal, 32° 27′, and Oratava, 28° 25′, and calculates from the difference between the mean temperatures of both places, the probable mean temperature of 31° 28′ in the old continent; this is 20° 5′, which number compared to 18° 2′ gives a difference equal to 2° 3′. Secondly, he must have a place in the old continent whose mean temperature should be 18° 2′; he obtains this place in the same manner through a comparison between Rome, 15° 8′ (41° 33′ of lat.) and Algiers, 20.1° (36° 33′ of lat.)†

The application of this formula in the present instance, will not only make up for the want of observations, but will furnish the means of making the comparisons with greater facility. From five places on the sea-coast in different parallels of latitude, whose mean temperature is known, we shall in this manner be able to ascertain the probable mean temperature of those points on the coast corresponding in latitude with those places in the valley of the Mississippi, whose mean temperature has also been ascertained.

* Centigrade thermometer.

† Observations concerning the geography of plants, in Brande's Quarterly Journal, vol. x. p. 235.

These places in the former region, are Albany, (New-York,) Cambridge, (Mass.) New-York, Philadelphia, and Williamsburgh, (Virginia); and are included in a range of about six degrees of longitude; in the latter region, Cincinnati, (Ohio,) St. Louis, (Missouri,) and Council Bluff. I shall now present a tabular view of their latitudes and mean temperatures.

1. *On the Atlantic Coast.*

	Latitude.	Longitude,*	Mean Temp.
Albany, (N. Y.)	42° 39′ N.	72° 32′ W.	48.7° †
Cambridge, (Mass.)	42 25	71 7	50.4 ‡
New-York,	40 40	74 1	53.8 §
Philadelphia,	39 56	75 10	53.9 ‖
Williamsburgh, (Va)	37 16	76 55	58.1 ¶

2. *In the Valley of the Mississippi.*

Cincinnati, (Ohio.)	39° 6′ N.	84° 37′ W.	54.3° **
St. Louis, (Missouri.)	38 36	89 36	56.2 ††
Council Bluff,	41 31	96 42	49.2 ‡‡

From this table it appears that the mean temperature of Cincinnati, is only four-tenths greater than that of Philadelphia, although the former is 50′ south of the latter. The difference here is probably not greater than it would be east of the Alleghanies. The comparison between the climate of these two places, has been so ably drawn by Dr. Drake, in his Picture of Cincinnati, that I shall do no more than state that this author gives it as his opinion—the result of numerous and faithful observations—that the climate of Cincinnati is not warmer than that of a corresponding parallel on the coast.

* From Greenwich, England.

† Three years observations, 1820–21–22, by T. Romeyn Beck, M. D. See the New-York Medical and Physical Journal, vol. ii. p. 253.

‡ Two years of observations. See an abridgment of Baron Humboldt's memoir on Isothermal Lines, and the Distribution of Heat over the Globe. Thomson's Annals of Philosophy, vol. xi. p. 177.

§ Two years. Humboldt, as above.

‖ Dr. Rush states the annual temp. of Philadelphia at 52.5; more recently Dr. Coxe, from six years observations, deduced 54.2. According to Mr. Legaux the mean heat of Springmill, on the Schuylkill, as drawn from seventeen years observations, is 53.3, (Drake's Picture of Cincinnati, p. 116.) Seven years of observations give 54,3. Mean temperature of springs near Philadelphia 54.8. Warden, (Humboldt in Thomson's Annals.)

¶ Humboldt in Thomson's Annals.

** Eight years' observations; Drake's Picture of Cincinnati, p. 93.

†† Three years. See Gazetteer of the states of Illinois and Missouri, by the author of this essay, p. 197.

‡‡ One year. Metereological Reports of the Surgeon General of the United States Army, published in the Medical Repository, New Series, vols. vi. & vii.

Proceeding in our comparison we come next to St. Louis on the Mississippi, in latitude 38° 36′ N. and 12° 15′ of longitude west of Cincinnati. But as the mean temperature of this parallel on the coast, has not been ascertained by observations, it must be done by the rule above prescribed. Taking, therefore, Philadelphia in latitude 39° 56′ (53.9° mean temp.) and Williamsburgh in latitude 37° 16′ (58.1° mean temp.) the mean will be 38° 36′, corresponding exactly with the latitude of St. Louis; and the probable mean temperature at this point will be 56.1°; only one-tenth of a degree higher than that of the latter place. The limited number of observations prevent the application of the second part of the formula, in order to ascertain the corresponding difference of latitude. This difference is, moreover, so very trifling, that it would not only be difficult but useless to settle it.

The next and last point of comparison is Council Bluff, in latitude 41° 31′ N., and whose mean heat is 49.2°. And here I must again resort to the method of calculation above adopted. By comparing therefore New-York, latitude 40° 40′ (mean temp. 53.8°,) and Albany, latitude 42° 39′ (mean temp. 48.7°,) the mean latitude will be 41° 40′, and the probable mean temperature of this point will be 51.2°. But this point is nine minutes north of the parallel of Council Bluff; and calculating from the whole difference between the mean temperature at Albany and New-York, the difference of mean temperature of latitude 41° 40′ and 41° 31′ will be about 00.5°. Adding this to 51.2° will give us 51.7° as the probable mean temperature of latitude 41° 31′ on the coast.

From these comparisons therefore, which are as correct as the limited number of observations will admit, it appears that the mean temperature of Cincinnati is the same as that of the corresponding latitude of the Atlantic coast; of St. Louis one-tenth higher; and of Council Bluff two degrees and a half lower. And hence taking the mean of all the differences obtained from the above data, it may be assumed that the temperature of the valley of the Mississippi from latitude 38° 36′ to 41° 31′ N. and from longitude 84° 27′ to 96° 42′ W. is eight-tenths of a degree *lower* than that of the Atlantic coast.

It will be observed that I have thus far only treated of the *annual* temperature of these places. I shall therefore next compare the different seasons; for the temperature of the cycle of vegetation, upon which depends the growth of plants, may be very different in places having the same mean annual temperature.

The following table will show the mean temperature of different seasons at the places above mentioned.*

1. *On the Atlantic Coast.*

Names of places.	Latitude.	Longitude.	Mean temp. of winter.	Mean temp. of spring.	Mean temp. of summer	Mean temp. of autumn.
Albany,	42° 39′N	72° 32′W	24.6°	47.7°	72.2°	50.6°
Cambridge,	42 25	71 7	34.0	47.6	64.4	49.8
New-York,	40 40	74 1	29.8	51.2	79.2	54.6
Philadelphia,	39 56	75 10	32.2	51.4	74.0	56.6

2. *In the Valley of the Mississippi.*

Names of places.	Latitude.	Longitude.	Mean temp. of winter.	Mean temp. of spring.	Mean temp. of summer.	Mean temp. of autumn.
Council Bluff,	41° 31′N	96° 42′W	20.1°	51.5°	74.6°	49.9°
Cincinnati,	39 6	84 27	32.9	54.4	72.8	54.4
St. Louis,	38 36	89 36	34.5	54.7	75.3	60.7

In the two last situations, therefore, in the second table, the temperature is more equally distributed among the different seasons than in corresponding latitudes on the coast; the summers being less hot and the winters less cold; completely disproving the assertion of Major Stoddard in his sketches of Louisiana, and which has also been incorporated among the erroneous notions to which the theory of Mr. Jefferson has given rise.

I come next to the proof in favor of the position I have laid down, drawn from the phenomena of vegetation.

It is a fact well established, that the climate can be determined with the greatest precision by the plants which vegetate in any country, and that observations on the distributions of plants in different countries serve to distinguish the climates of these countries from each other.† Such observations, however, from their very nature could not be used to any purpose in this comparison. A more easy, but not less accurate method of ascertaining the difference between the climate of different sections of country is by comparing the flowering seasons of plants.‡

* I have not been able to obtain the mean temperature of the different seasons at Williamsburg, (Virginia,) and it is therefore omitted in the table.

† See observations on the heat of springs, and on vegetation, in order to determine the temperature of the earth and the climate of Sweden. By George Wahlenberg, M. D. &c. in Thomson's Annals of Philosophy, vol. iv. p. 22.

‡ This method more particularly indicates the difference in the temperature of the cycle of vegetation.

My attention was first directed to this subject by the remarks of Muhlenburgh and Professor Bigelow,* and during my residence at St. Louis I kept an accurate register of the time of flowering of all the plants which I collected. The mean results of my observations upon a few of the most common of these, I shall now compare with similar ones made at Washington city,† on the coast, in latitude 38° 58′ N. twenty-two minutes north of the former.

Names of Plants.	*Habitats of St. Louis.*	Time of flowering at St. Louis.	Time of flowering at Washington City.
Sanguinaria Canadensis, *L.* (Blood root.)	Side hills	March 28.	April 6.
Claytonia Virginica, *L.* (Spring beauty.)	Low situations, prairies & woods.	April 20,	April 10.
Ranunculus fascicularis, *Big.* (Crowfoot.)	On the alluvions.	April 20.	April 14.
Uvularia perfoliata, *L.* (Bellwort.)	Side hills.	April 14.	April 11.
Fragaria virginiana, *L.* (Strawberry.)	Prairies.	April 15.	April 28.
Ranunculus abortivus, *L.* (Butter-cup.)	Alluvions.	April 18.	April 20.
Geranium maculatum, *L.* (Cranesbill.)	Prairie & woods.	April 18.	May 5.
Laurus Benzoin, *L.* (Spice bush.)	Banks of the Miss.	April 20.	April 7.
Dodecantheon media, *L.* (False cowslip.)	Barrens & prairies.	April 20.	April 28.
Cornus florida, *L.* (Dogwood tree.)	Hills.	April 20.	April 21.
Aquilegia canadensis, *L.* (Columbine.)	Alluvions, bluffs, hills.	April 20.	April 28.
Arum triphyllum, *L.* (Indian turnip.)	Moist shady situations.	April 22.	April 28.
Porcelia triloba, *Pers.* (Papaw.)	Alluvions.	April 23.	May 5.
Podophyllum peltatum, *L.* (May apple.)	Alluvions.	April 23.	May 5.
Hypoxis erecta, *L.* (Star grass.)	Prairies.	April 26.	May 5.
Potentilla canadensis, *L.* (Common 5 finger.)	Prairies, forests and barrens.	April 29.	April 14.
Rubus trivialis, *Mx.* (Dewberry.)	Prairies & barrens.	April 30.	May 5.
Cerastium vulgatum, *L.* (Mouse-ear chickweed.)	Banks of Creeks.	May 1.	May 4.?
Tradescantia virginica, *L.* (Spider wort.)	Barrens & prairies.	May 9.	May 19.
Convallaria racemosa, *L.* (Solomon's seal)	Alluvions, woods, and prairies,	May 10.	May 19.
Houstonea cærulea, *L.* (Venus' pride)	Prairies,	May —	April 14.
Iris virginica, *L.* (Wild flag)	Marshes,	May 14.	May 19.
Ceanothus americanus, *L.* (N. Jersey tea)	Prairies & barrens,	May 15.	June 15.
Achillea millefolium, *L.* (Yarrow, milfoil)	Prairies & barrens,	May —	June —
Prunella pennsylvanica, *Willd.* (Self heal)	Barrens & prairies,	May 30.	June 2.
Phytolacca decandra, *L.* (Poke)	Banks of streams,	June 7.	June 30.
Malva rotundifolia, *L.* (Dwarf mallow)	Old fields and road sides.	June 9.	June 16.

* Silliman's Journal of Science and Arts, vol. i. p. 76.

† Florula Columbiensis: or a list of plants found in the District of Columbia, during the years 1817 and 1818.

Names of Plants.	*Habitats at St. Louis.*	Time of flowering at St. Louis.	Time of flowering at Wash. City.
Lepidium virginicum, *L.* (Pepper wort)	Hills,	June —	May —
Rhus glabrum, *L.* (Common sumach)	Barrens,	June —	June 23.
Lobelia pallida, *Muhl.*	Prairies,	June 19.	June 2.
Asclepias tuberosa, *L.* (Butterfly weed)	Prairies,	June 19.	June 23.
Sambucus canadensis, *L.* (Elder)	Prairies,	June 19.	June 9.
Cephalanthus occidentalis, *L.* (Button bush)	Rocky banks of the Mississippi,	June 26.	July 7.
Lysimachia ciliata, *Mx.* (Loose strife)	Timber'd alluvions,	June 26.	June 16.
Bignonia radicans, *L.* (Trumpet flower)	Timber'd alluvions,	June 26.	June 30.
Circæa canadensis, *Muhl.* (Enchanter's nightshade)	Timber'd alluvions,	June 29.	June 30.
Anemone virginiana, *L,* (Thimble weed)	Alluvions & barrens,	June 29.	June 23.
Hypericum perforatum, *L.* (St. John's wort)	Prairies,	July —	June —
Cucubalus stellatus, *L.* (Campion)	Timber'd alluvions,	July —	June 23.
Scutellaria lateriflora, *L.* (Scull cap)	Banks of the Miss.	July 22.	Aug. 4.
Phlox paniculata, *L.* (Smooth stem lichnidia)	Timbered alluvions of creeks,	July 31.	Aug. 18.
Eupatorium perfoliatum, *L.* (Bone set)	Exsiccated ponds,	July 31.	July 7.
Cassia marylandica, *L.* (Wild senna)	Alluvions of creeks,	July 31.	Aug. 4.
Scrophularia marylandica, *L.* (Figwort)	Barrens,	Aug. 2.	Aug. 18.
Solidago lanceolata, *Ait.* (Golden rod)	Prairies,	Aug. 13.	July 28.
Eupatorium cælestinum, *L* (Blue bone set)	Barrens & hills,	Aug. 15.	Aug. 3.
Cuscuta americana, *Wild.* (Dodder)	Prairies & woods,	Aug. 23.	Aug. 29.
Helenium autumnale, *L.* (False sun flower)	Prairies & barrens,	Aug. 23.	Sept. 7.

From this comparison we obtain the mean result, that vegetation at St. Louis is less than two days earlier than at Washington city. And allowing the correctness of the conclusion of Dr. Bigelow, that a difference of about *four days*, correspond to a difference of *one degree* of latitude, we have here another striking proof of the similarity of climate in these two different situations.

If any importance can be attached to the observations and comparisons which I have detailed, I flatter myself that I have satisfactorily proved the truth of the position which I have laid down. I invite a free and full examination of all that has been advanced.

ART. VIII. *Observations on the Geological Features of the South Side of the Ontario Valley, in a letter to T. Romeyn Beck, M. D.* By JAMES GEDDES, Civil Engineer.

Read, February 15, 1826.

ALBANY, Feb. 1st, 1826.

DEAR SIR,

I had heard from geologists so much about the formation of every valley, by the action of waters flowing in vast torrents in times long past, that I was much pleased to find in the *Geological and Agricultural survey of the district adjoining the Erie Canal,* the following admission :—" We are compelled to admit that hills " and valleys were formed first, and that afterwards, water began " to descend the inclining sides of the hills and to collect, or march " onward through the valleys." Page 153.

In the year 1810, from examinations of the country at, and east of the Niagara Falls, I was led to doubt the reasonableness of the conjecture, that had been so often hazarded; that the cataract of Niagara had in *time* travelled from near Lewiston to its present site.

Lake Erie is held to its present level by the stratum called Black Rock, a lime rock in which horn-stone abounds, the *endings* of which can be traced west and east to a great extent. North of, and below the termination of the stratum, the Chippewa runs to the east and the Tonawanta to the west, both streams emptying into Niagara between Black Rock rapid and the Niagara Falls. These streams are deep for many miles from their mouths, and the Niagara river from Schlosser to Black Rock, may be considered as a lake, nearly. At the north of Navy Island the water is from 40 to 50 feet deep, and at the place where the Welland Canal is proposed to leave the Chippewa, the depth is 40 feet, which shews the stratum from which the great cataract is precipitated, dipping rapidly to the south, and giving depth to this piece of water, as the stratum at Black Rock dips southerly and gives depth to Lake Erie.

The vast *bed* of clay in which these deep creeks flow, is of considerable depth, and great extent, particularly eastward. It may be considered as beginning on the Genessee river, at the mouth of Black creek, and following up the valley of that sluggish stream through the great Tonawanta or Oak Orchard swamp, and down the valley of Tonawanta creek. All Grand Island, and the small ones around it are of this clay bed. It may be traced far west on the Chippewa and over on the Grand river.

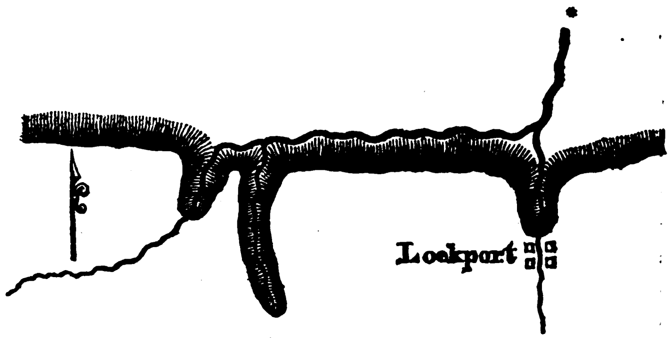
The lime stratum of Niagara Falls, with shells, is of very great extent, particularly eastward. Over it falls the Oak Orchard creek, Genessee river, Canandaigua outlet, Seneca outlet, and the streams from the lakes Owasco, Skaneateles, and Otisco, and it may be traced as far east as the falls of Skanado creek in Oneida county. The terminating edge of this lime stratum, is generally very straight, and varies but little from an east and west course. For the first 20 miles east of Niagara river, it ends in a denudated rock, projecting so much, that when tracing the level of the surface of lake Erie along the north side of it, in 1810, it was found a very convenient shelter from the showers.

Mr. William Smith and his followers observe of the British strata, that in all the eastern parts of England, they "end successive-"ly towards the N. W., generally with a fingered or digitated out-"line, running out into ridges, beyond the general range of the "edge or limit of the stratum." The outline or terminating edge of this great lime stratum, which is such a distinguishing feature in the south side of the great Ontario valley, is towards the *north*, and instead of a fingered form, thus,

may be represented thus :

calling the side above the line, the terminating edge or ENDING, as Mr. Smith would term it. This formation, as has been mentioned, is more particularly to be observed between the Niagara river and the 18 mile creek. In almost all the indents or chasms that run back, south of the general range of termination, streams run from the level table-land above, and by wearing their respective chasms, have given them the appearance of being formed by the action of said steams. That all these ravines have been scooped out by the agency of streams that occupy them, would be readily conjectured by every superficial observer, more particularly the one in which runs the Niagara river.

At the head springs of the 18 mile creek, it is shown to be otherwise. From three of these indents, the west branch of the 18 mile creek is formed as sketched below.



Into the westernmost one a stream of water runs from the table-land above, and here is no bad minature of the Niagara Falls, except that the solid lime rock, projecting far over the underlay of brittle slate, leaves more space behind the sheet of water. The middle one is the most remarkable. It cuts farther back beyond the general line of *ending*, and approaches nearest the Tonawanta creek—has no stream falling into the south end of it, but is to be seen as the valleys were, "e'er moving spirit bade the waters flow."

The junction of these three streams was found to be more than 200 feet below the level of Lake Erie, cut down through the several strata of *lime*, *slate*, gray and red *sandstone*, all exposed to view in the precipitous sides of the chasm.

From these observations I have been led to conjecture, that the cataract of Niagara first began at the head of a deep indent, which reaches south to within 70 or 80 chains of where the falls now are. This length of 70 chains, forms the pool or basin into which the water is shot from the great pitch, and is much deeper than the falls are high. The head or south end of this chasm was probably once not as much below Erie level as the 18 mile creek *one* is, the rocky bottom over which the water now runs from this *basin*, being about on the same level with the 18 mile creek.

This capacious basin, into which the cataract pours, is something over 240 feet deep, and the surface of the bottom very uniform, all the way from the cascade to the north edge of the basin, (or as near said places as the persons sounding dare approach,) and which bottom may be supposed to be a flooring of solid granite.

* West branch of the 18 mile creek.

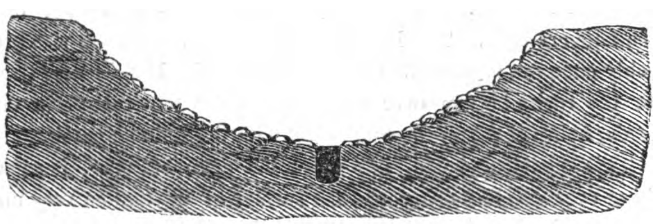
From the north side of this basin to their present place, I suppose the falls to have receded, worn by the action of the water and by frosts ; and cannot believe that they began in the general line of *ending* of the great shell lime stratum near Lewiston.

In viewing the river from Lewiston upwards, the whole distance is very much of a similar character to within a mile of the falls : precipitous shores of rock, nearly parallel with each other, the water dashing over a rough bottom, with a descent generally of about 20 feet in a mile. A short distance at the whirlpool, is the only exception to the above features : here the river is deep, and two or three times the common width.

Owing to the easy disintegration of some of the rocks, the ravine is wider in some places than others. About a mile above the whirlpool, the ravine through which this vast body of water dashes along, is so narrow, that a man standing on the brink of the precipice on the American side, can throw a stone across the stream. If the falls were once at this place, why is no trace left behind? Or will it be said that a pool 240 feet deep was here, and that the rocks falling from the shores filled it up again? The narrowness of the chasm forbids this supposition.

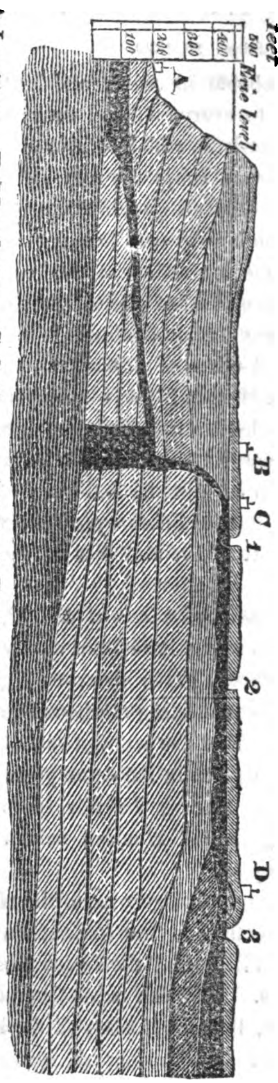
Immediately below the whirlpool, the ravine grows narrower as you descend towards the water, and here this mighty stream glides smoothly, though swiftly, through a channel of but little above 100 yards wide. The firm rocks which form either shore, are evidently still in place. The cataract, if it ever fell here, fell far and on a very narrow space.

A cross section of the chasm and stream here, would be something like this.



The smoothness of the rocks on each side would indicate that when the channel was less deep than at present, the water flowed above them, and the surface of the stream was two or three times its present width.

Supposed section of the American shore, between Lake Erie and Lewiston.



A *Lewiston.*—B *Manchester.*—C *Schlosser.*—D *Black Rock.*—The deepest black, *A section of the water.*
1. *Cayuga Creek.*—2. *Tonawanta Cr.*—3. *Buffaloe Cr.*

This section, designed to give some idea of the strata on the American side of the Niagara, is nearly a copy of one sent to the late Professor Barton in 1813, and since returned to me by his executor, the late Dr. Adam Seybert. I am pleased to see one so nearly the same, sketched by Professor Eaton.

South of the 12 mile creek valley, (down which it is designed to lead the Welland canal,) the great stratum of shell lime appears to have sunk to a level, we know not how low. By examinations made, it is ascertained, that at the depth of 8 feet lower than the level of the surface of the deep water above the falls, not a stone exists. The face of the rock may be as low as the bottom of the Chippewa, (here 40 feet deep) and the flow of the water through said canal, becoming unmanageable, we might see the destruction of the famed Niagara Falls, as the Fairhaven Falls, on the Poultney river, have been destroyed, and by which operation a part of the state of New-York was thrown into Vermont. The naked rocks here remain, never more to be wet but by the droppings of Heaven. In one night, a single man, it is said, set the stream to remove what millions could not again replace. The fine navigable Fairhaven bay, 9 miles in length, was turned into flats and shallows where no sloop can enter.—The fish were all killed by the feculent flood.

Art. IX. *Statistical Notices of some of the* Lunatic Asylums *in the United States.* *By* T. Romeyn Beck.

Read April 16, 1828 and April 29, 1829.

Insanity, with its causes, its probable increase, and its treatment, is a subject of deep interest to every civilized community. Its peculiar, but melancholy characteristic, which forbids any reasonable hope of cure, until the diseased subject is removed from his home and relatives, imposes the duty on governments of providing for its proper management both as to safe keeping and as to the means of recovery. That the legislators of this country and its inhabitants have not been unmindful of the obligation, we shall endeavour to shew in the present communication.

We shall first notice the Lunatic Asylum of this state.

The "Society of the New-York Hospital" was incorporated, in 1771, and by the liberality of the legislature of the province, of contributors in England, and of domestic contributors, sufficient funds were obtained for the erection of a public building. This was proceeded in with great spirit, but in February, 1775, when almost completed, it unfortunately took fire and was nearly destroyed.

"By this misfortune, the society suffered a loss of £7000, and the execution of their benevolent plan would have been wholly suspended, had not the legislature in March, 1775, generously granted them the sum of £4000, towards rebuilding the house and repairing the loss they had sustained. But the war between Great Britain and the colonies, which took place in the same year, prevented the completion of the edifice. During the war, the same was occasionally occupied by British and Hessian soldiers as barracks, and occasionally as an hospital."

The effect of the war and the general derangement of the affairs of our citizens, prevented any attention to the institution, and it was not until the 3d of January, 1791, that the house was in a proper condition to receive patients. Eighteen were then admitted. From that time to the present, the munificence of the legislature to this institution has been liberal and unwearied, increasing with the increase of the patients and the enlightened improvements of its governors.

As there existed no institution in the state for the reception and cure of lunatics, the governors were induced to appropriate apartments in the hospital for patients of that description. The building, however, not being designed for such a purpose, the accommodations were found to be extremely inconvenient and inadequate, and as the applications for their admission constantly increased, it was resolved in 1806, if the legislature would lend its aid for that purpose, to erect a separate building, to be exclusively appropriated to the reception of that unfortunate class of beings.

The application proved successful, and a building denominated the "LUNATIC ASYLUM," was immediately erected in the vicinity of the Hospital. This edifice contained 64 rooms, and could accommodate about 70 or 75 patients. It was opened on the 15th of July, 1808, under the medical superintendence of Archibald Bruce, M. D.

By an act of the legislature the proper officers in a city or county were allowed to contract with the governors of the hospital, for the care and maintenance of any pauper lunatic under their respective jurisdictions, and accordingly many have, from time to time, been sent to it from various parts of the state.

The "Asylum" continued to be the only public institution in this state for the reception of lunatics, until the year 1821, when the "BLOOMINGDALE ASYLUM" was completed. The history of this we shall hereafter notice.

Dr. Bruce continued physician until 1817, when Dr. William Handy was appointed. He was succeeded in 1819 by Dr. John Nielson.

We now proceed to give a detailed account of the numbers admitted and discharged.

Time.	ADMITTED.			DISCHARGED.					
	Remaining of former years.	*Admitted.*	*Total.*	*Recovered.*	*Relieved.*	*Discharged from various causes, as request or eloped, &c.*	*Incurable.*	*Died.*	*Remaining at the end of year.*
From Jan. 31, 1795 to Dec. 31, 1803	}	215	215	108	45	35	—	16	11
1804	11	46	57	22	5	12	—	3	15
1805	15	60	75	30	4	13	—	8	20
1806	20	68	88	29	—	31	—	7	21
1807	21	47	68	18	3	19	—	4	24
1808	24	66	90	16	10	16	—	4	44
1809	44	80	124	22	4	48	—	8	42
1810	42	91	133	44	7	16	—	10	56
1811	56	108	164	67	9	14	3	19	52
1812	52	127	179	64	14	25	1	11	64
1813	64	105	169	47	19	27	—	6	70
1814	70	104	174	23	39	14	7	9	82
1815	82	69	151	27	27	14	—	9	74
1816	74	49	123	14	10	18	—	5	76
1817	76	49	125	6	6	34	—	7	72
1818	72	75	147	45	14	13	—	5	70
1819	70	78	148	44	9	24	—	7	64
1820	64	87	151	48	15	17	—	10	61
to July 21, 1821	61	60	121	26	1	37	—	5	52
		1584		700	241	427	11	153	

Admitted from Jan. 31, 1795, to July 21, 1821,		1584
Discharged, Recovered, - - - - -	700	
Relieved, - - - - -	241	
Discharged, from various causes, as by request or eloped, - -	427	
Incurable, - - - - -	11	
Died, - - - - - -	153	
Transferred to the Bloomingdale Asylum, July 21, 1821, - - - -	52*	
		——1584

Causes.—These are not given in the printed reports, with the single exception, that for some years the cases originating in intemperance are mentioned. Thus in

1814 there were 17 from that cause,
1815 9

* We can find no trace of these "52" in the records of the Bloomingdale Asylum. They are not accounted for, as will be seen, in the reports of that institution.

1816	4
1817	5
1818	27
1819	26
1820	27
1821	32 (13 males and 19 females.)

Total for eight years. 147, out of about 670 cases, or upwards of one fourth of the whole number.

The immediate cause of death is also mentioned in ten annual reports, viz. from 1811 to 1820 inclusive.

The whole number of deaths for that period was, 88

Of these there died of	Mania, - - -	24
	Mania and Paralysis,	1
	Apoplexy, - -	12
	Phrenitis, - -	2
	Epilepsy, - -	3
	Palsy, - - -	4
	Convulsions, - -	1
	Dysentery, - -	5
	Diarrhœa, - -	4
	Consumption, - -	14
	Pneumonia Typhodes,	1
	Marasmus, - -	5
	Decay, - - -	1
	Debility, - - -	1
	Abscess, - - -	1
	Gangrene, - -	2
	Scirrhous Liver, -	1
	Syphilis, - - -	2
	Typhus, - - -	4—88

"In consequence of a communication made to the governors, in April 1815, by Thomas Eddy, stating the advantages that might be produced, by introducing a course of moral treatment for the lunatic patients, more extensive than had hitherto been practised in this country, and similar to that pursued at the "Retreat," near York in England, and proposing that a number of acres of ground near the city should be purchased, and suitable buildings erected for the purpose, a committee was appointed to consider of the plan proposed, and to report their opinion thereon. This committee, having approved of the plan and recommended its adoption, the governors resolved to carry it into effect, if they could obtain the aid of the legislature. Application having been made for that purpose, an act was passed on the 17th April, 1816, granting to the hospital the yearly sum of $10,000 until the year 1857, to enable the governors to erect further and more extensive accommodations for insane patients." Grounds to the amount of 77 acres, and lying on the Bloomingdale road, about seven miles from the city, were purchased, and here the corner stone of a building was laid on the 7th of May, 1818. It was completed in 1821.

The building is of stone, three stories high, and contains accommodations for about 200 patients. The land attached to it is laid out in walks and gardens, and when the weather will permit, the patients are allowed to walk abroad, accompanied by the superintendent or one of the keepers. Tame animals have also been procured for their amusement, and innocent diversions are permitted: they are allowed to dine in classes, while religious instruction is from time to time imparted to those who appear able to profit by it.

Dr. John Nielson has been the physician of the BLOOMINGDALE ASYLUM since its opening. There is also a physician resident at the institution, while a sub-committee of governors visit it every week, and a standing committee every month.*

The following details are taken from the annual reports.

ADMITTED.

Time.	*Males.*	*Females.*	*Total.*
From July 27, 1821 to Dec. 31, 1821	75	48	123
1822	66	36	102
1823	83	48	131
1824	77	44	121
1825	102	54	156
1826	97	45	142
1827	107	27	134
1828	86	48	134
	693	350	1043

* Annual Report of the Governors for 1821.

DISCHARGED.

	Recovered.	Much Improved.	Improved.	Relieved.	By request.	Improper objects.	Eloped.	Died.	Unimproved.
Part of 1821	19	—	—	7	9	3	—	2	—
1822	48	10	12	—	—	—	1	5	18
1823	55	13	20	—	—	—	6	5	14
1824	48	15	12	—	22	—	8	11	—
1825	61	19	23	—	63	—	—	8	—
1826	69	7	11	—	42	—	2	11	—
1827	67	9	17	—	34	—	4	9	—
1828	59	8	21	—	28	—	1	13	—
	436	81	116	7	198	3	22	59	32

The numbers to the end of the year 1828, will stand thus :

ADMITTED,

From the 27th July 1821, to the 31st Dec. 1828, 1043

DISCHARGED,	Recovered, - - - - -	436
	Much improved, - - - -	81
	Improved, - - - - -	116
	Relieved, - - - - -	7
	By request, - - - - -	198
	Improper objects, - - - -	3
	Eloped, - - - - - -	22
	Unimproved, - - - -	32
	Died, - - - - - -	59
	Remaining Dec. 31, 1828, -	89
		——1043

SPECIES OF INSANITY.—There is considerable variety in the arrangement of the species of insanity. We shall state them as given in each report.

	Mania.	Monomania.	Melancholia.	Dementia.	Imbecility adrentitious.	Imbecility, habitual.	Idiocy.	Hemiplegia.	Hypochondriasis.	Mania e potu	Furious and melancholy.	Fatuous.	Imbecile.	Total.
1822	42	—	7	4	—	—	7	1	4	37	—	—	—	102
1823	55	—	21	18	2	14	—	2	—	19	—	—	—	131
1824	42	20	—	17	—	—	2	—	—	40	—	—	—	121
1825	57	36	—	20	—	—	—	—	—	43	—	—	—	156
1826	63	28	—	15	—	—	1	—	—	35	—	—	—	142
1827	82	19	—	—	—	—	—	—	—	—	7	13	13	134
1828	80	—	26	—	—	—	2	—	—	—	7	8	11	134
	421	103	54	74	2	14	12	3	4	174	14	21	24	920

Causes.—These are given in detail for one year only, viz. 1826; of 142 cases, there arose from

Bodily disease, - - - - - - -	84
Organic affections of the brain, original or acquired,	4
Hereditary, - - - - - - -	6
Primarily moral, - - - - - - -	35
Unknown, - - - - - - - -	13
	142

In 1822, 33 cases were from intemperance.
1823, 22 from do.

In the reports, the old and recent cases are distinguished from each other. We are not able, however, to make the ensuing tables perfectly complete, in consequence of the deaths or elopements not being in all cases referred to one or the other. They are generally added, without reference to the length of the illness.

OLD CASES.

ADMITTED.		DISCHARGED.				
Time.	*Numbers.*	*Recovered.*	*Much Improved.*	*Improved.*	*Request.*	*Unimproved.*
Remaining of 1821	65					
1822	29	4	—	6	—	8
1823	58	18	7	13	—	10
1824	70	27	6	9	13	—
1825	67	20	7	15	47	—
1826	49	1	1	4	—	31
1827	42	2	1	3	28	—
1828	42	4	4	7	19	—
	422	76	26	57	107	49

Total, - - - - - -	315
Remaining, Dec. 31, 1828, -	68
	383

RECENT CASES.

ADMITTED.		DISCHARGED.				
Time.	*Numbers.*	*Recovered.*	*Much Improved.*	*Improved.*	*Unimproved.*	*Request.*
Remaining of 1821	18					
1822	73	44	10	6	10	—
1823	73	37	6	7	4	—
1824	51	21	9	3	—	9
1825	89	51	12	8	—	16
1826	93	68	6	7	—	11
1827	92	65	8	14	—	6
1828	92	55	4	14	—	9
	581	341	55	59	14	51

Total, - - - - - - 520
Remaining, Dec. 31, 1828, - 21
——541

If to the Old Cases, as above, 383
and Recent Cases do. 541
we add Eloped, - - - 22
Deaths, - - - 57
——1003

We shall have the amount equal to those admitted, viz.
Old Cases - - 422
Recent Cases - - 581
——1003

The proportion of each sex recovered, is given as follows:

	MALES.	FEMALES.
1822	38	10
1823	37	18
1824	41	7
1825	57	14
1826	50	19
1827	53	14
1828	39	20
	315	102

Total, 417
Recovered during part of 1821, 19
—— 436*

* The following authorities have been used in preparing the above. *An Account of the New-York Hospital*, 8vo. New-York, 1811.—*The Same*, 8vo. New-York,

Pennsylvania Hospital. This institution is the oldest of its kind in the United States, and its medical department has been illustrated by the labors of Morgan, Shippen, Wistar and Rush—besides many other departed as well as living worthies in the science. Lunatics appear to have been received since its opening in 1752. In 1796 however, a portion of the extensive building, now occupied, was finished for the reception of the insane, and upwards of 70 rooms are appropriated to their use. It constitutes the west wing. "There are fifty-six separate sleeping rooms, each about ten feet square—four larger apartments usually occupied by a patient with an attendant, the long garret in which about twelve of the most quiet male patients usually sleep, and a small garret with beds for four females. On the first story of the wing are two dining rooms, the matron's apartment and a sitting room for the female patients. In the rear of this wing is also a detached building, with separate sleeping rooms, each about ten feet by eight, for eighteen insane females."

The cells are warmed by fire places completely inclosed within the wall and opening into the passage, so that the inhabitant is rendered comfortable without having access to the fire. The fuel now employed throughout the house is Lehigh coal.

Provision has also been made to have day rooms, for the exercise and employment of the lunatics of each sex.

The lunatic department generally contains about 100 persons—one-third of which may be females. During the day, they are entertained as already stated, in large convenient rooms, or when the weather permits, in agreeable and shady court yards in the open air. Great pains are taken to find them employment.

The use of metallic chains is forbidden—the substitute for them being composed of links of strong bend-leather. The strait jacket is also nearly out of use. Straps buckling over the arms, or sleeves inclosing the whole hand and loosely fastened at the end to a waistband, so as in both instances to admit of as great freedom of motion as possible, are the modes adopted for confining the disorderly. The only punishment, as such, is subjection to a shower bath. "The number who require confinement by chains, or on whom clothes cannot be kept, is extremely small indeed;

1820.—*Annual Reports of the Governors of the New-York Hospital to the Legislature from* 1802 *to* 1828. (Journals of the Senate and Assembly for the respective years.)—*Reports of the Bloomingdale Asylum for* 1822, 1823, 1824, 1825, 1826, 1827, 1828.

frequently only one or two being in the former and none in the latter predicament."

The following table is the result of a very careful examination of the records of the Hospital since its commencement to the 26th of April, 1828, by Mr. William G. Malin, clerk of the institution.

Whole number of cases admitted during the above period, - - - - - - -	3487	
Of these, there are designated		
as Insanity strictly, - - - - -		3245
and Delirium Tremens, or Insanity caused by intemperance,		242
		3487

Cases of Insanity, from February 11, 1752, to April 26, 1828.

Total.		Cured.	Relieved.	Removed by friends.	Eloped.	Died.	Remain.
Males,	2418	910	452	444	188	364	60
Females,	1069	344	250	224	42	162	47
	3487	1254	702	668	230	526	107

Mr. M. adds, that a large proportion of the deaths have been from old age or diseases having no necessary connection with insanity. It should also be stated, that a large proportion of the elopements occurred before the wall was erected.*

* History of the Pennsylvania Hospital, by Benj. H. Coates, M. D. in the Philadelphia Journal of the Medical and Physical Sciences, vol. 9, p. 35. This contained the only account of the Lunatic Department published at the time of first reading the present paper, and I regret, that from the absence of statistical tables, it escaped my notice. *Since that time* (June, 1828,) Mr. Malin has published a pamphlet, entitled "*Some account of the origin, objects, and present state of the Pennsylvania Hospital,*" containing the table above quoted. In August, 1828, Mr. Hazard, in his very valuable "*Register of Pennsylvania,*" published an enlarged account of the Hospital, with statistical tables. The tables of diseases, &c. he obtained from Mr. Malin, and adds that "they have never been published."

It may be proper to subjoin, that Dr. Coates states the usual number of lunatics in the Hospital to be about 90, (page 40) while Mr. Hazard (vol. 2, page 96) puts it at 110. This must of course be somewhat variable from year to year, and I therefore thought I should be right in mentioning 100 in the text.

The FRIENDS' ASYLUM for the Insane near Philadelphia, was founded by that religious denomination, in imitation of the "Retreat" at York. It is erected in a retired situation, and on elevated ground, five miles from the city of Philadelphia, and one mile from Frankford. The buildings are of stone, and consist of a centre edifice with two wings. The centre building is 60 feet front and three stories high. The wings are each 100 feet front and two stories high. Long galleries divide the ranges of rooms from each other.

The doors have each a moveable small door in the pannel, to be opened from without. The windows of each room have cast-iron frames, and they are so constructed as to be darkened at pleasure. The edifice is warmed by heated air sent through flues issuing from stoves or large ovens, built in the arches of the basement of each wing.

To the buildings are attached workshops for the patients, and the whole are surrounded by airy grounds.

The patients are classified into the harmless and the violent and noisy; the latter are not allowed to come out of their rooms, while the former eat at table with the superintendant and his family. The diet is uniformly good, no meagre days being allowed—but neither spiritous nor fermented liquors are permitted. The only modes of coercion are, if necessary, the shower bath, immersion in water, or the strait waistcoat.

"On every Sunday evening, all the male and female patients, except one or two, who are permanently secluded, are collected together in their day-rooms, where a portion of scripture is read to them. This exercise seldom meets with any interruption from them, but on the contrary, there is great silence and quiet."

We have neglected to mention, although that of course will be understood from the name of this institution, that Friends or Quakers only are admitted as patients.

After this brief sketch of the police of the Asylum, we add the following statistical details, given by Mr. Waln.

Admitted,	from the opening of the Asylum in May, 1817, to the month of March, 1825,		158
Discharged,	Recovered, - - - - -	53	
	Much improved, - - -	23	
	Improved, - - - - -	17	
	Without apparent change, - -	9	

Died, - - - - - -	21	
Remaining in the house, - - -	35	
		— 158
Annual average number of patients during eight years,		$19\frac{3}{4}$
Annual average number for five years ending in 1825,		$31\frac{1}{2}$
Average number during the year ending in March, 1825,		33*

The CONNECTICUT ASYLUM was founded through the combined liberality of the legislature and the citizens of the state. It is situated in the city of Hartford; and judging from the engraving prefixed to the third report, the building must be large and spacious, and combine all the comforts of a New-England country residence. It was opened on the first of April, 1824, under the medical superintendence of Eli Todd, M. D. This gentleman we have heard spoken of by those who know him, as one of the first medical men in his native state; and his success, as we shall hereafter show, is a most satisfactory proof that his qualifications have not been overrated.

A remark made in the first report strikingly illustrates the value and indeed necessity of establishing lunatic asylums. Many, it is observed, whom it was found necessary, when at home, to confine in chains, became uniformly, in a few days after their admission, orderly and inoffensive, and needed little or no restraint.

The following extract from the report of the visiting physicians, dated May 11, 1827, will enable the society to judge concerning the mode of treatment pursued in this establishment.

"In respect to the moral and intellectual treatment, the first business of the physician, on the admission of a patient, is, to gain his entire confidence. With this view, he is treated with the greatest kindness, however violent his conduct may be—is allowed all the liberty which his case admits of, and is made to understand, if he is still capable of reflection, that so far from having arrived at a mad-house, where he is to be confined, he has come to a pleasant and peaceful residence, where all kindness and attention will be shown him, and where every means will be employed for the recovery of his health. In case coercion and confinement become necessary, it is impressed upon his mind, that this is not done for the purpose of punishment, but for his own

* *An Account of the Asylum for the Insane, established by the Society of Friends, near Frankford, in the vicinity of Philadelphia. By Robert Waln, Jun.* (Philadelphia Journal of the Medical and Physical Sciences, vol. I. New series.)

safety and that of his keepers. In no case is deception on the patient employed or allowed—on the contrary, the greatest frankness, as well as kindness, forms a part of the moral treatment. His case is explained to him, and he is made to understand, as far as possible, the reasons why the treatment to which he is subjected has become necessary.

"By this course of intellectual management, it has been found, as a matter of experience at our Institution, that patients, who had always been raving, when confined without being told the reason, and refractory, when commanded instead of being entreated, soon became peaceable and docile.

"This kind of treatment of course does not apply to idiots, or those laboring under low grades of mental imbecility, but it is applicable to every other class of mental diseases, whether maniacal or melancholic.

"In respect to the medical and dietetic treatment, it also varies essentially in the main, from the course adopted at other hospitals. Formerly patients labouring under mental diseases were largely medicated, chiefly by emetics, cathartics and bleeding. At the present time this mode of treatment has given place to intellectual and dietetic regimen, in most European hospitals. The physician of our Institution has introduced a course of practice, differing from both these, but partaking more or less of each. He combines moral and medical treatment founded upon the principles of mental philosophy and physiology. In one class of cases moral, and in another medical treatment, become the paramount remedies, but in each class of cases, both are combined."

With respect to the chronic cases, Dr. Todd remarks, "that the Connecticut Retreat is opened with a broader latitude of admission than is common to other institutions."

"The far-famed Retreat at York in England, professedly devoted to similar objects, admits no idiots, nor maniacal cases reduced to low grades of mental dilapidation. Of the thirty-four chronic cases stated in the present report, (3d year) nineteen are of the identical description which would have been excluded by the practice of that excellent institution. The remaining fifteen cases on the list, constituted the whole amount in that class, who were properly within the scope of curative treatment, and of this number, only a few were allowed to remain with us through the requisite term of trial prescribed, in such instances, by most other institutions. Six months' residence in the Retreat, has been thought by many who have placed their diseased friends in the Institution, to be a liberal allowance of time for deciding the question of recovery, in cases of 10 years duration. As if the chaos of illusions, teeming for years in a distempered imagination, and revived with innumerable repetitions, by the unexhausted workings of insanity, might be swept at once from the tablets of the mind, by a professional receipt; or the stormy passions of confirmed madness, already threatening the foundations of intellect, might be hushed and subdued by the sovereign touch of some Esculapian trident! He who seeks for events, not in miracles nor in magic, but in the operation of settled laws, will comprehend why years of persevering effort must be required for the cure of long established cases of insanity; and although he ought never to be sanguine in his hopes, yet, if his mind be endowed with a tact to perceive the subtle individualities of a case, and detect them under the disguise of a general character, he will find that such a case is marked as distinct and separate from its class, and completely exempted from the general rules of treatment and prognosis. Should he have learned to distinguish a derangement of mental functions from a destruction of mental organs, where insanity in the one case is disease, in the other, death of intellect, then he may occasionally have the unspeakable satisfaction to discover, here and there, a case on the list, where the still "glimmering embers of a nearly extinguished intellect" may be kindled and nursed into a clearer and brighter flame, by the delicate and dexterous administration of long continued and well adjusted moral and intellectual remedies."

Through the kindness of Dr. Todd, I am enabled to present the results of this institution for the five years during which it has been in operation. A large portion of the following tables, and particularly the details of the last year, have never been published.

NUMBER ADMITTED, AND SEX.

		Males.	Females.	Total.
1st year.	From April 1, 1824 to April 1, 1825,	32	12	44
2d year.	From April 1, 1825 to April 1, 1826,	13	20	33
3d year.	From April 1, 1826 to April 1, 1827,	22	15	37
4th year.	From April 1, 1827 to April 1, 1828,	18	22	40
5th year.	From April 1, 1828 to April 1, 1829,	23	19	42
		108	88	196

AGE.

	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Total.
1st year,	—	11	11	12	8	1	1	44
2d year,	—	14	12	6	1	—	—	33
3d year,	4	17	5	5	4	2	—	37
4th year,	3	9	16	9	2	1	—	40
5th year,	1	19	11	11	—	—	—	42
	8	70	55	43	15	4	1	196

CONDITION OF LIFE.

	Males married.	Females married.	Males unmarried.	Females unmarried.	Widowers.	Widows.	Total.
1st year,	14	7	17	4	1	1	44
2d year,	3	12	9	8	1	—	33
3d year,	5	10	17	5	—	—	37
4th year,	9	13	9	9	—	—	40
5th year,	10	6	13	13	—	—	42
	41	48	65	39	2	1	196

SPECIES OF INSANITY.

	1st Year.	2d Year.	3d Year.	4th Year.	5th Year.	Total.
Mania						
ferox,	4	3	3	6	5	21
exultans,	6	4	7	9	5	31
despondens,	3	7	8	7	5	30
puerperalis,	2	1	—	—	—	3
demens,	6	3	4	2	4	19
imbecilis,	3	2	1	5	6	17
errabunda	—	1	—	—	—	1
complacens,	—	—	—	—	3	3
nymphomania,	—	—	1	—	—	1
Melancholia						
complacens,	2	3	2	3	2	12
errabunda,	2	1	—	1	—	4
attonita,	4	4	5	3	11	27
despondens,	—	—	—	1	—	1
malevolens,	2	1	2	—	—	5
*Delirium						
tremens vel vigilans,	3	1	3	1	1	9
Idiotism,	5	1	—	2	—	8
Hypochondriasis						
autalgica,	2	1	1	—	—	4
	44	33	37	40	42	196

*Mania e Potu.

CAUSES.

Hereditary, - - - - - -	19*
Congenital, - - - - - -	2
Constitutional, - - - - -	10
Intemperance, - - - - - -	22
Puerperal, - - - - - -	7
Blow on the head, - - - - -	2
Long continued typhus, - - - -	4
Bilious remittent fever, - - - -	1
Repelled cutaneous disease, - - -	1
Excessive venereal indulgence, - -	1
Derangement of digestive functions, or hepatic disease, - - - - -	8
Malformation or structural disease of the brain,	4
Insolation in a tropical climate, - -	1
Mental and bodily fatigue under a tropical sun,	1
Bodily disease, - - - - -	10
Periodical, - - - - - -	1
Excessive study, - - - - -	8
Disappointment in business, loss of property,	8
Disappointed affection, - - - -	6
Grief, - - - - - - -	11
Religious excitement or despondency, - -	15
Domestic troubles, - - . - -	8
Austerity of parental government, - -	4
Agitation on the near approach of matrimony,	1
Jealousy, - - - - - -	1
Excessive agitation on return from a long voyage,	1
Disappointed ambition, - - - -	2
Employment which prevented regular sleep,	1
Predisposition from various causes, (one from novel reading) - - - -	6
Unknown, - - - - - -	30
	196

DURATION OF THE DISEASE.

The cases admitted are divided into recent and chronic. By the former, are understood those whose duration has not exceeded one year; while under the latter, are arranged all those in whom the disease has been more prolonged.

* In one case the eleventh in the family.

	Recent.	Chronic.	Total.
1st year,	12	32	44
2d year,	16	17	33
3d year,	23	14	37
4th year,	26	14	40
5th year,	20	22	42
	97	99	196

It is proper to mention in this place, that among the chronic cases are included many concerning whom all hope of successful treatment is abandoned, but who are kept in the institution with the view of rendering their situation more comfortable.

During the first year, of 32 chronic cases, 12 had been insane from one to five years, 8 from five to ten years, 6 from ten to fifteen, and 6 from fifteen to twenty years. Five of these were in a state of helpless idiotism, and 6 in that of mental decrepitude.

In the report for the fourth year, it is stated, that two thirds of the chronic cases then reported belong to the incurable ones, thus leaving only ten out of thirty that could be considered as subjects for treatment.

RESULT OF TREATMENT.

RECENT CASES.

	DISCHARGED.						REMAINING.				
	Recovered.	*Much Improved.*	*Improved.*	*Unimproved.*	*Died.*	*Total.*	*Recovered.*	*Improved*	*Convalescing.*	*Stationary.*	*Total.*
1st year,	5	2	—	1	—	8	1	1	2	—	4
2d year,	12	1	1	—	1	15	—	3	—	2	5
3d year,	25	1	—	—	—	26	—	—	1	1	2
4th year,	21	—	—	1	1	23	—	—	—	5	5
5th year,	22	—	—	2	—	24	—	—	—	1	1
	85	4	1	4	2	96					

CHRONIC CASES.

	Discharged.						Remaining.			
	Recovered.	Much Improved.	Improved.	Unimproved.	Died.	Total.	Much Improved.	Improved.	Stationary.	Total.
1st year,	—	7	3	1	1	12	6	5	9	20
2d year,	2	4	3	8	—	17	1	6	13	20
3d year,	4	5	5	4	—	18	1	2	13	16
4th year,	3	3	—	1	3	10	—	4	16	20
5th year,	5	3	4	12	2	26	4	3	9	16
	14	22	15	26	6	83				

Recent cases discharged,	96.	Remaining,	1.	Total,	97
Chronic cases do.	83.	do.	16.		99
					196

Recovered.	Recent cases,	86
	Chronic cases,	14
		100

Recovery as to Duration of the Disease.

Of 97 Recent cases, 86 recovered.
99 Chronic cases, 14 do.

Recovery as to Age.

Between	10 and 20,	5
	20 and 30,	41
	30 and 40,	27
	40 and 50,	16
	50 and 60,	9
	60 and 70,	1
	70 and 80,	1
		100

Recovery as to the Species of Insanity.

	Males.	Females.	Total.
Mania,	35	28	63
Melancholia,	16	13	29
Delirium Tremens,	7	—	7
Hypochondriasis,	1	—	1
	59	41	100

On an examination of the reports, it is also found that more cases of recovery occur when the disease originates in what are technically called physical causes, than when from moral ones.

Thus,	15 arising from	Intemperance, recovered.
	14	Hepatic or bodily disease.
	4	Typhus fever.
	9	Religious excitement or despondency.
	2	Disappointment in business.
	3	Disappointed affection.
	3	Grief.
	1	Puerperal disease.
	7	Hereditary.

The institutions now noticed, are the only ones of which I have been enabled to obtain *Statistical accounts.* Others however exist in various parts of the union.*

Concerning Private Asylums, my information is very scanty. I may however mention that the late Dr. James P. Chaplin, conducted a most excellent and successful one for many years of his life, at Cambridge, near Boston. In a biographical notice of Dr. C. it is stated, that "probably no institution of the kind in this "country ever presented a greater number of cures. His method "was a moral one. In common cases, he used no medicine but "occasional purgatives. Coercion and confinement were but "little employed, and violence made no part of the system. It "was by his peculiar calm, commanding manner, and admirable "judgment in conversing with his patients, that he succeeded in "softening the obstinate and controling the violent. To moral "modes of treatment, he added a careful regimen and great exer-"cise."†

A brief comparison of the above results, with those deduced from the experience of the principal Lunatic Asylums in Europe, will form a proper conclusion to this paper. And first, of the

* Capt. Basil Hall speaks with approbation of the Insane Institution at Baltimore, and also of a new Lunatic Asylum, erecting at Columbia, (South Carolina.) "This establishment (he observes) is really a splendid instance of the public spirit which the Americans delight to evince, whenever a beneficent object is fairly placed before them." *Travels, Amer. edit.* vol. 2, p. 103, 188.

† Boston Med. and Sur. Journal, vol. 1, p. 641.

PROPORTION OF CURED.

	Admitted.	Cured.	Centesimal proportion, or No. cured in every 100.
New-York Lunatic Asylum, from 1795 to 1821,	1584	700	44.19
Bloomingdale Asylum, 7½ years,	1043	436	41.80
Pennsylvania Hospital, from 1752 to 1828,	3487	1254	35.96
Friends' Asylum near Philadelphia, 8 years,	158	53	33.54
Connecticut Asylum, 5 years,	196	100	51.01
Mean,			41.30

According to Dr. Casper, who has examined the returns from the principal Hospitals and Asylums in England and France, the mean of cures are as follows :

In France, out of 100 insane, 44.81 are cured.
In England, out of 100 insane, 37.40*

There may however be some fallacy in these general deductions, and I therefore add distinct returns from various Institutions.

	Admissions.	Cured.	Per cent.
The *Cork Lunatic Asylum*, (1798 to 1818,)† - -	1431	751	52.49
Salpetriere and Bicetre, Paris, (1801 to 1821,)‡	12,592	4968	nearly 30
Aversa near Naples, (1814 to 1823,)‖			29.70
Senevra Hospital, Milan, (1802 to 1826,)‡			58
Charenton, Paris, (1826—7—8,)§			33
Bethlem, London, (1817 to 1820,)‡			54
St. Luke's, London, (1800 to 1819,)‡			46

Proportion of Cured, in Recent and Old Cases.

	Admitted.	Cured.	Per cent.
Bloomingdale Asylum.			
Recent cases, - -	581	341	58.69
Old cases, - -	422	76	18.00

* American Medical Review, vol. 3. p. 13.

† Hallaran's Practical Observations on Insanity, 2d edition.

‡ Burrows' Commentaries on Insanity, pages 519, 522, 512.

‖ Edinburgh Medical and Surgical Journal, vol. 27. p. 230.

§ Esquirol in "Annales D'Hygiene Publique et De Medecine Legale," No. 1, page 130.

	Admitted.	Cured.	Per cent.
Connecticut Asylum.			
Recent cases, - -	97	86	88.66
Old cases, - -	99	14	14.14

These may be compared with the result at the

Retreat near York, (from 1796 to 1819.)			
Recent cases, - -	92	65	70.65
Old cases, - -	161	47	29.19
Dr. Burrows' Private Asylum.			
Recent cases, - -	242	221	91.32
Old cases, - -	54	19	35.18
Glasgow Lunatic Asylum.			
Recent cases, - -			50.00
Old cases, - -			13.00*

Sex.—This is not distinguished except in the Bloomingdale and Connecticut Asylums.

	Males.	Females.
Bloomingdale, - - -	693	350
Connecticut, - - -	108	88

In explanation of the great excess of males in the first of these, a fact mentioned to me by Dr. A. V. Williams of New-York, (who was for several years, house physician at the Asylum) may be stated. It is, that in the Bellevue Hospital, where the pauper lunatics are confined, the females greatly exceed the males; and probably, if the gross amount of both establishments were taken, the difference would not be great.

In Scotland, in 1818, according to the returns made by the clergy of the established church, the respective numbers were,

Males, 2,311. Females, 2,339.

Dr. Esquirol, in the work already quoted, after noticing the returns from Asylums in every part of Europe, and showing that female lunatics are most numerous in France, Spain and Holland, and male ones in England, Germany, Denmark and Russia, makes a grand total of all, (including some trifling details from this country,) and finds the number to be

37,825 Males. 38,701 Females.

* Burrows.

Mortality.

	Admissions.	Deaths.	Proportions.
New-York Lunatic Asylum,	1584	153	1 in 10½
Bloomingdale Asylum, -	1043	59	1 in 17½
Pennsylvania Hospital, -	3487	526	1 in 6½
Friends' Asylum, - -	158	21	1 in 7½
Connecticut Asylum, -	196	8	1 in 24½

According to Burrows, the mortality at the	
Wakefield Lunatic Asylum, (England,) is	1 in 4
Lancaster Lunatic Asylum, - - -	1 in 4
Senevra, (Milan,) - - - - - -	1 in 23
Cork Lunatic Asylum, (Ireland,) - -	1 in 3
Glasgow Asylum, (Scotland,) - -	1 in 10
Friends' Asylum at York, (England,) -	1 in 5*
According to Esquirol, the mortality in	
Paris, is - - - - - - -	1 in 13
Aversa, (Naples,) - - - -	1 in 4†

Proportion of Insane to the whole Population of the State.

According to the census of 1825, the state of New-York contained a population of 1,616,458.

The number of Lunatics was	819
of Idiots,	1421
	2240

Or, 1 in 721.

In Scotland, the proportion is	one in	400	
In Paris, - - -	one in	350	
In London, - - -	one in	600	
In England and Wales,	one in	2000	(*Burrows.*)

There can hardly be a question, that the estimate for Great Britain is greatly too low; but even granting it to be the same with London, and thus making the result in our own state more favour-

* Burrows' Commentaries, p. 552, &c.

† Edinburgh Med. and Surg. Journal, vol. 28, p. 230.

able than in foreign countries, still the proportion is one that deserves the serious attention of every philanthropist and statesman. We have but one Asylum incorporated by the government for the safe-keeping and management of upwards of 800 lunatics and 1400 idiots; and it has been the practice until very lately to confine many paupers of the above description, either in county jails, or poor-houses, or in private dwellings.

In April, 1827, an act was passed by the legislature, forbidding the confinement of any lunatic or idiot in a prison or house of correction; nor is it even permitted to confine in this way a person furiously mad. High penalties are prescribed for violating the law. The utility of these enactments is already witnessed. In the county of Albany, commodious apartments, separated from the main body of the alms-house, have been completed for its pauper insane, and by an act passed in March, 1828, the county of Washington is allowed to raise a certain sum of money for the erection of such additional buildings as may be deemed necessary and proper for the idiot and lunatic paupers.

Our commendation must, however, end in an acknowledgment of the increased attention paid by the legislature to the proper safe-keeping of this unfortunate class of beings. The system itself is radically defective. It does not make the requisite provision for their cure—it is far from effecting the necessary confinement—it does not sufficiently guard the public from the consequences of furious madness—and finally, it is the most expensive mode of providing for them. The experiment has been tried on a large scale in Great Britain, and to condemn it I need only refer to the tales of horror and of misery developed by an investigation into the condition of lunatics in county poor-houses.

It is evident that the most humane, the most efficient, as well as the most economical plan, would be, for the state to erect in its various great divisions, extensive Lunatic Asylums, provided with proper medical attendance, and all the safeguards so essential both to the patients and the public. Let these be increased, if the increase of the malady demands it. The burden of their support will fall equally upon all; the success of their treatment which we might reasonably anticipate, would leave vacancies for new cases; and instead of merely, (as at present,) keeping them in custody, to wear out a miserable existence, new trophies might be gained for the medical art, and many valuable citizens restored to their families and the community.

NOTE—Owing to unavoidable delay in printing this article, I am enabled to add the following report from the Pennsylvania Hospital, for the year, from April 26, 1828, to April 25, 1829. Of 200 patients in the Hospital, there were

Cured, - - - - - -	24
Relieved, - - -	32
Discharged by request, - -	30
Discharged, - - - -	1
Died, - - - - - -	7
Remaining, - - - -	106
	200*

* *Hazard's Register of Pennsylvania*, vol. 3, p. 349.

ART. X. *Observations on the* GREAT GREYWACKE REGION *of the State of New-York. By* JAMES O. MORSE, of Cherry-Valley, Corresponding Member.

Read October 28, 1829.

The comparative strength, and fertility of the different soils of our state, is a subject in which considerable interest is beginning to be felt ; and as these soils can be most accurately classified, by considering the kind of rock on which they repose, it is hoped that the following paper will not be thought altogether unworthy of a place among the records of the Institute.

The greywacke region, now under consideration, commences on Lake Erie, and extends to the east as far as the western parts of the counties bordering on the Hudson.

Its northern boundary commences on the shore of the lake, a little above Buffalo, and runs east in a serpentine course to the county of Schoharie, and then stretches more north, so as to embrace portions of the counties of Montgomery, Schenectady and Albany. This northern boundary is all the way, more or less indented by tracts of country in which lime-stone is the mass of rock on which the soil reposes. These spots of lime-stone soil, penetrate the northern boundary of the greywacke region, from one to twenty miles. The southern boundary of this great region is, all the way, south of the line of our state, and has never as yet, it is believed, been accurately traced. The soil is somewhat diversified, but has many common properties. In like manner, the rock on which it reposes, varies in colour and texture, but its *general* properties are perceptibly the same. The surface of this region is generally uneven, and in many places its undulations rise to high hills and mountains. The water is pure, soft and wholesome. Its elevation varies from about 600 to 1650 feet above tide water. The loose stones scattered over the surface, are portions of the greywacke, and boulders and fragments of gneiss, quartz, and some of granite.

The greywacke on which the soil reposes, is generally a good distance below the surface of the ground, and of different compactness. Near Lake Erie it is quarried into blocks that make excellent building stone ; and there are various other places where it is quarried in large square and oblong masses, that are much used. Grind stones are made of it, which have a near resemblance to those made from the quarries on Cayahoga river, in Ohio. Public sentiment is undergoing a rapid change, favourable to the fertility of the soil of this region. Wherever this tract of country is not at too great an elevation, it produces extremely well. As you approach Lake Erie, there is a rich loam in which all kinds of grain and fruit come to great perfection. The soil of this region evidently *wears* better, and requires less manure than that of a limestone region.

The cattle from some parts of it are in higher repute in Philadelphia, than any other. The pure springs of water with which it abounds, make it one of the healthiest parts of our country, and the increase of its population is now very rapid. This, in 1825, amounted (the part of it in our own state is meant) to more than 350,000, and it is now greatly augmented.

Some of our mineralogists have doubted whether the rock of this region was, properly speaking, greywacke; but of this there can be but little question. Professor Jameson describes greywacke, as composed of sand connected together by a basis of clay slate. A minute inspection of the rock of this region will convince any one that our greywacke has these component parts.

In one place however, near the head waters of one of the branches of Broken Straw creek, about twenty miles from Lake Erie, and at an elevation of more than 600 feet above the surface of the lake, large masses of greywacke are found *in place*, in which are imbedded and intermixed sand and pebbles, exactly resembling those found on the shores of the lake.

It is known that in the greywacke regions of Europe, this kind of rock is uncommonly productive of metalliferous ores, both in beds and veins; but as yet they have not been discovered in that region in our state.

In the principality of Transylvania, in Europe, the greywacke is traversed by numerous small veins of gold. The greywacke soil of this principality, like ours, is fertile and abounds in rich pastures.

The alluvions, and second bottoms, on the streams and in the vallies of our greywacke region, possess uncommon fertility, and will ere long, it is believed, furnish immense quantities of hemp, as measures are in progress for the general introduction of this staple into the region.

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ART. XI. *Topographical Sketch of the State of New-York, designed chiefly to show the general Elevations and Depressions of its Surface.* *By* JOSEPH HENRY.

Read October 28, 1829.

The Topography of the state of New-York, viewed either in relation to that of the continent of North America in general, or only in reference to the space included within its own political boundaries, presents many interesting and peculiar features.

The two great lakes, and their outlets, forming a natural boundary on the north and west; the continued chain of water communication of the Hudson and Lake Champlain, along the whole eastern section; the connected series of smaller lakes in the interior, together with several large streams which rise in the middle of the state, and pass through its southern boundary; all give to the surface of New-York a diversity of aspect, and a facility of internal navigation, possessed by no other section of our own country, and perhaps not surpassed by any of equal extent on the surface of the globe.

The eastern portion of the United States, designated by geographers as the Atlantic slope, is separated from the central part, or the great valley of the Mississippi, by a marked natural division, consisting of a continuous swell or ridge of land extending from Alabama to the south shore of Lake Ontario. This ridge is the true *water shed* of the country, and determines the course of the rivers falling into the Atlantic on the one side, and those into the Mississippi on the other. It has a mean height of about 3000 feet; and cannot be crossed at any point south of the state of New-York, by an elevation of less than two thousand feet above the ocean. Upon the acclivities of this ridge are based an indeterminate number of spurs, hills, and collateral subordinate ridges, which often rise to a much greater height than the crest of the *water shed.* These subordinate ranges are not continuous, but are often cut through by the Atlantic rivers: They have, however, nearly the same direction as the main ridge; and in passing through North-Carolina and Virginia, assume the form of four principal ranges, nearly parallel to each other. The three westernmost of these mingle together in the northern part of Pennsylvania, and form a mountain chain, which diverges to the east from the great water shed, and in passing through the state of New-York, occupies the space between Seneca lake and the Hudson river. At first sight, it appears to terminate at the valley of the

Mohawk; but it soon rises again on the north side of the river, and forms the mountain district between Ontario and Champlain; is afterwards cut through by the valley of the latter, and then passes on towards the sources of the Connecticut. The remaining ridge of the four parallel ones continues separate from the others, and suddenly turns to the east in Pennsylvania, crosses the state of New-Jersey, and is deeply cut through by the Hudson at West-Point, where it forms the highlands of that river: It afterwards passes to the north in nearly a straight line, and forms the dividing ridge between the waters of the Hudson and those of the Connecticut: at the sources of the latter, it mingles with the other mountain chain, and they then together pass on to the northeast, and may be traced even to the coast of Labrador. The opening between these ridges forms a long, deep, and narrow valley, in which is situated the part of the Hudson river between West-Point and Glen's Falls, and the whole of Lake Champlain. South of this state, the several collateral ridges are cut through by the Susquehanna, the Potomac, and several other streams of less magnitude, which rise near the crest of the water shed, and flow with a rapid descent to the ocean. This fact has been stated as something peculiar in the topography of our country, and has given rise to the fallacious hope of finding practicable canal passes through the river vallies from the waters of the Atlantic to those of the Mississippi; but the water shed, in its uninterrupted continuity, every where rises as an insuperable barrier, and the lowest pass yet found south of New-York is elevated more than 2000 feet above the ocean. As a whole, these mountains are known by the name of the Appalachian system; but the parallel ridges are perhaps most generally referred to as the Alleganies; and these again, in their course, have received different local names, such as the Blue Ridge in Virginia, the Catskill in New-York, and the White Mountains in New-Hampshire. From the above sketch of the great mountain system of our country, the peculiar topographical features of the state of New-York will be readily understood.

The Appalachian system may be said to occupy the principal part of the state; and, indeed, through the whole district, the mountains appear to be only partially interrupted by the vallies of rivers, or depressed by the basins of lakes. The entire surface may perhaps be best described as an elevated tract of country, with indentations in various places below its general level. The most important depressions of the surface are the great basins in which are situated the lakes Erie and Ontario, and the long narrow valley which contains the Hudson river and Lake Champlain. The two last are connected with each other by a valley occupied by the Mohawk river and the Oneida lake; and with it, may be considered as separating the whole mountain system of this state into three principal divisions. The first of these, and the largest of the whole, occupies the space situated south of the Mohawk river and the Ontario valley, and between the Hudson river and Lake Erie. The second is the mountain district north of the Mohawk, and between Lake Champlain and the east end of Lake Ontario. The third division comprises that part of the mountain range on the east side of the Hudson river included within this state. The first division is separated into two parts, by the basins of Seneca and Cayuga lakes, and by an elevated valley extending from the head of the former to the valley of the Chemung or Tioga river, at Newtown.

The western subdivision, or the part of the state between Seneca lake and Lake Erie, is occupied by that portion of the mountain system which we have called the *water shed*. This, in its course from the south, in Pennsylvania and New-York, forms a high table land of about two thousand feet in mean elevation. The highest part of it comprises the surface of the counties of Steuben, Allegany, Cattaraugus and Chautauque; and a little to the north of these, it begins to decline, and finally descends, by three principal steps, to its terminations on the south shore of Lake Ontario. The great elevation and geographical importance of this table, may be inferred from the fact, that it gives rise to several streams of water, which find the level of the ocean at points almost as distant as the extremities of the continent. The head branches of the Allegany, of the Genesee, and of the Susquehanna, are all found inosculating with each other in the county of Allegany; while their waters separately mingle with the ocean in the gulf of St. Lawrence, the Chesapeake bay, and the gulf of Mexico. But the following heights, from actual survey, will serve to give a more definite idea of its general elevation.

Chautauque lake, the largest* sheet of water on this table, and the most elevated of its size in the United States, is 1291 feet above the level of the ocean, and 723 feet higher than Lake Erie, although only eight miles distant: its discharged waters descend to the ocean, along the western declivity of the water shed, through

* It is 18 miles long, contains 16,000 square acres, and discharges 2295 cubic feet of water per minute.—*Whippo's Report.*

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the Ohio and the Mississippi rivers. The lowest pass to the east, over a swell of land near Casadaga outlet in Chautauque county, is 1720 feet high; and another pass in the same swell is 1972 feet. The lowest notch in the height of land between Elm and Little Valley creeks, in Cattaraugus county, is 1725 feet; and between Little Valley and Big Valley, the lowest pass is 2144 feet above the level of the ocean. Franklinville has an elevation of 1580 feet, and Angelica 1428 feet, although both are situated in vallies. This height of land extends close to the shore of Lake Erie, as it may be seen by the map, that one of the head branches of the Allegany, a tributary of the Ohio, rises within four or five miles of the lake. The surface is not broken, but consists of large swells of land, with broad shallow vallies intervening. The principal indentation of the surface, is the valley of the Genesee river, which may be considered as an arm of the Ontario valley, extending into the state of Pennsylvania. The extreme southern branches of this river rise at an elevation of more than 2500 feet.

The space between Seneca lake and the Hudson, and south of the Mohawk, is occupied by the mountain chain formed by the union of the three parallel ridges before mentioned, as mingling in Pennsylvania, and passing through New-York. The surface is much more uneven than that of the part just described, and presents the general appearance of a number of ridges in a north and south direction. The highest of these is the Catskill mountains, which bound the valley of the Hudson on the west, and rise in some places nearly 4000 feet higher than the level of the ocean. The Round Top is 3804, and the High Peak is 3718 feet, above the level of the tide waters of the Hudson.* The principal indentations of the surface of this subdivision of the mountain part of the state, are the vallies of the Susquehanna, the Delaware, and their several branches. By a reference to the map, it will be seen that the Chemung river, the main branch of the Susquehanna, and the Delaware river, when viewed in connexion with each other, present an almost entire water course, extending along the Pennsylvania line, from Painted Post, in Steuben county, to the northwest angle of the state of New-Jersey, the only interruption being the space between the Delaware and the Susquehanna. The vallies in which these rivers are situated, cross the mountains in an east and west direction; but their several tributaries, viz. the two branches of the Susquehanna, the Unadilla and the Chenango

* As measured by Capt. Patridge.

rivers, the Owego and the Cayuta creeks, besides several smaller streams, descend to the south, and intersect the principal vallies in a remarkable manner, nearly at right angles to their general course. These streams all rise on a narrow table land, which is situated a little south of the line of the Erie canal, and may be traced on the map as forming the water shed, between the heads of streams flowing to the north and the south, in an uninterrupted course, from the Catskill mountains to the head of Seneca lake. Along the summit of this table land, are a number of small, but highly elevated lakes, which give a peculiar character to this region. The first of these, from the east, and the largest of the whole, is Otsego lake, the outlet of which forms the Susquehanna river. It is a beautiful sheet of water, surrounded by high hills ; is nine miles in length, three in breadth, and elevated 1193 feet above the surface of the ocean. Tho next is Schuyler's lake, which also gives a branch to the Susquehanna : It is situated a few miles to the west of Otsego lake, in the same county ; its exact elevation is not known, but it cannot be less than 1200 feet. The other lakes worthy of notice on this table land, are Cazenovia, Skaneatelas and Owasco. These are on the northern declivity, and discharge their waters to the north : they are scarcely as much elevated as the two just mentioned ; the first being about 900 feet, the second 840, and the last 670 feet above the level of the ocean. It might be supposed, by an inspection of the map, that Cayuga and Seneca lakes were also highly elevated on this table land ; but this is not the case, as the former is only 387 and the latter 447 feet above the level of tide. They in reality occupy two long narrow ravines, which deeply indent the surface of the adjacent country, and are separated from each other by a ridge which rises to the height of more than 800 feet above Cayuga lake. The smaller lakes above mentioned are situated several hundred feet above the highest level of the Erie canal, and form inexhaustible reservoirs to supply it with water.

It may be here remarked, that this is an advantage possessed by no other canal route in this country, as it is a curious feature in the physical geography of the United States, that except in the swamps along the southern sea coast, no lake is to be found east of the Mississippi and south of the latitude of the southern boundary of New-York, while almost every river north of this degree issues from a lake or a pond.*

* Gallatin's Report.

The following tables of ascents and descents will serve to give a correct idea of the general configuration of the surface of the whole of the first division of the state, or that part situated between the Hudson and Lake Erie.

No. 1, is a section in an east and west direction from the Hudson to Lake Erie. It commences at the level of tide in the river, and passes over the several ridges to the village of Bath, in Stuben county, and then crosses the high table land to Lake Erie.—No. 2, also begins on the Hudson, at Kingston landing, and follows principally the vallies of streams along the Pennsylvania line to Bath, where it intersects with No. 1.—Nos. 3, 4, 5, 6, 7, 8 and 9, are sections at right angles to Nos. 1 and 2. The five last, pass from points on the south shore of Ontario up the slope of the great depression which contains this lake, to the summit of the table land, and then down the valley of streams to the Susquehanna and the Allegany rivers.—No. 3, is from a point in the valley of the Mohawk, and passes over the ridge to the head waters of the Susquehanna, and then descends this river to the Pennsylvania line.—No. 4, extends entirely across the state, from the St. Lawrence to the Susquehanna river, and exhibits the deep depression of the Mohawk valley below the level of the ridges on each side.

The several distances given in these tables are in most cases straight lines, measured from point to point on a map, but the elevations are all from actual surveys, made at the expense of the state.

The elevations in table No. 1, between the Hudson river and Bath, are from the survey of William Morell, Esq. The remaining elevations of this table, as well as those in No. 2, are from the personal survey of the writer of this article. The elevations in both these tables were taken under the direction of Messrs Hammond, Morell and Pitcher, as commissioners to explore the route of a state road through the southern tier of counties, in 1825. No. 3, is from the survey of Dr. William Campbell and De Witt Clinton, Jun. The remaining six tables were taken from the reports and maps of Messrs Geddes, Roberts, Hutchinson, Young and Whippo, engineers employed by the canal commissioners to explore the routes of 15 proposed canals, in 1825.

It must be premised with regard to these heights, that as they are points on routes explored for roads and canals, they are the elevations of the lowest passes near the line of survey, and are consequently less than the general height of the several ridges.

No. I.

Table of Ascents and Descents across the Ridges from Catskill, on the Hudson, to the Village of Bath, in Steuben County, and thence to Lake Erie.

ROUTE.	MILES.		FEET.		
From the Hudson river, at Catskill, to Madison village,		4	rises		184
Cairo,	7	11	rises	226	410
Shinglekill at Cairo,	0	11	falls	40	370
Catskill mountain summit,	13	24	rises	1542	1912
Valley of the Schoharie at Gilboa,	10	34	falls	742	1170
Head waters of the Delaware,	10	44	rises	716	1886
Delhi on the Delaware,	18	62	falls	502	1384
Height of land between the Delaware and Susquehanna,	5	67	rises	759	2143
Susquehanna river at the junction of the Oleout creek,	17	84	falls	1143	1000
Unadilla river one mile above its junction with the Susquehanna,	5	89	falls	27	973
Between Unadilla and Chenango,	6	95	rises	657	1630
Valley of the Chenango at Oxford,	6	101	falls	669	961
Between Chenango & Tioughnioga or Homer river,	13	114	rises	133	1094
Valley of the Tioughnioga, at the junction of the Otselic,	6	120	falls	159	935
Between Tioughnioga and Owego creek,	8	128	rises	445	1380
Valley of the Owego at Richford,	7	135	falls	285	1095
Between the Owego & the dp. valley of Cayuga lake,	4	139	rises	275	1370
Valley of the Cayuga lake at Ithaca,	10	149	falls	962	408
Between the Cayuga valley and the Seneca inlet at Catharine landing,	11	160	rises	849	1257
Catharine landing,	7	167	falls	801	456
Between the Seneca valley and Mud creek, a branch of the Conhocton,	9	176	rises	1188	1644
Valley of Mud creek 1 mile below Mud lake,	4	180	falls	528	1116
Between Mud creek and Conhocton,	6	186	rises	463	1579
Conhocton valley at the village of Bath,	4	190	falls	489	1090
Between Conhocton and Canisteo,	7	197	rises	750	1840
Canisteo valley at Arkport,	9	206	falls	646	1194
Between the Canisteo and Genesee,	8	214	rises	868	2062
Genesee valley at Angelica,	10	224	falls	634	1428
Between the Genesee valley and Oil creek,	13	237	rises	59	1487
Oil creek valley, a tributary of the Allegany,	2	239	falls	39	1448
Between Oil creek and Ellicottville,	12	251	rises	696	2144
Ellicottville, on a tributary of the Allegany,	8	259	falls	630	1514
Between Ellicottville and the Conewango,	3	262	rises	621	2135
Conewango valley, at the junction of Clear creek,	15	277	falls	885	1250
Between Conewango valley and Chautauque lake,	8	285	rises	716	1966
Chautauque lake,	18	303	falls	675	1291
Between Chautauque and Lake Erie,	1	304	rises	61	1352
Lake Erie, at Portland harbor,	7	311	falls	787	565

Note—The numbers in the first column of figures are the distances from point to point—those in the second, are the total distances. The third column of figures gives the ascents and descents; and the fourth, the elevations of the several points above the level of tide water in the Hudson.

No. II.

Table of Ascents and Descents from the Hudson, at Kingston Landing, to Bath in Steuben County, by the route of the vallies of the Rondout Creek, the Beaver Kill, the east branch of the Delaware, and the east and west branches of the Susquehanna.

ROUTE.	MILES.		FEET.		
Hudson river, at the junction of the Rondout, to Kingston village,		2	rises	188	188
Warwasing,	21	23	rises	123	311
Sullivan county line on the Rondout,	10	33	rises	462	773
Height of land between the Rondout and Neversink,	6	39	rises	896	1669
Neversink river,	2½	41½	falls	357	1312
Height between the Neversink and Beaver kill,	2½	44	rises	768	2080
Junction of the Beaver kill and the east branch of the Delaware,	24	68	falls	1062	1018
Junction of the east and west branches of the Delaware,	7	75	falls	96	922
Deposit on west branch of the Delaware,	11	86	rises	82	1004
Height of land between the Delaware and the Susquehanna,	6	92	rises	684	1688
Susquehanna at Windsor,	4	96	falls	775	913
Height across the Great Bend of the Susquehanna,	5	101	rises	644	1557
Binghamton on the Susquehanna,	9	110	falls	721	836
Owego on the Susquehanna,	18	128	falls	32	804
State line above Tioga Point,	15	143	falls	19	785
Newtown on the Chemung or Tioga,	13	156	rises	51	836
Painted Post, at the junction of Tioga and Conhocton,	14	170	rises	106	942
Bath on the Conhocton,	17	187	rises	148	1090

The last six stations in the above table, or those from Binghamton to Bath inclusive, are along the valley of the two great branches of the Susquehanna. The elevations opposite these stations give 900 feet as the mean height of the bottom of this valley, but the mountains on each side rise from five hundred to a thousand feet higher. These mountains are some of the high ridges whose elevations are given in table No. 1, and which here retain about the same elevation.

No. III.

Table of Ascents and Descents from the valley of the Mohawk through Otsego Lake, and down the valley of the Susquehanna to the Pennsylvania line.

ROUTE.	MILES.		FEET.		
Fort Plain, on Erie canal, ...					304
Lake Summit, in Springfield, ...		16½	rises	1048	1352
Head of Otsego lake, ...	3	19½	falls	159	1193
Along Otsego lake to its outlet, ...	9	28½	level		1193
Mouth of Oats creek, ...	3½	32	falls	12	1181
Crippen's Ville, at the dam, ...	12	44	falls	23	1158
Opposite the mouth of Charlotte river, -	7	51	falls	80	1078
Pennsylvania line, ...	59	110	falls	178	900

No. IV.

Table of Ascents and Descents on nearly a direct line from Ogdensburgh on the St. Lawrence, to Binghamton on the Susquehanna, by the way of the Black river, and across the valley of the Mohawk; thence to the head of Chenango River, and down the same to its mouth.

ROUTE.	MILES.		FEET.		
Ogdensburgh, on the St. Lawrence, . .					226
Indian river, near the village of Antwerp, .		34	rises	233	459
Black river, above the falls at the village of Carthage,	14	48	rises	234	693
Along the valley of Black river, to foot of High falls, near mouth of Moosic river, . . .	27	75	rises	10	703
Summit between Black river and the Mohawk, near Boonville, ...	9	84	rises	432	1135
Erie canal at Rome, and highest part of the Mohawk and Oneida lake valley, ...	18	102	falls	710	425
Head of Chenango valley, at Hamilton village,	26	128	rises	730	1155
Along the Chenango river to tha forks, . . .	42	170	falls	208	947
Binghamton on the Susquehanna, . .	10	180	falls	111	836

No. V.

Table of Ascents and Descents from Lake Ontario along the Oswego River, through the Tully Lakes, and down the Tioughnioga River to the Susquehanna.

ROUTE.	MILES.		FEET.		
Lake Ontario, at mouth of Oswego river, .					231
Outlet of Onondaga lake, ...		28	rises	130	361
Erie canal at Syracuse, ...	7	35	rises	38	399
Tully lakes, town of Tully, ...	18	53	rises	795	1194
Forks of the streams near Homer village, .	12	65	falls	98	1096
Chenango forks, ...	29	94	falls	149	947
Junction of Chenango and Susquehanna, at Binghamton, ...	10	104	falls	111	836

No. VI.

TABLE of Ascents and Descents from Little Sodus Bay on Lake Ontario, to Owego on the Susquehanna, along Cayuga Lake and the valley of Owego Creek.

ROUTE.	MILES.		FEET.		
Little Sodus bay on Lake Ontario, . .					231
Montezuma on the Erie canal, . . .		31	rises	49	380
Outlet of Cayuga lake, ...	6	37	rises	7	387
Along the lake to its head, ...	36	73	level		387
Summit between Cayuga lake and Owego creek,	6	79	rises	594	981
Susquehanna at Owego, ...	20	99	falls	185	796

The elevation of Owego, according to table No. 2, is 804 feet, which differs eight feet from that given in the above table. This small discrepency is owing to the circumstance of the elevations in these two tables being the results of surveys entirely independent of each other, and which intersect at Owego, after a circuit from the Hudson, of more than 300 miles. Table No. 2, also intersects with No. 4, at Binghamton, andwith No. 7, at Newtown. At the former place the difference was only the fraction of a foot, and at the latter less than two feet. These facts show with what precision measurements of this kind can be made, and what reliance may be placed on the correctness of the elevations of the several points given in these tables.

No. VII.

TABLE of Ascents and Descents from Great Sodus Bay on Lake Ontario, along Seneca Lake and the route of the Chemung Canal, to Newtown on the Chemung or west branch of the Susquehanna River.

ROUTE.	MILES.		FEET.		
Lake Ontario, at Great Sodus bay, . .					231
Lyons, on the Erie canal, ...		15	rises	170	401
Outlet of Seneca lake, near Geneva, . .	12	27	rises	46	447
Along the lake to its head, ...	34	61	level		447
Summit between the lake and Chemung river,	8	69	rises	443	890
The Chemung at Newtown, ...	10	79	falls	53	837

No. VIII.

TABLE of Ascents and Descents from Lake Ontario, along the valley of the Genessee River, to the mouth of Black Creek in Allegany County, and thence to Olean, on the Allegany River, along Oil and Black Creeks.

ROUTE.	MILES.		FEET.	
Mouth of Genessee river, ...				231
Erie canal, at Rochester, ...		8		506
Squaque hill, ...	29	37	rises 68	574
Gardow flatts, ...	6	43	rises 76	650
Head of the Great falls in the town of Nunda,	8	51	rises 453	1103
Mouth of Black creek, ...	16	67	rises 162	1265
*Summit level between Black and Oil creeks,	10	77	rises 221	1486
Olean on the Allegany, ...	13	90	falls 78	1408

No. IX.

TABLE of Ascents and Descents from the mouth of Oak Orchard Creek, on Lake Ontario, in nearly a direct line to Olean on the Allegany, by the route of Batavia, the Tonnewanta Creek, Lime Lake, and the valley of Ischua Creek.

ROUTE.	MILES.		FEET.	
Lake Ontario, at the mouth of Oak Orchard creek,				231
Albion, on the Erie canal, ...		8	rises 275	506
Tonnewanta creek, at Batavia, ...	17	25	rises 377	883
Attiea, along Tonnewanta creek, ...	11	36	rises 71	954
Dividing ridge between Tonnewanta and Cattaragus creeks, ...	18	54	rises 526	1480
Lime lake,†	14	68	rises 143	1623
Olean Point, on the Allegany, along the valley of Ischua and Oil creek, ...	27	95	falls 214	1409

It is evident from these tables, that the mountain system occupies the entire width of the southern part of the state, between the Hudson and Lake Erie. The section given in Table No. 1, exhibits a mean elevation, after the first 13 miles from the Hudson, of 1400 feet, and presents no height less than 935 feet, except at its extremities, and in the two places where the survey descends into the deep ravines in which are situated Cayuga and Seneca lakes. If this section had passed a few miles to the south of the head of Seneca lake, the lowest point would have been 890 feet, which is the highest part of the bottom of a valley extending from this lake to the Chemung river. The mean elevation of the sev-

* This summit is a marsh—the discharged waters of which find the level of the ocean in the gulf of St. Lawrence and the gulf of Mexico.

† This lake, according to Mr. Roberts' report, is 1642 feet above tide. According to the same report, Beaver lake, in the town of China, is 1704 feet.

eral ridges, crossed by the same section, is 1700 feet. And as these elevations are the lowest notches near the line of the survey, they may be considered as being but little higher than the general elevation of the surface of the country.

The second division of the mountain district of the state, or that on the north side of the Mohawk and Oneida valley, and between Lake Ontario and Champlain, has not been as minutely explored by topographical surveys for roads and canals, as the division we have already described; but the surface is known to be traversed, in a northeast direction, by at least five or six parallel ridges. The position of the principal one of these, beginning in Oneida county, may be traced on the map, between the heads of streams flowing to the right and left of its course through the middle of Herkimer and Hamilton counties, and the northern part of Essex, near the sources of the Hudson. The lowest pass across this ridge, between the valley of the Black river and the head waters of the Mohawk, is shown in table No. 4, and is elevated 1135 feet above the level of tide water. The lowest notch between West Canada creek and the Black river, is elevated 1226 feet, and between Fish creek and Salmon river, near where the ridge commences, the pass is 659* feet high. One of the peaks of this ridge, called the White Face, rises to the height of 2686 feet; and the general elevation of the country in the middle part of Hamilton county, has been estimated at from 1800 to 2000 feet above the level of the ocean.

The mountains of this section are often described as an isolated group, entirely disconnected from the Appalachian system, which is generally considered as terminating in New-York, at the valley of the Mohawk river and Oneida lake. But when we view their relative positions, and the general direction of their several ridges, we must at once be convinced that they are, with all the other mountains in this state, only a part of the great chain which traverses the United States from Alabama to Maine. Indeed, the existence of a separate mountain group in any part of our national territory, has been reasonably doubted; and, strictly speaking, such a phenomenon is perhaps not to be found on the surface of the globe.

The third division, or that portion of the state on the east side of the Hudson, is situated principally on the western acclivity of the ridge which has been described as continuing distinct from the

* Judge Geddes' report.

other subordinate ridges of the mountain system, and crossing the Hudson in the vicinity of West-Point, forming the Highlands of the river, and afterwards the dividing ridge between the Hudson and the Connecticut. The crest of this ridge passes to the north, on the east side of the boundary of New-York, in New-England, and has a mean elevation of more than 2000 feet. One of the lowest notches yet explored, is at Washington summit, in Massachusetts, on the route of the contemplated rail-way from Boston to Albany, and is elevated 1480 feet above the level of tide water in Boston harbor. This mountain range is known by various names in different parts of its course: before it crosses the Hudson, it is called the Blue Ridge; in Massachusetts and Connecticut, the Taghonnuc Range; and in Vermont, the Green Mountains. But as it lies principally without this state, a more particular description would be foreign to our purpose.

From the foregoing sketch, the truth of our remark must be evident, that the whole surface of the state of New-York is a mountain tract of country, indented in several places below its general level, by the great depressions, in which are situated the waters of its principal lakes and rivers. The most important depressions, as we have already observed, are the basins of Lake Erie and Ontario, the valley in which is situated the Oneida lake and the Mohawk river, and that which contains the Hudson river and Lake Champlain. The basins of Lake Erie and Ontario are only parts of the immense St. Lawrence basin, which contains the five great western lakes, and bounds a principal part of the northern frontier of the Union. As this interesting depression of country is intimately connected with the topography of this state, we will dwell a few moments on some of its general features. Commencing at the Gulf of St. Lawrence it extends almost to the head waters of the Missisippi, a distance of nearly 1800 miles. In its whole depression it is computed to contain 511,930 square miles of surface, 72,930 of which is covered with water. It may be described as consisting of three great but unequal divisions; the upper, the middle, and the lower sub-basins. The first of these is in the form of a rhomb, and has an area of about 90,000 square miles, more than one-fourth of which is occupied by the waters of Lake Superior. The next, or middle sub-basin, occupies a quadrangular area of at least 160,000 square miles, and contains the three central lakes, viz: Huron, Michigan and Erie, in its lowest depressions. The surface of the lower sub-basin has an area of about 260,000 square miles, and is covered in part by the waters of Lake Ontario and St. Lawrence river.

Lakes Michigan and Huron are immense chasms, the bottoms of which, in some places, sink to the almost incredible depth of 1000 feet below their surface, and more than 300 feet below the level of the ocean. This is an interesting fact in the physical geography of the country; as these lakes are probably the lowest depressions on the continental surface of the earth. The surface of Lake Erie is elevated 565 feet above the level of the Atlantic ocean, 76 below Lake Superior, and 35 lower than the general level of Michigan and Huron. Its bottom, which is seldom depressed more than 200 feet below its surface, is composed of alluvial deposit, probably washed down from the upper lakes by the continued action of a rapid current. Lake Ontario is elevated 231 feet above the level of the ocean: its mean depth has been estimated at 492 feet, although, in the middle, attempts have been made with 300 fathoms without striking soundings.* The St. Lawrence river, which connects this system of lakes with the Atlantic ocean, is the second river in magnitude in America, being no less than ninety miles wide at its mouth, and navigable for ships of the largest size, 400 miles from the ocean: Its whole length, from Lake Ontario to its mouth, is 692 miles.†

The following table, compiled from Darby's Geographical View of the United States, gives in a connected form, the elevation and extent of the several waters of the St. Lawrence basin.

No. X.

TABLE of Elevation, mean Depth, Length, Breadth and Area, of the several collections of Water in the great St. Lawrence basin.

	Elevation above tide level.	Mean depth.	Mean length.	Mean breadth.	Area.
	Feet.	Feet.	Miles.	Miles.	Square miles.
Lake Superior,	641	900	300	80	24,000
Lake Huron,	596	900	200	95	19,000
Lake Michigan,	600	900	300	50	15,000
Lake Erie,	565	120	230	35	8,030
Lake Ontario,	231	492	180	30	5,400
River St. Lawrence and smaller lakes,		20			1,500
Total water surface,					72,930

* Dr. Bigsby's sketch of the topography of Lake Ontario. Philosoph. Mag. and Annals, vol. 5, page 4. † Darby.

The several slopes of the St Lawrence basin, not covered by water, have been estimated to be sufficient to sustain a population of thirty millions of inhabitants. But the most interesting fact connected with this great depression, is the vast quantity of fresh water contained in its several reservoirs. From the data furnished by the above table, which may be considered as an approximation to truth, we find that the whole amount of water is 10,500 cubic miles; more than one half of the fresh water on the surface of the globe.*

The discharged waters of the upper lakes, in passing from the middle to the lower sub-basin of the St. Lawrence, are precipitated over the great falls of Niagara. This celebrated cataract has been rendered so familiar to almost every person, by the pen and pencil of the many travellers who have visited it, that a formal description, in this sketch, would be entirely unnecessary. About 20 miles below Lake Erie the Niagara river narrows, and the rapids commence: these are of such force and velocity, that their noise, agitation and fury constitute an object of as much curiosity as the falls themselves. On the very brink of the precipice, is situated Goat island, which contains about eighty acres, and extending up the stream, divides the waters. At this place the Niagara river, nearly half a mile wide, and flowing with immense velocity, is precipitated headlong over a perpendicular ledge of rocks, into an almost unfathomable abyss below. The height of the falls, from the surface of the water above to that of the water below, is 151 feet on the Canada side, and 164 on the American. The descent of the country from Lake Erie to Ontario, is principally by a step, not at the falls, but at Lewiston, several miles below. The surface on each side is a level plain, through which the Niagara river passes below the falls, in a deep chasm, nearly a mile wide, with almost perfect mural sides. In viewing the position of the falls, and the features of the country around, it is impossible not to be impressed with the idea, that this great natural race-way has been formed by the continued action of the irresistible current of the Niagara, and that the falls, beginning at Lewiston, in the course of ages have worn back the rocky strata to their present site.

The distances and descents along the Niagara river, from Lake Erie to Lake Ontario, from actual survey on the American side, are as follows:

* See Edin. Encyclop. Article Phys. Geog. page 605.

From Lake Erie to the head of the rapids, distance	20 miles, fall	15 feet.
Thence to the falls,	1	51
The falls,		164
From the falls to Lewiston, at the mouth of the chasm,	7	104
Thence to Lake Ontario,	7	2
Total,	35 miles, fall	336 feet.

The annexed table of elevations and distances, through the whole extent of the St. Lawrence basin, in connexion with the tables already given, will show its depression below the mountain surface of the country.

No. XI.

Table of Ascents and Distances through the St. Lawrence basin, from the gulf of St. Lawrence to the western angle of Lake Superior.

ROUTE.	MILES.		FEET.		
Up St. Lawrence river to the head of tide water,		450			
Lake Ontario level,	200	650	rises		231
Lake Erie level,	175	825	rises	334	565
Lake Huron level,	340	1165	rises	31	496
Lake Superior level,	240	1405	rises	45	641
Mouth of St. Louis river into the western angle of Lake Superior,	380	1785	level		641

The slopes of the lower subdivision of the St. Lawrence basin, which descend to the shores of Lake Ontario, occupy a considerable portion of the state of New-York. Beginning near the eastern extremity of Lake Erie, the boundary or edge of this sub-basin may be traced on the map along the heads of streams falling into Lake Ontario, through the southern part of the counties of Erie and Genessee, to the valley of the Genessee river, which is an arm of the St. Lawrence basin, stretching up into the high lands of Pennsylvania. From the Genessee river, the edge of the basin curves to the southeast around the southern extremities of Seneca and Cayuga lakes, including the four smaller lakes which lie a little to the west of these. The deep ravines in which are situated Seneca and Cayuga lakes may also be considered as arms or branches of the principal basin, separated from each other by a high ridge. From the head of Cayuga lake, the edge of the basin turns suddenly to the north along the lake, and passes in a northeasterly direction through the northern part of Cortland county, a little south of Skeneateles lake, in nearly a straight line to the Little Falls on the Mohawk river. Here it suffers, for the first time in the course that we have described, an interruption, and an outlet appears to have been forcibly broken through into the lower valley of the Mohawk, by some tremendous convulsion of nature. From the Little Falls, the edge of the basin may be traced along the sources of the Mohawk river, Fish creek and the Salmon river, to the valley of the Black river, which may be considered a branch of the St. Lawrence basin, extending back almost to the valley of the Mohawk. From the Black river to St. Regis the remaining part of the basin in this state is the narrow slope of land along the St. Lawrence river, and the several vallies through which descend the Grass, the Racket, and the St. Regis rivers.

From the foregoing description of the southern boundary of the lower subdivision of the St. Lawrence basin, it evidently comprises the richest and most fertile part of the state, and includes the minor basins of the Genessee country, of the Oneida lake, and the valley of the Mohawk river as far east as the Little Falls. It is also evident from the data before given, that the mean elevation of the high land, forming the boundary just described, must be at least 1600 feet above the level of the ocean. On the north side of the lake in Canada,* the edge of the basin probably rises to nearly the same height, and as the bottom of Lake Ontario, in the deepest places, sinks 900 feet below its surface, or more than 600 feet below the level of the ocean, it follows that this collection of water occupies the lower part of an immense hollow, the deepest depressions of which are more than two thousand feet below the general level of the surrounding mountain surface. As this hollow is situated with its longer diameter directly across the mountain system, it lays bare to the view on its southern side the different strata of rocks which deeply interlays the surface of the country to the south, and presents a geological section in this state, perhaps not less interesting than that at Paris, London or Rome.

The lowest pass from the ocean into the St. Lawrence basin throughout its whole extent, except the bed of the St. Lawrence river, is through the vallies of the Hudson and the Mohawk rivers. The highest part of this pass is near the Little Falls, and is elevated only 425 feet above the level of tide water.

The elevation of the lowest passes to the south, between the waters of Lake Ontario and those of the Susquehanna and the

* See Bigsby's Sketch.

Allegany rivers, are given in tables Nos. 5, 6, 7, 8 and 9. The lowest of these is shown in table No. 7, where the Seneca lake approaches to within 18 miles of the Chemung river, and is separated from it by an intervening elevation of 443 feet above the lake, or 890 feet above the ocean. The pass through which the Ohio canal is constructing is 395 feet above the level of the ocean. But the lowest pass to the south from any of the western lakes is that between the Chicago, a small stream emptying into the southern end of Lake Michigan, and the river Des Plaines, a branch of the Illinois. The summit is here only 17 feet above Lake Michigan, or about 617 feet above the ocean.* This is the most surprising and important hydrographical feature of our country; as it here, comparatively speaking, requires but a slight effort of art to give a new outlet to the upper lakes, and to divert a portion of the waters of Superior and Michigan from their present channel of the St. Lawrence to that of the Missisippi. Indeed, two of the plans reported by the canal commissioners of the state of Illinois, are to cut entirely through the barrier, and to supply the summit of a canal through this pass with water directly from Lake Michigan.

From the elevations of the several notches in the height of land that surround Lake Ontario, we may infer the curious fact, that if a sufficient barrier were to exist across the St. Lawrence river above Quebec, and another at the Little Falls on the Mohawk, Lake Ontario would rise to the level of Lake Superior; the falls of Niagara would disappear, and these two lakes would be merged in one immense inland sea. That this has actually been the state of things at some remote period in the history of our globe, is a favorite opinion of many; and indeed the appearance of the two outlets, particularly that at the Little Falls, and the nature of the surface of the different slopes of the lower basin, are not unfavorable to the support of this hypothesis.†

* Report of the Canal Commissioners of the state of Illinois, 1825.

† Appendix to Cuvier's Theory of the Earth, American edit. page 332.

No. XII.

Table of Ascents and Distances on the line of the Erie Canal, through the Mohawk valley from the mouth of the river to Little Falls, and thence along the St. Lawrence basin to Lake Erie.

ROUTE.	MILES.		FEET.	
Mouth of the Mohawk to Schenectady,		21	rises 226	226
Head of Little Falls,	58	79	rises 142	368
Beginning of the long level of Utica,	12	91	rises 57	425
Along that level to its end near Syracuse,	$69\frac{1}{2}$	$160\frac{1}{2}$	level	425
Montezuma at the Seneca river,	$36\frac{1}{2}$	197	falls 45	380
Beginning of Rochester level,	64	261	rises 126	506
Along that level to Lockport and Lake Erie level,	63	324	rises 59	565
Along that level to Lake Erie,	30	354	level	565

The whole length of the canal, from Albany to Lake Erie, is 363 miles. The junction of the Hudson and Mohawk is nine miles above Albany.

That part of the above section between Utica and Lake Erie, presents a remarkable uniformity of elevation, with only one intervening depression of 45 feet at the Seneca river. The great length of its levels is also a striking feature of the Erie canal: the Utica level is $69\frac{1}{2}$ miles long, and the Rochester level extends a distance of 63 miles. These facts, however, are both readily explained from a consideration of the circumstance that the canal passes from the Little Falls to Lake Erie along the slope of the St. Lawrence basin, the gradual descent of which to the north is highly favorable to the graduation of a line to the most uniform elevation.

The following are the elevations of the principal lakes in this state, included within the boundaries of the lower sub-basin of the St. Lawrence:

	Above Lake Ontario.	Above tide water.
Crooked lake in Yates and Steuben counties,	487	718
Canandaigua lake,	437	668
Seneca lake at Geneva,	216	447
Cayuga lake,	156	387
Oneida lake,	144	375
Cross lake,	139	370
Onondaga or Salt lake,	130	361

The discharged waters of all these reservoirs pass into Lake Ontario, through the Oswego river.*

After the lower sub-basin of the St. Lawrence, the principal depression of surface connected with the topography of this state, is that containing the Hudson river and Lake Champlain. This de-

* It is a curious fact, that this river is the common drain of 15 lakes.

pression is a long, deep and narrow vale, extending through the country, in a direct line from the ocean near New-York, to the valley of the St. Lawrence river, a distance of 380 miles. That part north of the Highlands at West-Point, is formed by an opening between two of the Allegany ranges; and is bounded on the one side by the Catskill ridges and the mountains on the north side of the Mohawk, and on the other by the range which we have described as forming the separating ridge between the Hudson and the Connecticut. There are only three lateral passes from this valley. The most important of these is the lower valley of the Mohawk, which may be considered as an arm of the Hudson and Champlain valley, extending back as far as the Little Falls; and thus forming a pass from the Hudson, through the Appalachian mountains, into the great St. Lawrence basin. The highest part of this pass, as we have before observed, is only 425 feet above tide water. The next pass is the valley through which the Delaware and Hudson canal has been constructed. It extends from the Hudson, near the village of Kingston, to the Delaware river; and is elevated in the highest part, 500 feet above the level of the Hudson. The other pass is also between the same rivers, and is through a spacious valley bounded by the Catskill ridge on the one side and the mountains forming the Highlands on the other. The elevation of the summit is 430 feet above the Hudson and 207 above the Delaware.

The most remarkable and peculiar feature of the Hudson and Champlain valley, is its great and uniform depth below the general level of the surface of the adjoining country. The highest part of the bottom of this valley, throughout its whole extent, is on the intervening space between the Hudson and Lake Champlain, and is elevated only 147 feet above the level of tide in the river, and 54 feet above the surface of the lake. From this surprising fact, we learn that an obstruction in the channel of the Hudson at the entrance of the Highlands, near Newburgh, of only 150 feet in height, would turn the current of the river to the north, and cause its waters to descend to the gulf of St. Lawrence, through the outlet of Lake Champlain and the St. Lawrence river. The appearance of the mountain pass at the Highlands, is highly favorable to the supposition, that the Hudson has in reality forced its way through this impeding barrier, and thus gained a more direct passage to the ocean.

It has been justly remarked by an able geographer, that there is but one pass on the earth having a specific resemblance to this valley. Scotland is divided into two unequal sections, by what is well expressed by the term *glen*, signifying a deep vale between high and steep hills. This glen extends from the Atlantic ocean to the German sea, a distance of 120 miles, and has no summit higher than 70 feet, although bounded on each side by high mountains. Each of these passes is occupied by lakes and rivers which follow the general direction of the glen, and both have been rendered navigable by means of canals and other artificial improvements.

Viewed as a whole, the Hudson and Champlain valley may be more minutely described as consisting of two unequal sub-basins; the one containing Lake George, Lake Champlain, and the Chambly river; the other, the Hudson river below Glen's falls. Lake George is a narrow sheet of water, lying in an apparent rend in the adjacent mountains; is thirty-four miles long, and from one to three miles wide. It discharges its waters into Lake Champlain, through a descent of nearly 200 feet. Lake Champlain, which forms the most important part of the upper sub-basin, is 109 miles long, and from one-half mile to twelve miles wide: its depth nearly corresponds to that of Huron and Michigan; while its surface is elevated only 93 feet above the level of tide water. Surrounded by imposing mountain scenery, the traveller on this lake imagines himself raised to Alpine heights, and can scarcely be convinced that a descent of less than one hundred feet would depress him to the level of the ocean. Lake Champlain is connected with the river St. Lawrence by the Chambly river on the north, and with the Hudson river on the south, by the artificial communication of the Champlain canal. The intervening distance between the Hudson river and the lake is only 22 miles; but the whole length of the canal, from its junction with the Erie canal, is 64 miles, 39 of which is along the side of the river.

The other division of the Hudson and Champlain valley, is the deep basin of the Hudson; and this may again be described as consisting of two subdivisions. The first of these includes the lower valley of the Mohawk, and the slopes of land on each side of the Hudson, from Glen's falls to the entrance of the Highlands near Newburgh. The sandy plain between Albany and Schenectady, is an upper shelf of the lower valley of the Mohawk, the southern boundary of which is a continuation of the Catskill mountains, and is seen in travelling between these cities, stretching along the horizon in a northwesterly direction towards the Mohawk river. This plane has a mean elevation of 320 feet, and suddenly declines into the valley of the Hudson by a precipitous step nearly parallel to the river. The capitol at Albany is built on the very edge of this step; and the Mohawk, in passing over the same depression, forms the Cohoes or great fall of the river. A similar shelf exists on each side of the Hudson, from Albany down to the Highlands. The country rises abruptly from the river to upwards of two hundred feet, and then sweeps backwards with a very gentle rise to the mountain chain. On this shelf are situated all the cities and villages along the river, with the exception of Troy, which is the only place on the Hudson erected on the alluvial flat.

The lower or southern sub-basin of the Hudson, is a section of country highly interesting to the political geographer. It includes all that part of the state south of the Highlands, (except Long Island,) as well as a part of New-Jersey. Its greatest width is from the southern sources of the Raritan river, to the eastern head of Croton river, in Putnam county, a distance of about 100 miles.

No. XIII.

TABLE of Ascents and Distances through the Hudson and Champlain valley, from the Ocean, at New-York, to the St. Lawrence River.

ROUTE.	MILES.		FEET.	
New-York to the mouth of the Mohawk,		154		
Level at Stillwater,	14	168	rises 99	99
Level at Fort Miller,	17	185	rises 18	117
Beginning of summit level at Fort Edward, nearly opposite to Glen's falls,	8	193	rises 30	147
Along that level to Fort-Ann,	12	205	rises	147
Lake Champlain at Whitehall,	12	217	falls 54	93
Along the lake to its outlet near the 45° of north lat.	110	327	falls 33	90
Down the Chambly or Sorel river to its junction with the St. Lawrence, 40 miles above the head of tide water,	70	397	falls 55	35

The Hudson river, which occupies so important a part of the Hudson and Champlain valley, is in itself one of the most interesting water courses on the surface of the globe; and as a navigable inlet to the vast and fertile regions of the west, demands a more particular notice than the limit of this article can afford to any other river in the state. It is formed of two principal branches: the Hudson proper, and the Mohawk. Each of these deserves particular attention, as contributing to supply the waters of our northern and western canals.

The Mohawk rises west of Oneida lake, flows south about twenty miles, and then suddenly turns to the southeast at Rome, where it falls on the bottom of what has been called the upper valley of the Mohawk. At this place, in high floods, the waters of the river divide; one part passing down the channel to the Hudson, and the other through Wood creek into Oneida lake, and thence to Lake Ontario. From Rome to the foot of Little Falls, a distance of 37 miles, the river descends 97 feet. Here the river descends through a narrow pass to the lower valley of the Mohawk, and offers incontestible evidence of having forcibly broken its way through the primitive rocks: the ledges on each side bear striking marks of the action of water at a height of more than 40 feet above the present level of the stream. The whole fall of the river, from Rome to its mouth, as may be seen by table No. 5, is 425 feet, in a distance of 116 miles; 78 feet of this descent is passed by the cataract of the Cohoes, one mile above its junction with the Hudson.

The two most remote branches of the Hudson proper, have their sources in the marshy regions of Hamilton and Essex counties. These united with each other, and the Sacandaga river, form a stream of considerable magnitude, which is first precipitated over a ledge of rocks called the Great falls, and afterwards down Glen's falls into the deep valley of the Hudson and Champlain basin. The length of what may be called the upper Hudson, from its extreme source to this place, is about 120 miles; and from here to its junction with the Mohawk is 40 miles, with a fall of 117 feet.

The Hudson, after its reception of the Mohawk, from its peculiar character, has been defined by some geographers as a long narrow bay. The periodical rising of the tides to the height of two feet at Albany—the great volume of water, and the gentleness of the current, which, under ordinary circumstances, is reversed by the ascending tide, are indeed the several characters of a bay; but it nevertheless possesses all the distinctive properties of a river, and when swelled by the spring floods, pours a rapid and immense torrent to the ocean. The oscillation of the tide in this river, is an interesting phenomenon. It is not caused, as in the main ocean, by the direct action of the sun and moon, but is produced by a vast wave, propelled by the force of the Atlantic tide, along the slightly inclined plane of the bed of the river. The crest of this wave passes through the whole distance of 151 miles, between New-York and Troy, in from seven to nine hours.

The comparative importance of the Hudson, as a great commercial inlet to the western territory of the union, may be inferred from the fact, that it is the only Atlantic river, with the exception of the St. Lawrence, that has not its navigation soon interrupted by a precipitate descent from the mountain chain. At the Highlands the Hudson penetrates the primitive rock, and admits the ocean tide one hundred miles to the interior of the ridge, at whose foot, in every other Atlantic river, it is stopped.* Its tributary, the Mohawk, as we have seen, occupies the bottom of a depression which deeply indents the remaining ridges of the Appalachian mountains, and thus connects by an easy pass the valley of the Hudson with the basin of the St. Lawrence. Nature has thus done more by the vallies of the Hudson and the Mohawk, and that to the south of Lake Michigan, towards uniting the waters of the Atlantic with those of the Missisippi, than the utmost efforts of art can ever hope to accomplish in any other part of the union.

The importance of these peculiar topographical features, was duly appreciated by the projectors of our canal policy, and the Erie and Champlain canal, with those in contemplation for uniting the former with the waters of the Susquehanna and Lake Ontario, fully develope the natural facilities for internal navigation possessed by this state.

In a physical point of view, these works produce changes which it could scarcely have been believed that the power of man could have accomplished. The waters of the Tioga river, which now entirely contribute to swell the volume of the Susquehanna, by the construction of the artificial channel of the Chemung canal, will in part be conducted to Seneca lake, and thence with the discharged waters of this reservoir, to the gulf of St. Lawrence. On the summit level of the Champlain canal, the waters of the upper Hudson are turned back to the north, and instead of mingling, as formerly, with the Atlantic ocean in the bay of New-York, now mix with the sea in the straits of Bellisle.

* Gallatin's Report.

NOTE.

For the accompanying plate of the comparative elevations of the principal mountain ridges and peaks in this state, we are indebted to the politeness of David H. Burr, Esq. It forms a part of a general map of the state, which together with an atlass containing a map and statistical table of each county in the state, has just been published by the above named gentleman.

This work is an important acquisition to the topographical knowledge of our state; and as it is intimately connected with the subject of the preceding article, the following extracts from the author's preface may not be improper in this place. "The legislature of New-York, in 1827, upon the recommendation of Governor Clinton, passed an act directing that whenever a set of maps was compiled on this plan, and delivered to the surveyor-general and comptroller, they should revise and correct the same; and that when they were satisfied with their accuracy, should publish them at the expense of the state. The legislature at the same and subsequent sessions, made liberal appropriations to defray the expenses, at the same time giving the author permission to make use of all documents deposited in any of the public offices of the state, or of the several towns and counties, which he should deem necessary in the completion of the work."

"During its progress, the surveyor-general addressed circulars to the supervisors of the several towns, requiring them to furnish surveys of the same, that their boundaries might be correctly described in the revised statutes. The information so obtained was furnished by the surveyor-general to the author, and has been used in the present work. When the author had rendered the work as perfect as these authorities and his own personal observations enabled him to do, it was delivered to the surveyor-general and comptroller, for revision and correction, pursuant to the act before mentioned."

" Circulars were again addressed by the surveyor-general to the several supervisors, enclosing maps of their respective towns, and requesting them to point out the errors, if any, and also to suggest such additions as might be necessary to render the work more full and perfect. These circulars were in most instances returned with much useful information, which enabled the surveyor-general, with his previous knowledge, to correct such errors as had escaped the observation of the author. This work, therefore, comprises not alone the geographical knowledge of a single individual, but that of many, and those the best informed by their vocations of any in the state."

ART. XII. *An Account of a Man who lived on Water for fifty-three Days.* *By* JAMES M'NAUGHTON, *M. D. Professor of Anatomy and Physiology in the University of the State of New-York.*

Read June 7, 1830.

The subject of the following narrative lived in the town of Fairfield, Herkimer county, in this state. His father is a respectable farmer, to whom, and to his wife and daughter, I am indebted for the particulars I am about to relate.

Reuben Kelsey, the individual referred to, was, until three years ago, considered a young man of great promise—remarkable for the correctness of his conduct, and his diligence in the prosecution of his studies. After having received the ordinary advantages at the academy at Fairfield, he entered on the study of medicine, and read in the office of Dr. Johnson. In the year 1825 he attended the lectures at the College of Physicians and Surgeons of the Western District.

Although among so many, it is not always possible to know what proficiency each makes; yet, from all I can gather, he must have at least equalled his companions in the progress he made in his studies. His health seemed good, and there was nothing very peculiar in the operations of his mind. But in the course of the summer, after the close of the session of the college, his health began to decline, and his mind seemed to have undergone a change. His spirits, which were never very buoyant, became more sedate, and his thoughts seemed habitually to dwell on the subject of religion. He quitted Dr. Johnson's office and went home. From that time until his death, he never left his father's house, even for a day. For the three years immediately preceding his death, he almost constantly kept his room, apparently engaged in meditation. His only companion was his bible. He read nothing else, and his whole thoughts seemed to be fixed upon another world. He shunned society, even that of the pious; but he seemed happy and full of hopes. To his family he was kind and attached; and, with the exception of the deep cast of his devotional feelings, the equilibrium of his intellect did not seem, to his friends at least, to be materially disturbed.

Considering the little exercise he took, his general health, during the period, was as good as could have been expected. He came to the table at every meal, when called—and seemed not deficient in appetite. The only sickness of any consequence he experienced during his seclusion was an attack of cholera morbus, in the summer of 1828, from which he soon recovered, and seemed to enjoy his wonted health, until the latter end of May, 1829. At this time, his friends began to notice that his appetite was failing. It continued to decline more and more, until about the beginning of July, when it seemed entirely to have disappeared. For some weeks he had eaten very little; but on the 2d of July, he declined eating altogether—assigning as a reason, that when it was the will of the Almighty that he should eat, he would be furnished with an appetite.

It is not correct as has been stated in the newspapers, that he refrained from eating, in consequence of a vision, warning him to do so, nor that he commenced his fast, in imitation of our Saviour in the wilderness. It does not appear that he had set any definite time for his fast, nor very distinctly assigned his motive for fasting at all. Indeed, it is more than probable, that the great motive in the first instance, was, that he felt no inclination to eat, and that after all desire for food had left him, he became convinced that there was more merit in abstinence than in eating. Towards the close of his life, he told his sister that he had not experienced the least hunger except on the second day of his fast. For the first six weeks he went regularly to the well, in the morning, and washed his head and face, and took a bowlful of water with him into the house. With this he used occasionally to wash his mouth—he also used it for drink. His parents think, that the quantity of water he took in 24 hours, did not exceed, if it equalled, a pint. When he had fasted about a week, his parents became alarmed, and sent for medical aid.

The physicians, fearing that death would speedily ensue if nothing were done, advised his friends to insist on his taking food, and if necessary, to make use of compulsory measures, to induce him to comply with their wishes. Attempts were accordingly made, to force him to take nourishment, and about a table spoonful of water gruel, was, in consequence, swallowed. But it was found in vain to struggle with him, as neither fear nor entreaty would avail. From that time until his dissolution, he was allowed to follow his inclination, without control or constraint. On one occasion he went three days without taking even water; but this was probably more than he could persist in, as on the 4th morning he was observed to go to the well, and to drink copiously and greedily.

On the 11th day of his fast, he replied to the expostulations of his friends, that he had not felt so well, nor so strong, in two years, as at that moment, and consequently denied the necessity of taking food. For the first six weeks he walked out every day, and sometimes spent a great part of the day in the woods. His walk was steady and firm, and his friends even remarked that his step had an unusual elasticity. He shaved himself until about a week before his death, and was able to sit up in bed to the last day.

His mental faculties did not seem to become impaired as his general strength declined; but on the contrary, his mind was calm and collected to the end. His voice, as might have been expected, towards the last, became feeble and low, but continued, nevertheless, distinct. Towards the close of his life, he did not go into the fields, nor during the last week even to the well; but still, he was able to sit up and go about his room. During the first three weeks of his abstinence, he fell away very fast, but afterwards he did not seem to waste so sensibly. His colour was blue, and towards the last, blackish. His skin was cold and he complained of chilliness. His general appearance was so ghastly that children were frightened at the sight of him. Of this he seemed himself to be aware; for it was not uncommon to observe him covering his face when strangers were passing by.

Professor Willoughby visited him a few days before he died. He found his skin very cold, the respiration feeble and slow, but otherwise natural; but the effluvia from the breath, and perhaps the skin, were extremely offensive. During the greater part of the latter weeks of his life, the parents say, that there was a considerable discharge of a foul, reddish matter, from the lungs. To this, perhaps, the offensive smell referred to, may be chiefly attributed. The pulse was regular, but slow, and feeble, and what struck Professor Willoughby as most remarkable, was, the diminished size of the radial artery. Owing to the emaciation, it could be very distinctly felt. It seemed to be as small as a stout thread, and much firmer than natural. The artery had contracted to accommodate itself to the diminished quantity of blood it had to convey, and its greater hardness may be attributed partly to this contraction, and partly to the absorption of some of its elements, and the almost total suspension of nutrition.

Alvine evacuations were rare. His mother thinks he passed several weeks without any—but the secretion of urine seemed more regular. The voiding of this secretion was one of the last acts of his life.

After a lapse of fifty-three days, or nearly eight weeks, nature became exhausted, and his spirit fled. His hopes continued bright to the last, and he departed this life in the full expectation of a glorious immortality. And it is not unreasonable to suppose, from his unblemished life, and ardent piety, while in the possession of his faculties, however erroneous some of his later opinions may be considered, that, in his last hope, he has not been disappointed.

The body was examined by Dr. Johnson, the day after death. The viscera did not exhibit any very striking mark of disease. The stomach was not contracted as might have been expected—but was loose and flabby. The gall bladder was distended with a dark, muddy looking bile. The mesentery, stomach, and intestines, were excessively thin and transparent—and there was no fat in the omentum. It looked somewhat like the arachnoid membrane of the brain. At the time of death Mr. Kelsey was 27 years of age.

Such are the principal facts I have been able to gather respecting the case of this excellent young man. I may however observe, in conclusion, that, from a consideration of all the circumstances of the case, from the known honesty of all the parties particularly mentioned, and the concurring testimony of friends and neighbours, there is not the smallest reason to suspect, that, in the case, the least deception has been attempted, either by the unfortunate individual himself, or by any one connected with him.

A very interesting question presents itself in regard to this case. How could life have been so long protracted under such circumstances? It is not perhaps possible in the present state of our knowledge to answer this question in a satisfactory manner. It is not usually supposed that water alone affords any nourishment, at least to the higher animals; but this opinion is incorrect. Water is an ingredient in almost every one of the animal tissues, and a supply of it is as essentially necessary for the preservation of life as that of solid aliment. Plants, it is well known, require little more than air and water to live and grow, to a large size; the same is the case with many kinds of fish. It is therefore likely that air and water contribute materially towards nutrition, even in the human species. But these are not sufficient of themselves, to support life for any great length of time, when all the functions are vigorously performed. But when they are feebly performed, the wheels of life are not so much worn out, consequently they require less repair. In such cases, water and air, together with what can be absorbed from the system itself, may be sufficient to preserve life for a considerable period. In the case above related, life must have been supported by means of water and air, together with what was furnished by one part of his own system, to repair other parts more essential to his being.

It is well known that in the most perfect health, many fluids after having been secreted by the arteries, are again resumed by the absorbents, and carried into the venous system to be again, in all probability, used for the nutrition of some particular organs for which, from their nature, they may be well adapted. This is true not only in respect to lymph, serum, mucus, saliva, &c. which are considered recrementitious, but also in respect to the urine, and the alimentary mass, after the separation of the chyle. The urine, if long retained in the bladder, becomes darker in its colour, and more highly charged with saline matter, than when it is early expelled. This arises from the absorption of its more watery parts. The fæces also become indurated in consequence of the absorption of the fluid parts, and the breath and cutaneous transpiration become tainted with the effluvia. It is not improbable that the general mass of fluids is much more frequently contaminated in that manner than in the present age is usually allowed.

With a knowledge of these facts, it ought not to be considered unreasonable, were we to conclude, that the system may, for a time, be sustained by its own resources—that is, that some of its less essential constituents may be absorbed and used for the nourishment of organs concerned in the nobler functions, upon which the continuance of life depends. I am inclined to the opinion that such is the ordinary course in the most perfect health—namely, that a portion of matter which is no longer fit for sustaining one organ, may yet be fit for the nutrition of some others; and that in this manner it may serve to nourish several tissues before it becomes utterly effete, and is absolutely required to be expelled from the system. It is also probable that in some extraordinary states of the system, such as in the case mentioned, matter is longer retained than in the ordinary condition of the body, when the functions are all well performed, and an adequate supply of food regularly taken;—just as happens in ordinary repairs, when good materials are wanting, such as can be procured are made use of. Fat is one of the least essential constituents of the body—it is only secreted when the several functions are sluggishly performed—and deposited in different situations, until the exigencies of the system require it to repair the waste of parts, in which decomposition is going on faster than the supplies from without can be elaborated to preserve the due balance between the actions of nutrition and decomposition.

We find in accordance with these views, that the secretion of fat ceases whenever the muscular or vascular systems are much excited. We all know that a hard working man is hardly ever fat, even when well fed—we also know how soon the fat already secreted is absorbed in consumption and fevers. Fat is therefore one of the first constituents of the body taken up whenever the animal or vital functions are much excited. It is also soon absorbed, even when the vascular and muscular systems are but little exerted if the supply of food be too scanty. Man and beast soon grow lean on spare diet, no matter how little they may be exercised. Granting that fat may be absorbed and converted into nourishment, it will be asked, whether even with its aid, life could have been so long protracted as in the above case without any other assistance than what water and air afford.

Fat is known to consist of carbon, hydrogen, and oxygen, the ordinary elements of vegetables, and air contains nitrogen; fat and air, then, contain the elements of our ordinary food, whether animal or vegetable; consequently, with the addition of water, they possess the elements of what is found adequate to support the system in the most perfect vigour. That fat is abundantly nourishing, is well known: The most perfect chyle has been observed to be formed from fat.* A Russian sailor could live on water and oil alone for weeks. But it will be objected that in such case, the oil is first reduced to the state of chyle; the objection, however, is not so formidable as it may at first appear. When fat is absorbed from the system, it is not found in the blood in its entire state. It is probable that in the act of absorption it is decomposed, and that its elements form new combinations with the venous blood. It has already been in the state of chyle, in which state it was incorporated with the venous blood, changed by respiration, and separated from the blood by the secreting arteries. It is more than probable that the absorbents, when taking it back again into the circulation, have the power of reducing it into the same elements of

* Magendie's Physiology, p. 253.

which it consisted originally, when in the state of chyle it was introduced into the blood.

When fat is absorbed, as it does not exist in the blood in its entire state, its elements necessarily form new combinations with that fluid. When the venous blood reaches the lungs, and is exposed to the influence of the air, it parts with its superfluous carbon. By the combination of the carbon with the oxygen of the air, carbonic acid is generated, caloric is evolved, and the venous blood converted into arterial, and consequently again rendered fit for the nutrition of the system. Besides the caloric extricated by the generation of carbonic acid in the lungs, there is more or less, doubtless, evolved in the several new combinations formed in the act of nutrition. When life becomes feeble, and the system is no longer capable of furnishing matter fit for generating carbonic acid in sufficient quantity, or for nourishing the body properly, animal heat becomes diminished, nutrition is suspended, and life at last departs from the worn out frame.

Applying this reasoning to the case under consideration, the following is the sum of our explanation: The water drunk preserved the blood from acrimony—the fat and other less essential parts of the body, were absorbed, carried into the venous system, and thence into the lungs—in the lungs the superfluous carbon of the fat, &c. was discharged, and carbonic acid generated—by the formation of carbonic acid, heat was evolved, and the venous blood converted into arterial. The arterial blood thus renovated, conveyed nutrition and heat to all parts of the body; life was for a long time supported, in a great measure, at the expense of the system itself; and in proportion as materials fit for nutrition became scanty, all the functions became more and more feeble, until nature became exhausted, and life departed.

The case was very analogous to those of hybernating animals. These, when merely torpid during the winter, and possessing some animal heat, are observed to be much leaner in the spring than at the beginning of winter, when they first become torpid. Bears, for example, in northern regions, are torpid during the cold season,* and though fat at the commencement of the winter, are observed to be lean at the approach of warm weather. The fat is probably absorbed for the purpose of furnishing the carbon necessary for gen-

* Edinburgh Encyclopedia, Art. Hybernation, and Spallanzani's Tracts, vol. 1, ch. 5.

erating animal heat, and also for the nutrition of the more important organs worn out even by this feeble life. In many other hybernating animals, all the functions are suspended—even life itself is frozen up. These, of course, undergo no change. This every body knows happens to insects. It is also well known that many kinds of fish may be frozen, and that upon being cautiously thawed, they leap, as it were, into life again, when the vital principle is released from its icy fetters.

If the explanation above offered be admissible, we can readily account for the prolongation of life in the case referred to. The principal channels of waste in the human body are, the pulmonary and cutaneous exhalations, and the alvine and urinary excretions. In the above mentioned case, the discharges from the bowels were so few and so small, as scarcely to deserve to be taken into consideration; and we may safely say, that the quantity of water taken was at least equal to the quantity of urine discharged. The cutaneous and pulmonary exhalations, therefore, are almost the only sources of waste to be accounted for. The quantity of carbon discharged in respiration does not much exceed half a pound in twenty-four hours, even in a state of vigorous health; and in a feeble condition of the system, doubtless falls much short of that quantity.* The pulmonary exhalation, and the cutaneous transpiration, owing to the diminished temperature of the system, must also have been smaller than in health. It is therefore probable that the system lost no more than six or eight ounces of its weight in a day. But even if we allow that it lost a pound every day, which must exceed the actual loss, we can still find no difficulty in believing that life could have been prolonged to the period of fifty-three days by its own resources, without any foreign aliment beyond air and water. There are many remarkable cases on record in which life has been protracted much longer than in the case of Mr. Kelsey without any nourishment; but in all these, so far as I can recollect, life was much more feeble than in him. All the more destructive functions were in a great measure suspended; while in his case the muscular and vascular systems were comparatively active, consequently the body wasted faster, and life was sooner extinguished.

* Thomson's Chemistry, vol. 4, p. 468.

ART. XIII. *Monograph of the* CONES *of North America, including three new species—By* JACOB GREEN, *M. D., Professor of Chemistry in Jefferson Medical College, Philadelphia, Corresponding Member.*

Read June 7, 1830.

The genus Conus derives its name from the conical shape of the shells which it embraces. It may be considered a natural association of species—for though they are exceedingly numerous, their similarity in form renders it scarcely possible for the merest tyro ever to mistake them. It appears to have been first established by Linnè, and it still remains precisely as he left it, notwithstanding the numerous changes which the science of conchology has suffered.

Many of the shells of this genus are extremely beautiful, from the diversity and richness of their markings. They are the diamonds or gems of conchology, and therefore the rarer species are among the most costly articles of the cabinet. As examples, we may notice the Conus gloria-maris and the Conus cedo-nulli; a very few perfect examples of which have ever as yet been discovered. As the strong influence of light seems to be necessary for the richness and variety of colour in the animal kingdom, we are not to expect, and have certainly not found, any beautiful species of the cone in the northern parts of America.

All the shells of this genus have the whorls or convolutions flattened, and rolled over each other; the lower part or base terminating in an obtuse point, the upper part or spire being expanded. The outer whorl only is therefore entirely visible, and the other convolutions are only seen at their upper edges, with a suture or groove between them: these form the spire. This spire is either flat or convex, or more or less produced; and in a few instances it is even slightly concave. The upper edges of the whorls are either smooth or carinated: the aperture is long and narrow; effuse at the base, and never toothed; its upper part terminates in a notch occasioned by the separation of the external whorl, from the others, in that place: the outer lip, in perfect specimens, is always smooth and sharp. The conical contour of these shells is various: in some it is long, narrow, and somewhat oval, and in others it is short and wide; the surface is sometimes covered with granulations; sometimes marked with grooves and striæ, and sometimes it is entirely smooth. All of them, in their living state, are covered with an epidermis or periostracha.

But few accurate observations appear to have been made on the animal which inhabits the cone. I am informed by a friend, that in the bay of Bengal it is frequently taken with a bait—a piece of flesh is attached to a long line and sunk to the bottom; upon drawing up the line cautiously, the cones will be found adhering to the bait; when near the surface of the water, a small hand net must be dexterously slipped under them to secure them as they drop off.

As this genus includes a vast variety of species, many subdivisions of it have been proposed, founded on certain peculiar characters. La Marck has divided it into two sections; the first including *coronated* cones, and the second those which have a *plain* spire. Dillwyn makes four subdivisions: 1st. Cones with a spire truncated; 2d. Pyriform cones, rounded at the base; 3d. Elongated cones, the body whorl being as long again as the spire; and 4th. Ventricose cones, with a wide aperture. In a general monograph, the species could perhaps be better described and identified, by combining the *sections* of La Marck with the divisions of Dillwyn.

As far as the coast of North America has hitherto been examined, but five or six species of the cone have as yet been found; but since the animal inhabits the deep parts of the ocean, it is believed that when our shores shall be more fully explored by dredging and by other methods, many new varieties of this interesting genus will be added to our Fauna. The following species are all that have as yet fallen under our personal observation.

Conus Mus. *Bruguiere.* Plate 3. Fig. 1.

Shell conical, pyriform with elevated transverse striæ; brown, with longitudinal confluent streaks of a lighter colour; a single transverse irregular band of white below the middle of the body whorl; spire acute; its whorls coronated on the lower side; the upper being marked with cancellate striæ; the tubercles are white, and the interstices of a rich brown: one inch and a half long and half as broad.

Good specimens of this shell are uncommon, but worn and imperfect ones are often brought from the West-India islands. Mr. Peale found a number of them on the Florida Keys. Dillwyn says that "the transverse striæ are *alternately* larger." This is not the case, in our shell, or in either of the figures to which he refers. See Lister, t. 784, fig. 31, and Enc. Meth. t. 320, fig. 9.

Conus Leucosticus. *Gmelin.* Plate 3, fig. 4.

Shell conical; white, marbled with brown or yellow; spire acute and coronated; body whorl marked with transverse granulated striæ, especially near the base; length about an inch and half, and half as broad.

Many varieties of this beautiful species inhabit the West-Indies, and, as it is said, other parts of the world. Those found on the Florida Keys are commonly about an inch long; but in other places they often reach twice that size. Some of the varieties of the C. Leucosticus resemble very much the far famed C. cedo-nulli, a specimen of which, now in the museum at Paris, has been valued at 1500 dollars.

Conus Pealii. *New species.* Plate 3. fig. 3.

Shell conical; whitish, marked with light yellow irregular stripes: these markings on the whorls of the spire give them a nodulous aspect, being alternately white and yellow; spire acute; the whorls coronated at their edges; body whorl traversed throughout with deep transverse grooves, forming regular rounded ribs; length less than an inch, and half as broad.

This pretty little cone was found by Mr. Titian R. Peale, near Key Vache, on the Florida coast. While exploring the extensive and interesting shoals in that region, this enterprising and acute naturalist discovered three other species of the genus conus, all of which appear to have been undescribed; but from their worn and mutilated state, it would be injudicious to introduce them at present into our Fauna.

Conus Mamillaris. *New species.* Plate 3, figs. 5 and 6.

Shell conical; smooth; yellowish white; spire depressed, and terminated at its apex with a whitish mamillary knob; whorls of the spire channeled, having a double indented line on each, which follows their whole course, but is rarely apparent on the outer whorls; length two inches, breadth one inch.

This shell, which in its perfect state must be a splendid species, was found in Florida by Mr. Peale. The colour and markings on the body whorl are a good deal defaced. The spire is almost perfect, and the shell is here marked with orange coloured spots on a whitish ground, something like the Conus tesselatus, to which it bears a distant resemblance in other respects.

Fig. 5. *Plate* 3. Represents a front view of the spire.

Fig. 6. *Plate* 3. Is an outline of the whole shell.

Conus Marylandicus. *New species.* Plate 3, fig. 2.

Shell conical, pyriform, with 8 or 10 deep grooves at the base. In some specimens, upon very close examination, impressed transverse lines may be discovered on the upper half of the body whorl; spire elevated and acute; the whorls channeled and carinated on their lower edges: length an inch and a half, and half as broad.

For this fine fossil species I am indebted to John Finch, Esq. who found it in Maryland, during his laborious and persevering researches into the rich and extensive locality of fossil shells in that state. We are greatly indebted to the personal exertions and public lectures of this gentleman for much of our knowledge of the mineral conchology and geological character of the United States.

Conus Deluvianus. *New species.*

Shell conical, and somewhat elongated; spire elevated and rather acute; whorls slightly grooved and concave; base of the columela slightly twisted inwards: length three inches, and less than half as broad.

I am indebted to the politeness of Mr. T. A. Conrad for this shell, who found it, together with many other new species of fossil relics, at St. Mary's, in Maryland. The whorls at first sight appear to be entirely smooth; but on close examination, a few transverse impressed lines may be seen in the aperture. It has some resemblance to the Marylandicus, but differs from that shell in the spire not being carinated; in the whorls being concave, and in the general contour of the shell. Though entirely distinct, it approaches nearer the *conus deperditus*, figured in Enc. Meth. t. 337, f. 7, than the C. Marylandicus, for which this last shell has been sometimes mistaken.

It is well known that many of the fossil shells found in the *upper* marine formation of Maryland, are often in a more perfect state of maturity, and precisely identical with those which now inhabit our coast. The two cones from that locality, above described, have not as yet been found recent.*

The conus tæniatus is mentioned by Chemnitz as inhabiting the

* In the rich repository of fossils in Maryland, most of the mineralized shells are of the same species as those which now inhabit our middle and southern coasts. There is however a large pecten found there, and described by Mr. Say as the P. Clintonius, which appears to be identical with the recent shell called P. Magellanicus, found by Mr. T. R. Peale on the coast of Maine, and which seems not to occur in a more southerly latitude. Chemnitz states that this magnificent species inhabits the Straits of Magellan, and hence Gmelin's specific name, Magellanicus; but if our suggestion be correct, that locality for it must be erroneous.

North American seas : this is no doubt a mistake. Lamarck seems to imply that the conus daucus, conus nivosus, and some others, may also be found on our coast ; but as we have no personal knowledge of these facts, we shall not insert them in this monograph. Mr. J. Finch has in his possession the *cast* of a cone which he discovered along the Chesapeake and Delaware canal, but this does not furnish characters sufficiently distinct to make out a satisfactory description.

Art. XIV. *Observations on the* Coal Formations *in the State of New-York; in connexion with the great Coal Beds of Pennsylvania. By* Amos Eaton, *Corresponding Member.*

Read March 11, 1830.

There are four distinct coal formations in the United States. First—The genuine anthracite or glance coal found in the transition argillite; as at Worcester, (Mass.) Newport, (R. I.) also in small quantities in the north and south range of argillite along the bed and banks of the river Hudson. Second—Coal destitute of bitumen, usually called anthracite; but differing greatly in its character from the anthracite found in argillite. It may be called *anasphaltic coal.* This is embraced in a slate rock, being the lowest of the lower secondary series of rocks. This coal formation is equivalent to the greatest coal measures of Europe. But there is always bitumen in a greater or less proportion, though the proportion is often exceedingly small. The principal American localities of this coal hitherto discovered, are in the state of Pennsylvania; as at Carbondale, Lehigh, Lackawaxen, Wilkes-barre, &c. Third—The proper bituminous coal; as at Tioga, Lycoming, &c. This coal is embraced in a slate rock, which is the lowest of the series of upper secondary rocks. The fourth formation has not been found in the state of New-York. I refer to the lignite coal, which is found in a very extensive stratum in the state of New-Jersey along the south shore of the bay of Amboy.

The argillite that contains the anthracite coal is made up of tables or lamina very highly inclined, whose edges may always be seen at the upper surface of the stratum; and the stratum may be inspected from Canada to Orange county in the state of New-York. The beds of anthracite are always interposed between these inclined tables; consequently when anthracite is present in this rock it may be seen at its upper surface. Such is the situation of the beds of anthracite in Worcester and Newport. As all the beds of this mineral in the argillite of the state of New-York are exceedingly thin (none of those hitherto discovered exceeding one inch in thickness) we have no good reason to hope for the discovery of extensive beds in that formation.

The prospect of discovering bituminons coal of the third coal formation within the state of New-York is equally doubtful, for the following reasons. Mr. C. Van Rensselaer and myself have traced the slate rock which embraces the bituminous coal of Tioga to Seneca and Cayuga lakes, also down those lakes to their outlets. I have traced the same to Lake Erie and continued my examinations more than twenty miles along its southern shore. The same bituminous shale embracing the variety of bituminous coal which is found in vast beds in Tioga and Lycoming are found in the same continuous rock along the shores of the aforesaid lakes. The thickest of these beds hitherto discovered in the state of New-York do not exceed two inches. This carboniferous rock may be inspected to its very base, and there seen reposing upon a stratum of limestone, which the English call upper carboniferous limestone, for the distance of at least two hundred miles; reckoning both banks of Cayuga and Seneca and the south bank of Erie. The layers of this rock are always horizontal or nearly so, and the great beds of Pennsylvania as well as the thin beds of the state of New-York are interposed between these horizontal layers. Consequently if any thick beds of coal were present along the shores of these lakes they would present themselves to the eye of the most careless observer. As the banks of the Seneca lake together with the walls of the continued ravine from the head of the lake towards Pennsylvania present a profile section of this rock almost across the state, we can desire no better evidence of its character in regard to coal. And the two hundred miles of profile view presented by the almost perpendicular banks of these three lakes, afford evidence of the quantity of coal embraced in this formation equal to a line of borings or any artificial excavations of the same extent to the depth of from fifty to one hundred feet. Deeper borings or other excavations would be of no use; because we now inspect the carboniferous slate rock to its base.

From the preceding statement of facts it appears that all our hopes of discovering valuable coal beds in the state of New-York are necessarily limited to the second coal formation in which the coal beds of Pennsylvania destitute of bitumen are embraced. It was stated in a preceding part of this paper that the coal beds of Carbondale, &c. were embraced in a slate rock, which is the lowest stratum of the lower secondary series of rocks. Although I have traced this rock from the Pennsylvania coal beds along the foot of Catskill mountains, the Heldebergh mountains, and by the way of Utica to Big Salmon river on Lake Ontario, and observed it passing latterally under the rock which contains all the salt springs of the west; yet the importance of this part of my subject demands a more detailed description. The lime rock which extends along the foot of the Catskill mountains is the lower carboniferous lime rock of European geologists. It underlays the slate rock which embraees the Pennsylvania coal beds last mentioned. It supports the same slate rock from the south part of Pennsylvania to Sackett's Harbour on Lake Ontario. It forms a kind of gothic arch around the southern extremities of two primitive spurs from M'Combs mountains; one called Root's Nose and the other Little Falls Hill. With these two exceptions it forms a pretty uniform curve from near Harrisburgh in Pennsylvania to Sackett's Harbor on Lake Ontario. Throughout its whole extent the same continuous slate rock which embraces the Pennsylvania coal beds reposes immediately on its upper surface. This is the slate rock which Farey calls limestone shale, because it is always slaty, and always reposes on limestone. This is the slate rock which embraces all the great coal measures of Europe. I have denominated this rock second graywacke slate.

This slate rock may be seen passing laterally under a conglomerate rock, called millstone grit or rubble stone, from near Little Falls to Lake Ontario; a distance of eighty miles. The conglomerate rock underlays the saliferous rock which forms the floor of all the salt springs of the state. That this slate is coextensive with the saliferous rock cannot be doubted; for to doubt would be to overturn every principle of the science founded on analogy.

It now remains to present a summary view of the evidences for and against the prospect of finding coal in large beds beneath the saliferous rock.

First—The same variety of coal which is found at Carbondale, and other coal beds in that range, is found in the same continuous rock along the foot of the Catskill mountains, and in numerous other localities; but the beds are subject to the same diminution in thickness as mentioned in tracing the bituminous coal formation along the banks of the western lakes: so far this formation presents the same forbidding features. But it must be observed that the saliferous rock does not assume its peculiar characters, such as its marly slate alternations, blue and grey spots, and other variegated lines, &c. further east than the town of Vernon, about twenty miles west of Utica. Here too the salt springs commence, and continue in uninterrupted series to the Niagara river. This same saliferous rock forms the roof of most of the great coal measures of Europe, where it is the floor of the salt mines and springs. Conglomerate rocks, such as that which underlays the saliferous rock in this state, generally accompany the slate rock which embraces the coal.

One of the strongest indications of the presence of coal beneath the saliferous rock, remains to be mentioned. It is the production of carburetted hydrogen gas, which issues from beneath the saliferous rock in various parts of that district. The most easterly point where this gas has been observed, is near the most easterly salt spring which issues from this rock. The spring is near Vernon centre, and the place whence the gas issues, is one mile west of Vernon village. The same gas issues from beneath the same rock, at a place called Gasport, six miles east of Lockport, in the bed of the canal, also near the village of Canandaigua, and near Cayuga lake. Several other places have been mentioned, but these have been carefully examined and minutely described. The production of a similar gas is considered by all geologists as referable to no other origin but that of fossil coal. If we are to reason from analogy, we may be justified in venturing an opinion, that borings for coal made near the places where this gas issues from beneath the saliferous rock, might be attended with success. And it may be added, that if coal should be found beneath the saliferous rock, it would probably be of the bituminous kind, notwithstanding the same slate rock embraces coal destitute of bitumen in the state of Pennsylvania ; for the European slate rock, which is equivalent to this, always contains bituminous coal, when similarly situated.

It may be proper to add a few remarks upon the probable depth to which borings must be extended, if search is to be made for coal by that method. The only data from which we can deduce probable conclusions, are, the thicknesses of the strata to be perforated at their bassetting edges. As all the borings would of course be commenced on the upper surface of the saliferous rock, the thickness of that rock, of the millstone grit, and of the carboniferous slate, would be the measure of the depth to which the perforations must extend. The thicknesses of these rocks at their bassetting edges, between Little Falls and Lake Ontario, are as follows: The thickness of the saliferous rock averages about 95 feet—that of the millstone grit about forty feet—that of the carboniferous slate about 150 feet—making in the whole 285 feet. But the saliferous rock increases in thickness throughout its whole extent, from its bassetting edge near Little Falls to the Niagara river. The surface of this rock at Gasport is 274 feet higher than the surface of the waters of Lake Ontario. Here it disappears beneath the waters of that lake ; and from a consideration of its uniform dip, as far as it can be observed, its under surface must be at the depth of at least 100 feet below the surface of the lake. Then allowing 40 feet for the thickness of the millstone grit, the upper surface of the carboniferous slate will be 414 feet lower than the surface of the saliferous rock at Gasport. If we add 150 feet for the thickness of the carboniferous slate rock, the depth of the boring will be 564 feet. It may be stated in round numbers, that a satisfactory examination, to be made by boring, will require that these rocks be perforated to the depth of 600 feet. By the same mode of calculation, it appears, that if a similar examination be made at the easternmost locality of native carburetted hydrogen gas, which is near Vernon village, the perforation must extend to the depth of about 250 feet. All the intermediate perforations will require to be in proportion to their distances from these two extremes, which are about 200 miles distant from each other. In Europe, shafts are frequently sunk to the depth of from 400 to 600 feet for raising coal from a formation equivalent to this.

There is one locality of native carburetted hydrogen gas, which requires particular consideration. It is in the village of Fredonia, county of Chautauque. Here the gas issues from the upper surface of the slate rock, which embraces the bituminous coal of Tioga ; being the third coal formation. It is about 80 feet higher than the surface of the waters of Lake Erie ; or 140 feet higher than the saliferous rock at Gasport. If the bituminous coal beds of Tioga extend to this place in considerable thickness, the gas may issue from them. Such beds might be perforated by boring to about 100 feet. But if the gas issues from the carboniferous slate beneath the saliferous rock, the borings must extend to the depth of at least 700 feet.

I confess that these conclusions amount to nothing more than probable hypothesis. I consider the risk of loss too great to be hazarded by any one individual, and that it is a proper subject for legislative aid. And it may be stated, that if coal is not found beneath the saliferous rock, which is more than 200 miles in extent, it will be truly a geological curiosity which has no parallel on the eastern continent. But we find many deviations in America from the geological maxims which seem to be established in Europe.

ART. XV. *The* DOLIA *of the United States. By* J. GREEN, *M. D. Professor of Chemistry in Jefferson Medical College, Pennsylvania, Corresponding Member.*

Read June 7, 1830.

The great analogy existing between the very limited number of species which form the genus Dolium, seems first to have been noticed by M. Dargenville. He accordingly classed them together—the Buccinum Dolium of Linnè being its type. La Marck, in his arrangement, preserved this genus. All the species included in it, except perhaps the D. Pomum, which seems more nearly allied to the genus Cassis, form a natural group. They are all ventricose, inflated, and subglobular, The spire is usually somewhat depressed, and the substance of the shell is uncommonly thin and brittle. All of them yet known are covered with large transverse ribs on the exterior surface, causing the interior to be grooved or furrowed. The right margin of the aperture is dentated or crenulated along its whole length; sometimes the lip is reflected, and sometimes there is a callous ridge on its inferior side. There is a notch or semicanal at the base inclining backwards. Some of them attain a very large size, as the D. Gallea, which have been found more than ten inches in diameter, the characteristic thinness of the shell still remaining. The animal is said to have an operculum, and to produce a beautiful colouring matter, secreted in a little reservoir contained in its neck.

La Marck describes but seven species. Our late lamented friend, the Rev. D. H. Barnes, of New-York, has figured an 8th, which he calls D. Dentatum; it is a fine large species; but Mr. Swainson, of London, seems first to have noticed it under the name of D. Ringens. We shall here describe a ninth species brought from the Pacific, and said also to be found on our western coast. The Dolium in English is sometimes called the Tun.

Dolium Zonatum. *New Species.* Plate 4.

Shell ovate, thin; inflated with about twenty flattened ribs, not quite as broad as the intervals between them; in these intervals there are one or more elevated lines, often increasing in number as they approach the spire, where the longitudinal striæ give them a granulated appearance; colour a uniform chestnut brown or yellowish, darker on the ribs, without markings, except some whitish lines formed by the striæ of growth; these are numerous near the aperture; aperture semicircular; outer lip thin, and crenulate, with a strong callous ridge along its inferior edge, like the D. Fasciatum; pillar slightly umbilicate: length about five inches, breadth three and a half inches.

This shell was brought from the Pacific by the Rev. C. S. Stewart, chaplain in the U. S. navy, and late missionary to the Sandwich islands. I am indebted to his kindness and research for many new and interesting objects of natural history. The fine specimen from which our drawing was made, is in the cabinet of my friend, P. H. Nicklin, Esq.

Dolium Perdix. *Lin.*

Shell ovate, thin, inflated, with about twenty flat circular ridges, broader than the interstices between them; colour greyish, or yellowish brown, marbled or irregularly spotted with white; aperture large and somewhat semicircular; outer lip thin, crenulate, and thickened near its edge; pillar umbilicate: length 4 or 5 inches, and about three-fourths as broad.

This species is not uncommon on the Florida Keys; it has, I think, never been found north of the Chesapeake bay; but as a small variety inhabits the coasts of Great Britain, it is probable that future researches will discover it on our northern shores. In Mr. Nicklin's cabinet there is a small specimen of this species, as thick and ponderous as the D. Pomum.

Dolium Plumatum. *New species.*

Shell ovate, thin, brittle, inflated, with about seventeen broad flat ribs; those near the spire are almost obliterated; spire deeply grooved at the sutures; colour pale brown, with transverse hastate, white spots, having somewhat the appearance of a feather; outer lip thin, without any thickening of the shell near its edge; the inner surface of which is marked with a dark brown band; pillar slightly umbilicate: length about five inches, breadth three and three-fourths.

I have but little doubt that this shell is the Buccinium Maculosum of Solander; figured by Seba, vol. 3, tab. 63, fig. 18. I have compared our shell with that figure, and have been surprised that Dillwyn should consider it only a variety of Perdix. The deep grooving of the sutures of the spire and the absence of the callous, or thickened ridge along the inner surface of the lip, sufficiently distinguish the two species. As Solander's specific name of *Maculosum* is almost identical with *Maculatum*—already employed to designate a Dolium—we have chosen to revive Solander's species, supposing ours to be such, under the name of Dolium Plumatum.

The *habitat* of this shell I am unacquainted with; the specimen from which my description is made, was obligingly lent to me for that purpose, by P. H. Nicklin, Esq. I have a perforated specimen from one of the South Sea Islands, which was once an ornament of an Indian chief.

Dolium Olearium. *Lin.*

Shell roundish, rather thin, with about twenty transverse ribs, having an elevated line in the interstices of those nearest the spire; spire rather flat, and grooved at the sutures; outer lip crenulate, with a very strong callous ridge on its inferior edge; pillar umbilicate; colour light fawn or pale brown: length about three inches, and more than two-thirds as broad.

Mr. T. R. Peale brought a number of these shells from Florida, but none of them were living specimens.

ART. XVI. *Notes on the* AMERICAN SHELLS, *figured in the Supplement to the Index Testaceologicus.* *By* JACOB GREEN, *M. D. Professor of Chemistry in Jefferson Medical College, Philadelphia, Corresponding Member.*

Read June 7, 1830.

The object of the present communication is to correct some of the inaccuracies which occur in the Supplement to the Index Testaceologicus of W. Wood, Esquire, lately published in London. On three or four of the plates which adorn this beautiful work, we have a number of American shells accurately delineated, but on referring to the accompanying catalogue, for their names, these will be found in almost every instance, to be incorrect or misapplied.

Plate 1st.

In this plate, under the head *Mya*, we have figured 12 bivalves, all said to be inhabitants of the United States.

Fig. 1. Is called Unio Rotunda—It is, we think, the U. Circulus of Mr. Lea. This shell we saw labelled with the name, U. Rotunda some years since in the cabinet of the British Museum. Mr. Lea's name, U. Circulus, must therefore be abandoned.

Fig. 2. Is called Unio Oblongata. We never saw or heard of this species before.

Fig. 3. Unio Alatus—A bad representation.

Fig. 4. Unio Nasutus.—Very good.

Fig. 5. This is called Unio Undulatus.—It certainly does not represent the U. Undulatus of Barnes—Mr. Lea, in his paper on American Unios, says that this shell should be called the U. Plicatus of Le Sueur. Waving the objection that Le Sueur never described a shell, we repeat* that La Marck's name U. Peruvianus, has the priority, and therefore must be applied to it.

Fig. 6. This is called Unio Gravis in one place, and U. Cariosus in another; the last name is probably right.

Fig. 7. Is called Unio Rugulosa. It cannot be the U. Rugosus of Barnes, which Mr. Lea, has improperly noticed as a variety of U. Metanevra of Rafinesque.

Fig. 8. Is called Unio Obliquus. It is perhaps intended for U. Obliqua of La Marck, or U. Scalenius, Raf.

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* See Contrib. Mac. Lyceum, vol, 1. page 44.

Fig. 9. Is called Castalia Ambigua. No species of Castalia has been discovered in the United States—the only one seen by La Marck was the C. Ambigua in the cabinet of the Marquis De Drēe. The genus Castalia however should no doubt be joined to that of Unio.

Fig. 10. Is called Unio Rigida. We are wholly ignorant of this species.

Fig. 11. Is the Unio Prælongus of Barnes. La Marck's name, U. Rectus, has the priority.

Fig. 12. Is called Hyria Angulata. This shell is not, we think, a native of the United States. The figure looks something like one of the varieties of the U. Peruvianus.

Plate 4th.

Fig. 26. This shell is called Strombus Noveboracensis, and is said to be found in the harbor of New-York. It was new to us —perhaps it is intended for the Nassa Obsoleta of Mr. Say.

Plate 7th.

Fig. 11. This is rightly called Helix Tridentata—we have seen it however more than three times the dimensions of the one figured, which is said to be of the natural size.

Fig. 12. This is named Helix Angulata. It is the Planorbis Bicarinatus of Say.

Fig. 13. This is named Paludina *Subcarinatus*. It is the Pal. Dissimilis of Say.

Fig. 14. This is called, as we are glad to find, *Helix* Septemvolva, and not by the ill devised and unnecessary generic name, *Polygyra*, proposed by Mr. Say.

Fig. 15. This is named Helix Monodon. It is the H. Fraterna of Say—whether this last name has priority we cannot determine, as Mr. Wood does not refer to his author.

Fig. 16. This is named Helix Fraterna. It is the Helix Hirsuta of Say.

Fig. 17. This is named Paludina Discisa. It is Paludina Subcarinata. Say.

Fig. 18. This is named Paludina Dissimilis. It is Paludina Discisa. Say.

Fig. 19. This is named *Paludina* Virginea. It is the *Melania* Virginea. Say.

All the shells figured on Plate 7th, we are informed by Mr. Wood in the preface to his interesting work, have been named from the labels in his own cabinet—the correspondent in this country who sent them to him must have been exceedingly careless. A case of this kind happened within our knowledge. An eminent conchologist sent to the Baron Ferrusac, the Unio Ochraceus labelled Unio Radiatus, and it will probably appear under that appellation in the magnificent forthcoming work of that zealous naturalist. The cabinet of this gentleman is rich in American Unios, and on a late visit to Paris, we assisted him in correcting many misnomers on this subject.

Fig. 34. This is properly called Helix Sayii, and not Polygyra Auriculata, the name given by Mr. Say—the specific name of Auriculata being preoccupied by a fine Helix, native we think, of Africa.

When in London, we examined the collection of shells in the British Museum, and found them for the most part correctly named. There is one there presented by Mr. Say, and called Unio Tuberculatus, of Barnes. It is the Unio Lachrymosus of Lea. Perhaps the U. Lachrymosus is nothing more than the young of the Unio Metanevra of Rafinesque? Mr. Gray, the amiable and profound zoologist of the Museum, has named the Melania Canaliculata—Melania Sayii, as the specific name *canaliculata* he informed me was preoccupied. Mr. Wood, in the book before us, has also made this correction, and has given us a good figure of the shell on Plate 4, fig. 24. It is represented however in the young state before the nodules on the ribs are fully developed. The only perfect specimen of this species we have ever seen is in the splendid cabinet of Charles A. Poulson, Esquire, of Philadelphia.

It has given us real pain to detect so many errors in the beautiful and expensive work of Mr. Wood; but as it will be often referred to for the names of our shells, we have felt compelled to offer these remarks. The plates and names of the foreign shells we have not accurately examined, and we therefore hope that they will be found generally correct.

ART. XVII. *Address delivered before the* LYCEUM OF NATURAL HISTORY, *(now the Second Department of the Institute,) at its first Anniversary, March* 1, 1824. *By* T. ROMEYN BECK.

IT is with no small degree of pleasure, that I meet the members of the Lyceum, to celebrate its first anniversary. Having been a witness, rather than an actor, in this place, I can with the more freedom, bear testimony to the activity which has characterized its proceedings, and the success which has attended its youthful efforts. The uncertainty that accompanies every untried undertaking, was early dissipated by the generous patronage of our fellow citizens, while our progress in advancing the objects of the institution has been prosperous even beyond the hopes of the most sanguine. A permanent foundation is laid for the study of several of the sciences that appertain to natural history, and as the information which is so advantageously acquired in a society, increases, we may confidently hope for the elucidation of the remainder. These are subjects worthy of congratulation, and they deserve to be noticed at this time, as commendations for past exertions and incentives to future endeavours.

Natural History with the governments of Europe, is deemed an object worthy of regal patronage. There is no civilized nation, I believe, in that quarter of the globe, which has not at one time or another, sent forth her scientific missionaries to investigate the productions of other lands, and to bring back the fruit of their toils to the bosom and for the benefit of their country. In some instances, these have been connected with commercial or warlike expeditions; while in others, the promotion of science has been the leading and permanent object. The French and English governments, in particular, have adopted such views with steadiness and with unparalleled success. The expedition of Bonaparte to Egypt was attended by a corps of scientific men, who pursued their studies amidst the din of arms and the horrors of the climate; and when that sagacious individual became the ruler of France, he embraced the first moment of peace to dispatch vessels on a voyage of discovery to the Australasian continent. So also with the British government, from the days of Captain Cook down to the present period. Individuals are at this very time employed in every part of her magnificent East India empire, in collecting the natural riches of that region—in developing their uses, and in offering them as a tribute to the mother country.

The consequences of such exertions are manifest to every observer. The patronage which governments bestow, fosters the study of the natural sciences—improves the stock of general knowledge—increases the wealth of the nation, and exalts its character. The extensive national and collegiate collections in France and England, are so many magazines, that with accelerated rapidity, at once, combine and diffuse information. No man, indeed, can view such establishments without emotion. They contain innumerable proofs of the divine skill—exhibit, in the most striking manner, the beauty and magnificence of the works of the Creator, and attest, in a thousand ways, to His wisdom and beneficence. It is hence not surprising that great exertions have been and are still making to enlarge and extend these noble repositories. Of the Royal Museum at Paris, it has been asserted, and with some probability, that an American can see more of the productions of his country collected together in it, than in any place on this continent.

"These are imperial arts and worthy kings."

In thus acting, they appear as benefactors to their subjects.

But in admiring such efforts, we must not be led to indulge the wish that they should be exactly imitated in this country. The object may here be also attained, but the means must be different. Our national government embraces so large a number of important interests within its purview, that it may well be permitted to defer the patronage of similar undertakings to a more advanced period. It has, however, done something to advance the cause of science, in the expeditions that it has from time to time sent forth to visit our northern and western frontiers. The results, in several instances, have been honorable to the scientific men that were engaged in them ; yet, even with these, the fact to which I have just alluded, is strikingly illustrated. Their narratives have been published at the expence of individuals, and the record of their discoveries is contained in the transactions of the scientific societies of Philadelphia and New-York. It is thus evident that a partial support is all that can be expected at the present time, in furtherance of the cause of natural science ; and to individual exertions, properly combined, are we principally to look for its progress and advancement. This is a truth, which cannot be too strongly enforced on all proper occasions. It is accordant to those proper feelings of independent effort, which we should cherish, while it is the purest incentive to industry.

Natural history, although only a single branch of human knowledge, is in itself too extensive to admit of successful cultivation, in all its parts by the same individual. Even the original and philosophic genius of Linnæus was unable to embrace all, and he is generally allowed to have either imperfectly understood or incorrectly arranged some of its divisions. If it proved thus with him, how can such general study be expected to succeed with men of inferior mold at the present day? It must be, that numerous parts will remain unexplored—the interest which those, that are most interesting and most important to us, should inspire, will be dissipated over the wide spread surface that we intended to occupy, and at last, with a sensation of weariness, the student will be led to imagine that the object in view is too vast for accomplishment.

It is hence found, that they excel most, whose inquiries are limited to a single branch; and if this be the fact in Europe, with how much greater certainty will it occur amongst us. The votaries of natural history in America, are very generally, and indeed necessarily, engaged in the ordinary pursuits of life, and these require the devotion of the principal part of our time. The science must be pursued as a pleasure—an amusement, or a relaxation, and as such it may be made useful to ourselves and beneficial to others. Hence it is evidently among the favorable omens of the present day, that so many associations are forming, from year to year, in different parts of our state, for its advancement. The combination of individuals, engaged in investigating the different branches, leads to an intercourse, which gradually throws light on all; while the number and locality of each confine, as it were, their particular investigations, within a sphere they can readily compass.

On a previous occasion, I had the honour very briefly to state the leading divisions in natural history, and I may repeat them at this time. At the head of the list is usually placed Zoology, or the natural history of animals. This again is subdivided into several classes, founded on the internal structure of each—such as Quadrupeds; Birds; Amphibious Animals; Fishes; Insects, and Worms; to which systematic writers have subsequently added, the Mollusca, and Zoophytes. Next to this is Botany, or the natural history of vegetables: Mineralogy, or the natural history of minerals: Geology, or the natural history of the earth: and, lastly, Meteorology, or the natural history of the atmosphere. To these, we must, in strictness, add another most curious and interesting subject—the natural history of man.

The enumeration of these various subjects is, of itself, sufficient to indicate their importance. The natural history of animals teaches the characteristic, or distinctive marks of each individual object—as well as its habits, its qualities, and its uses. The interest which these should inspire, can hardly be appreciated without some reflection, since we become so familiar with many of them at an early age. From some we derive nourishment, and from others, raiment, while our enjoyments are enlarged by their subserviency. Here indeed, the argument of utility, without which, in the eyes of some, all other arguments are frivolous, may be pressed with irresistible force. It was among the earliest decrees of heaven, that the animal creation should be placed under the power of man, and minister to his wants; and what was so ordained, certainly deserves his care and his study. How admirably are many of the brute creation adapted to the above purpose. The camel, "that ship of the desert," as he is beautifully styled by the orientals, traverses the sands of Arabia, in obedience to his rider. The horse is domesticated in almost every part of the globe; the ox has for ages been trained to purposes of agriculture; while the dog affords proofs of instinct, which almost renders him a companion for man in the pastoral state. If we notice the genera that furnish wool, what wisdom is seen displayed in their organization—what benignity in adapting them to the climate and zone to which they belong. The fiercer tribes, which refuse the dominion of man, are not less objects of enlightened curiosity. The dangerous power which they possess, the structure on which that power depends, and the striking distinctions that appear between them and domesticated animals, exhibit points worthy of philosophic reflection and examination.

Our own country, in particular, has many subjects which deserve and indeed have obtained notice, with respect to its animals. In former times, it was the residence of the fur bearing tribes, and for centuries it has furnished this material, not only for ourselves, but for foreign nations. The march of population is alike driving them and the aboriginal man of the country before it, and it cannot be long before they and he will be extirpated. They will then acquire that intense interest, which every thing relating to the early history of America is one day destined to obtain. Among quadrupeds, what can be more curious, than the accounts given by travellers, of the manners of the beaver. Pope, in his Essay on Man, has designated the elephant by the epithet of "*half-reasoning*," but how far do the most striking traits related of him fall below those recorded of the American animal. The admirable plan of union, the ingenuity evinced in felling trees, the skill displayed in building—the solidity of the dwelling, and the foresight in the collection of magazines of food, all designate great sagacity, and an instinct which should have, in some degree, protected it from the destroying hands of the hunter.

The brief notice which I have now given might be extended through the other divisions of Zoology, but I will not venture on this, at the present time. Many points connected with the subject have been ably and amply illustrated in an introductory discourse, before the Literary and Philosophical Society of New-York; and at the same time, additional subjects, deserving of investigation, have been indicated. The distinguished author, with others, is from time to time, engaged in unfolding new species, which inhabit our waters—or dwell in our forests; while the insects, and other inferior classes of animals have found an observer whom we may with safety as well as pride, place in the first rank with any European Entomologist. Even the despised science of Conchology, so much sneered at by those who have formed comparative estimates of the value of different branches of human knowledge, is daily obtaining respectable votaries, and they who, with supercilious feelings, were inquiring to what use the study of shells could be applied, are at length convinced, that the wisdom which formed and perpetuates them, knows nothing great or little, as man knows it. Geology, that study, which, among the natural and physical sciences, is only inferior in the extent of its views and the sublimity of its investigations, to Astronomy, is variously and strikingly illustrated by a previous knowledge of the branch in question.

On Botany,—its interesting nature and its varied utility, but few observations require to be made. We need only refer to the spot, where it must be successfully cultivated—if cultivated at all. It is the country—amidst the woods and groves—and along the banks of our beautiful and majestic streams.

God made the country, (says the poet,) and man made the town.

> What wonder then (he adds) that health and virtue, gifts
> That can alone make sweet the bitter draught,
> That life holds out to all, should most abound,
> And least be threatened, in the fields and groves?

Among the knowledge which the wisest of men possessed was that of the science we have just mentioned. It would appear that he did not despise its acquisition, or think it beneath the dignity of his intellect; and his example may at least serve as an apology for those who desire to be its votaries. But even here, the argument of usefulness meets us, with its usual force. The perennial grasses which afford sustenance to animals—the various vegetables which furnish food to man—the lofty forests which present materials for his dwellings—and the numerous plants which are ordained for the removal or mitigation of disease, all require elucidation, or deserve inquiry. It is an object of liberal curiosity to be acquainted with these, and even were it only a subject of downright calculation, it would certainly seem to be necessary that some individuals should be conversant with them. The meanest flowret has its use. What the inattentive observer may consider as a worthless weed, aids in its place, in preserving the face of our country from being a desart—like the sands of Arabia, uninhabitable by man or animals. Modern Chemistry has also detected the life preserving power of vegetables, and taught us how dependent we are on the verdure of the fields for the continuance of perfect health.

Botany at the present day, is not a mere description and classification of species. Amidst the systems which have been from time to time presented by master spirits in the science, those of Linnæus and Jussieu are at present most followed, and the latter in particular is well calculated to group together such plants as resemble each other, most nearly, in appearance and qualities. This is an approach to generalization, but research has extended it still farther. It has ascertained the natives of different elevations of land—traced the limits within which they are to be found—and thus is gradually establishing rules, which may serve as general principles in the science. When this is accomplished, the study may be approached as a magnificent whole, where parts, apparently dissimilar and unconnected, are yet all subservient to universal laws. Indeed in some late papers, and particularly in one, read not long since before the Linnæan Society, in London, by Mr.

Macleay, the affinity between certain classes of plants is most strikingly illustrated, and he has shown that the same chain which we can trace from man down through quadrupeds, to the lower classes of animals, is also to be seen, even in the more minute and inferior orders of vegetable life. These general views are, and evidently must be dependent on previous minute investigation, but the last receives, in this way, a guide to direct its steps, and a developement, which exhibits anew the harmony of the works of the Creator.

Mineralogy and Geology present inducements so obvious and so valuable, as to render them the most popular of the natural sciences. They are very generally cultivated amongst us, and there are many reasons probably, why at the present period, they should receive the preference. The stores of our mineral wealth are but imperfectly explored, and it will require years, even with the present ardor for mineralogy, to become thoroughly acquainted with the extent and value of these natural treasures. Our own state is annually unfolding new mines of iron—new beds of gypsum—or new springs of salt. As the strata which compose different districts are better understood, examinations will be made with clearer views, and with increasing and brighter prospects of success. The northern parts of this state are probably among the most interesting, as to metals, of any in the United States; and a circumstance worthy of notice, may be adduced as illustrative on this point. So far as the inquiries of mineralogists have proceeded in that quarter, a remarkable similarity has been observed between the minerals found in it and in the iron districts of Sweden. It is not necessary to repeat the list, which is considerable, at this time ; but I will refer, in confirmation of my remark, to a paper by Mr. Jessup, in the Journal of the Academy of Natural Sciences of Philadelphia. This indeed is not positive proof that the iron of the north is equal to that of Sweden, but it certainly affords a presumption sufficiently strong to warrant extensive trials. Nature has spread this important material, with an impartial hand, over every quarter of the globe; but its superiority for the various uses to which it is applied, must arise from the skill that is employed in its purification, and the knowledge that is applied to its manufacture. The strong conviction entertained on this point, has led the governments of Europe to form seminaries for instruction in mineralogy, geology, the art of mining, and metallurgy; and some of them have proved to be as distinguished schools of science, as they are of the arts. France is indebted for her present race of mineralogists—who have so rapidly and successfully increased the internal wealth of that country—to her school of mines; and the utility of uniting theoretical knowledge with practical experience, has thus been most amply verified. When the mine of Pesey was first entrusted to this institution, the lead extracted from the ore did not exceed 27 per cent. But by gradual improvements, introduced with caution and science, the product obtained by them rose, in a few years' time, to 73 per cent.—the actual maximum of what the ore can yield.—(Keating.) Saxony, also, that interesting portion of Germany, has taken a high rank among nations, from the celebrity of her institutions for the promotion of mineralogy. Over it presided for many years, the illustrious Werner, who, whatever may be said of his geological opinions, has at least proved the Linnæus of mineralogy. He numbered among his disciples, individuals from every part of Europe, and his fame even attracted some from this country. In Saxony, also, the art of mining has been raised to the rank of the most honorable profession, and the sons of the proudest noblemen of the land do not consider it as unworthy of their attention, to go through the regular studies, and perform the same tasks as the common miners, in order to prepare themselves for the higher offices. The local situation of the school is also most favorable. The Academy of Freyburg has, in its immediate vicinity, one hundred and thirty mines; to all of which the students have free access, and which they are even invited to attend.

It is only when similar institutions shall be organized in this country, that we can expect the full fruition of our mineral riches. Large sums are now constantly wasted in visionary speculations, or in exertions, no doubt laudable, but not sufficiently founded on proper knowledge. These might all be rendered productive, were the science practically taught. We may confidently anticipate the period, when such an establishment will be deemed worthy of public patronage. In the mean while, let us act as pioneers of it—as individuals who are collecting materials for its future utility.

I will not indulge myself at this time in expatiating on Geology—its extended views—its progressively accumulating facts—the philosophical form it is rapidly assuming—and the interest it must and ought to inspire in every enlightened and serious mind.

These are more and more understood, as society advances in improvement and knowledge. I will only add a remark on the subject previously mentioned, as the last in the circle of natural sciences—viz. Meteorology. I need not to state how generally it is neglected, or adduce many arguments to illustrate its importance. There evidently are phenomena which can alone be elucidated by it. That the variations constantly occurring in the atmosphere exercise a powerful influence on the general health, is universally acknowledged; but the extent of this power is imperfectly appreciated. Why are we not to find in this the cause of epidemic diseases? The air itself is demonstrated by chemists to be homogeneous. Whether taken from the Andes, or the valley at their feet—from the surface of the sea, or from the streets of the most crowded city—its constituents are the same. To what more probable cause then, can we refer the origin of general maladies, than to alterations in temperature, density, moisture, or rapidity of circulation. The connection of this science with medicine cannot be too profoundly studied. It may throw light on disputes, which have agitated mankind for centuries.

I have thus, gentlemen, endeavoured to throw together a few remarks on the sciences, which are comprised under the general denomination of Natural History. The discursive plan which I have adopted, was chosen, not only because I conceived it might embrace more interesting topics than the examination of a single subject, but that I had also to consult how I could best employ those fragments of time, which I was enabled to allot to the preparation of this address. If I have, in any degree, vindicated the importance of the subject, or illustrated its utility, my design has been accomplished.

This city, from its local situation and its political rank, is peculiarly well fitted for the successful cultivation of the branches for which we are associated. With proper exertion, it may be made a focus, in which shall be concentrated all the numerous and diversified productions of our state. Nothing is wanting but a proper devotion of that portion of our time, which can be prudently allotted to it; and an extensive correspondence with intelligent and scientific individuals. And we should recollect that we are under peculiar obligations to endeavour to effect this. No society can long remain stationary. It must increase in usefulness and activity, or it falls by its own weight. While, therefore, we have somewhat of a reputation, acquired by past efforts, to sustain, we should proceed forward with renewed vigour. There is, also, another inducement, which the place and the occasion imperiously call on me to notice; nor shall I be deterred from doing so, by any apprehension that my motives may be misconstrued. An individual, who, to the best virtues of the citizen, adds that of the generous patron of science; whose every action is that of the patriot and public benefactor, has consented to place himself at our head. Is it not then our peculiar duty to see that the Lyceum receives no injury, or suffers no diminution during his presidency. In making this allusion, I doubt not that I meet with corresponding feelings on your parts. It was a custom of the ancients not to sacrifice to their worthies, until after sun-set. We would not innovate on this, but as the decline of day approaches, we may be permitted to deposit our offering on the altar.

Finally, let us remember of what state we are citizens. Is it not one which deserves all our efforts, and demands our noblest and best exertions? The native of New-England recurs with warmth to the pleasant fields, where he passed the days of his youth, and thinks his land the best of all the main. Those who dwell in the south, pride themselves on the great men it has produced—and equally boast of their paternal soil. I honour both for the preference they exhibit. They would disgrace themselves and bring contempt on their native states, were they not to feel and evince such attachments. But I ask that such predilections should also be cherished by us, who are natives, or long residents of the state of New-York. As individuals, its prosperity is identified with our own; and its exaltation should be our leading object as citizens. I need not dwell on the sublimity of its geographical features, extending as it does from the Atlantic to the Lakes—on the grandeur of its rivers and mountains—the fertility of its soil—the extent of its commerce—the stupendous wonders of nature that it exhibits—or its noble works of art. These are themes that must animate every one who reflects on them—to render himself worthy of the enjoyment of such blessings. The surpassing forms of loveliness and beauty, that nature presents in every part, have been partially delineated by him,* who is now the admiration of the British public; but whose talents were first developed, and whose early productions were first applauded in this, his native

* Washington Irving.

state. As with the man of taste, so also with the scientific individual. New-York can boast her full share of intellect. She has exhibited it in the closet, in the cabinet, and in the field; and as her powers develope, she will be found advancing in every great undertaking. The general diffusion of knowledge will illumine every hamlet; and though the political agitations, which are inseparable from free institutions, may mar her splendor, or dim her glory, it will only be for a time. She is destined to rise above them, and to take her place as the first and fairest among the confederated communities of this great republic.

ART. XVIII. *Note respecting the* RANUNCULUS LACUSTRIS. *By* LEWIS C. BECK *and* JAMES G. TRACY. (With a Plate.)

Read June 7, 1830.

One of the first papers read before the Albany Lyceum, now a branch of the Institute, was a description of a new species of Ranunculus, and for which the above name was proposed. This description, together with the reasons which led us to the conclusion that this plant had either been overlooked by botanists, or been confounded with some other species, was published at length in the second volume of the New-York Medical and Physical Journal. The facts which we shall hereafter state, will we trust be a sufficient excuse for a few additional remarks upon this subject.

The plant which we described under the name of *R. lacustris*, had been previously, though incorrectly, described by Dr. Bigelow as R. *fluviatilis ; (Flor. Bost.* 1*st edit. p.* 139*)* from which last species it was clearly proved by us to be wholly distinct. We further stated, that though it might be the R. *multifidus* of Pursh, that name had previously been given to an Egyptian plant by Forskall, from which also our plant was found to differ. *(See Dr. Smith in Rees' Cyclopædia, article Ranunculus.)* In the mean time however, De Candolle, now at the head of European Botanists, changed the name of Forskall's R. *multifidus* to R. *Forskæhlii*, and left to Pursh's plant the name of R. *multifidus*. For what reason this change was made, does not appear; but it is evident that it was by no means in accordance with the common usages of naturalists. Following in *this* track of De Candolle, Dr. Bigelow, in the second edition of his Florula Bostoniensis, describes our plant as the R. *multifidus* of Pursh, acknowledging that he had previously mistaken it for R. *fluviatilis*.

Such were the opinions concerning this plant until the publication by Dr. Richardson, of his Botanical Appendix to the narrative of Capt. Franklin's first journey, when our R. *lacustris*, or a mere variety of it, received the name of R. *Purshii*. And finally, this view is also taken by Dr. Hooker, in his splendid Flora of British America, who gives a figure of one state of the plant, not however the most common.

It appears therefore that our ideas of this plant have been confirmed by the authorities just cited. That they are not by De Candolle and Dr. Bigelow, arises from rather an unwarrantable licence in the change of names previously occupied; which cannot be too much discountenanced. Our name and description having been first published, is certainly entitled to the preference. The species is characterized as follows:

R. *lacustris:* leaves submerged, dichotomously divided into numerous capillary segments: flowers terminal, yellow; calyx spreading or reflexed, caducous, half the size of the petal; nectary petal-like; fruit subglobose; style straight, ensiform. Plate V.

This, at least in our vicinity, is by far the most common state of the plant. But when it grows in shallow waters, or in ditches, the upper leaves assume various shapes, from reniform palmately 3-parted, to multifid. Dr. Hooker describes several distinct varieties. To these we might add some others which have fallen under our observation. But all these varieties may be referred to slight differences in situation.

This species was first observed by us in a small pond near Lansingburgh in this vicinity. It is also found at Salina, near Rochester, and various other parts of western New-York. It extends north to Arctic America, and as far west as the Missouri.

Explanation of the Plate. Plate V. Fig. 1, represents our plant 1-4 natural size. Fig. 2, the flower, full size.

ART. XIX. *Reclamation of* SALAMANDERS—*in a Letter to the Baron F. Cuvier, from* JACOB GREEN, *M. D. Professor of Chemistry in Jefferson Medical College, Philadelphia, Corresponding Member.*

Read June 7, 1830.

When on a visit to Paris in July and August, 1828, in consequence of an introduction to you from our mutual friend J. G. Children, Esq. of London, I received that attention and kindness in your hospitable mansion at the Garden of Plants, which I shall ever remember with delight. I mention this circumstance both with a view of expressing my gratitude and with a faint hope of recalling myself to your memory.

My principal object in this letter is to correct an error which by some inadvertence has crept into the last edition of your "Regne Animal," where you attribute to R. Harlan, M. D. the animals of the genus Salamandra, which were discovered and first described by myself. A full account of them you will find in the first volume of the Academy of Natural Sciences, Philadelphia, and in the first number of the contributions of the Maclurean Lyceum. Most of them are also noticed in the Nouveau Dictionaire Hist. Nat. of Paris. I have for a long time paid special attention to these animals, and hope at no distant date to give a monograph of them with figures, as you have suggested in your excellent work. Some of my animals, with my own labels affixed to them, I noticed in the museum attached to your magnificent Garden of Plants—they were probably sent to France by our friend C. A. Lesueur.

Those species of American Salamanders which are best characterized, and about which there can be no doubt, are the following:

Salamandra	subviolacea.	Barton.
	fasciata.	Green.
	glutinosa.	Green.
	fusca.	Green.
	erythronota.	Green.
	Punctata.	Gmelin.

These six are always found in moist situations, and never to my knowledge absolutely in the water. I have described in the works above referred to, two other land Salamanders, under the names of S. tigrina and S. cinerea. The S. cinerea is almost always found associated with the S. erythronota, and though very different from it in colour, I am disposed to think it merely a variety of that species. Their favorite places of retreat are under large stones, and not under prostrated logs or fallen trees, as is common with the other land species. The S. Tigrina is perhaps the finest of our species, and serves to form a natural link in a chain of resemblances, between the S. subviolacea and the S. fasciata. These three animals, together with the S. glutinosa and S. variolata, form a group which is exceedingly analogous in many particulars. I have no doubt of the correctness of your remark, that the S. punctata of Gmelin is the same with the S. symmetrica. This last is not so numerous as many of the other species, but it inhabits our country from Florida to Maine.

Our well characterized aquatic species, are

Salamandra Longicauda.	Green.
Subfusca.	Green.
Bislineata.	Green.
Jeffersoniana.	Green.
Intermixta.	Green.

The S. Rubra of Daudin, which appears to have been the first of these animals described, comes very near to my S. Rubriventris. Var. Whether the S. maculata be a distinct species, is yet doubtful. These three, in certain stages of growth, and especially when preserved in alcohol, require minute attention to distinguish from each other. The S. porphyritica, in some of its characters, approaches to S. Jeffersoniana, but it is distinct.

Were I not fearful of becoming tedious, I could add many other particulars on this subject. I shall therefore reserve them for my contemplated monograph. The error which I have noticed in your late invaluable work, I hope you will correct, by the publication of a portion of this letter, or in any other way which your better judgment may dictate. Were it not that your book is destined for remote posterity, I should not be at all solicitous on a subject which is in itself so unimportant.

With sentiments of gratitude and respect,

I am yours truly,

JACOB GREEN.

P. S. I shall publish a portion of this letter in some scientific periodical in this country.

Philadelphia, May 10, 1830.

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ART. XX. *Discourse delivered before the* ALBANY INSTITUTE, *at its first Anniversary after its Incorporation by the Legislature, April 23d,* 1830. *By* BENJAMIN F. BUTLER, *one of the Members of the Third Department.**

IN addressing you on this first anniversary of our complete organization as an incorporated Society, it certainly is natural, and it seems to be appropriate, to invite your attention to a general survey of the objects of our association, the means by which they are to be accomplished, and the motives which should prompt us to vigorous and permanent exertion.

Established at the center of an extensive and most interesting territory, with all parts of which it enjoys great facilities of communication, and including within the range of its enquiries every useful art, and the whole circle of the sciences, it is the high purpose of the ALBANY INSTITUTE, to promote useful improvements—to diffuse the blessings of science and general knowledge—to foster sound learning and a correct literary taste—to develope the resources, to increase the wealth, and to elevate the character of the state. The dignity and importance of the labors to which we are thus pledged, are doubtless fully appreciated by those whom I address; but it is obvious that the subjects to which those labors are to be applied, cannot too frequently be presented to our contemplation—for it is only in this way, that men laboriously employed in their respective callings, can be stimulated to those exertions, which, in enterprises like ours, are indispensable to success.

In noticing the various topics connected with the duties of our several departments, my position in the Institute will justify me in commencing with those which belong to History and General Literature, and in making them the principal theme of my remarks; though the other branches of knowl-

* This discourse having been pronounced in the presence of a numerous assemblage of ladies and gentlemen who honored the Institute by their attendance, several passages were omitted in its delivery, for the purpose of reducing it within the limits usually assigned to such occasions. This course, however, has not been adhered to in the present publication. In addition also to occasional emendations, the discourse has been somewhat extended in a few instances, in which it was supposed that a particular topic could receive further elucidation by a slight enlargement; and with the like view, several notes have been added, which it is hoped will not be unacceptable to the reader.

edge within the sphere of our pursuits, will not be entirely overlooked.

In establishing a department, which, in connexion with general history and literature, is specially devoted to the collection and preservation of materials calculated to elucidate the history of our own state, we have but followed the promptings of a feeling natural to our race, and when properly directed, innocent in its character and useful in its results. Institutions of this sort are common in our country ; and one has long been in existence in this state, whose efforts it will be our highest honor to imitate and to second. It will readily occur to you, that I allude to the New-York historical society. This valuable association dates as far back as 1804 ; since which it has twice received, and more than twice deserved, the liberal patronage of the legislature. The anniversary discourses of its presidents and other officers, are among the most creditable specimens of American literature ; its library, which consists of eight thousand volumes, is exceedingly rich in works relating to this country ; and it has collected a great number of newspapers, manuscripts and other documents, illustrative of the colonial and revolutionary history of the state and union. In addition to the valuable collections of this spirited society, we have in the secretary's office, besides the minutes of the colonial council and other ordinary matters, twenty-four volumes of Dutch records, recently translated pursuant to an act of the legislature, by the learned Vanderkemp, and furnishing authentic materials for the history of the internal affairs of the colony of New Netherlands from 1638, (the date at which they commence,) until its surrender to the English ; and also, forty-five volumes of original documents, connected with the revolutionary war, which not only shed much light on the share borne by New-York in that memorable contest, but are, in other respects, deeply interesting.

But though we have abundant materials for the purpose, it is yet to be regretted that they have not been applied to the composition of any work, which possesses the requisites, or deserves the name, of a complete history of New-York.

The original work of our provincial historian, William Smith, gives us a clear and unostentatious account of the history and progress of the colony, from its acquisition by the English to the year 1732; and his supplementary volume, recently published by the New-York historical society, brings down the narrative to the year 1762. But neither the original nor the posthumous work of Mr. Smith, is calculated to satisfy the enlightened curiosity of the present age. The Dutch records in the secretary's office, as has already been remarked, commence with the year 1638; and as Mr. Smith had no other means of information than such as were to be found in the colony, he was compelled to pass over the period prior to that date, in less than three pages; and his notices of the succeeding thirty years are not much more extended or satisfactory. It is evident from his work, that he did not understand the language in which the ancient records were written, and he was probably unwilling to incur the expense of procuring translations.

Smith's history, as published by himself, is dated in 1756, but it closes with the commencement of Governor Cosby's administration in 1732. The author candidly informs us, that "a very near relative had so great a concern in the public controversies with Col. Cosby, that the history of those times will be better received from a more disinterested pen." After expressing his apprehension, that it would perhaps be difficult for him to avoid the extremes of suppressing truth, on the one hand, or exaggerating it on the other, he adds, as a further reason for his silence, that "a writer who exposes the conduct of the living, will inevitably meet with their fury and resentment;" and that "the prudent historian of his own times, will always be a coward, and never give fire, till death protects him from the malice and stroke of his enemy."* As might be anticipated from this annunciation, the posthumous work of Mr. Smith is written in the spirit of a partisan, and is therefore to be received with some degree of caution, if not of distrust. It also treats, too exclusively, of the political parties which existed in the province, and of the intrigues and conflicts of their leaders, to become, at the present day, a work of general or permanent interest. To William Smith, however, the people of this state in particular, and the friends

* Smith's History, (Albany edition of 1814) p. 282.

of learning in general, are deeply indebted. Whatever imperfections may be discovered in his works, they embrace a body of authentic information not elsewhere to be found, and furnish incontestible evidence of a literary zeal greatly in advance of the times in which he lived. To his historical narrative, he annexed, " a description of the country, with a short account of the inhabitants, their religious and political state, and the constitution of the courts of justice." This summary, which is perhaps the most valuable part of his original work, furnishes a succinct but interesting view of the state of the colony, as it existed at the date of his publication. (1)

In 1814, an edition of Smith's history was published in this city, with a continuation from 1732 to 1747, published anonymously, but generally understood to have been written by Mr. J. V. N. Yates. This was evidently a hasty performance ; but it appears to have been compiled from authentic sources, and is written in a style so lively and agreeable, that we cannot but regret its abrupt termination.

Much labor has recently been bestowed on our early colonial history, by a gentleman whose efforts are entitled to the highest praise, and whose industry and zeal may properly be held up as models for imitation. I allude to that portion of the " History of New-York, including its aboriginal and colonial annals," by Mr. Joseph W. Moulton, which has been given to the public.

Mr. Moulton's plan was at once comprehensive and minute. He proposed, after a full examination of our aboriginal annals, " to mark the migration, first settlement, gradual increase in population and resources of our people ; to delineate their manners, customs, habits and employments ; to develope their genius, and embody the spirit of the times ; to trace the progress of arts, manufactures, commerce, agriculture, literature, science, and the legal code, during their separate stages of advancement and improvement ; to hold up for emulation all that has been illustrious in character and policy, and for censure, all that shall have appeared deserving public reprobation ; to follow the vicissitudes and revolutions of the state, signalizing those which have had a permanent influence upon its prosperity, and examining particularly the

(1) See Note 1.

causes of that memorable revolution, which was the foundation of its past and future greatness; and to deduce from the whole, an impressive moral and political lesson, salutary to the future destination of the people."* He has published the first and second parts of his work, (the former in 1824 and the latter in 1826) containing in the whole, 428 pages, but only bringing down the history to the close of the year 1632—a date but little more than twenty years after the discovery of Hudson's river. He had free access to the documents in the office of the secretary of state and in the library of the New-York historical society. He appears also to have pursued, with commendable anxiety, every other accessible source of information; and whoever reads his work, will find in every page, proofs of extensive research and unwearied labor. He has also, when he confines himself to the books and documents before him, the rare merit of minute accuracy in his details; and he always gives us the authorities on which his statements are founded. His investigations in respect to the settlement of the colony and its progress to 1632, comprising a part of what he justly terms "the dark era of our history," are particularly satisfactory; especially when we consider that no records of the transactions of this period are to be found in our archives. On comparing this part of Mr. Moulton's work with any other publication relating to the same era, we are struck with the superior extent and value of his researches; and the intelligent reader, as predicted in the advertisement of the author, is surprised, "not that so little has been brought to light, but that by any process of unwearied and elaborate investigation, it was possible, to present a connected and consistent narrative of the rise and progress of the colony in its infancy."†

But though the work of Mr. Moulton, so far as he has proceeded, is an invaluable repository of facts to which antiquaries and historians may resort with profit; truth and justice require us to say, that the great *desideratum* in our national literature—a compendious, entertaining and standard history of New-York, from its discovery to the present day,

* Moulton's History, Part. I. p. 325.

† Ibid. advertisement to Part II.

is not to be expected from the continuation of Mr. Moulton's labors, even if he should be encouraged to renew them. His plan, to be completely executed by one man, would require the labor of a life-time; and so far as it has been presented to the public, it does not appear to have secured their approbation. The minuteness of his details, although in many respects highly interesting, are tedious to general readers; whilst his frequent digressions—his desire to communicate information on every kindred topic, though its connexion with his subject be ever so remote—his numerous reflections, retrospects and anticipations, interrupt the thread of his narrative, fatigue the attention, and offend the taste. But in expressing with frankness this opinion of his work, I cannot withhold the tribute of admiration so eminently due him, for the zeal, disinterestedness and courage, which have characterized his labors. He informs us in his preface to the second part, that he had devoted two years to the portions of the work then published; "that he had spared no expense or exertion, in personally collecting original materials from the societies of several cities—from individuals, and through a friend in Europe, from the manuscripts of the royal library of Paris." And though he adds that he "had not realized a public patronage sufficient to remunerate the cost of printing," a result "which might have dismayed the timid, and which certainly would have alarmed the selfish," he assures us, "that as no mercenary motives had prompted the undertaking, so no moderate sacrifices shall prevent its accomplishment." A spirit like this, though it may fail of success, is yet entitled to homage and esteem. (2)

During the last year, Mr. James Macauley of Herkimer county, has presented to the public the "Natural, statistical and civil history of the state of New-York," in three octavo volumes. It was published by subscription, and as the author's proposals were accompanied with letters of commendation from several distinguished and scientific gentlemen, he obtained a liberal patronage. The first volume treats, at length, of the extent of the state; its physical geography, and more especially its waters and canals; its geology, climate

(1) See Note 2.

and winds—with some notices of its zoology and botany. The second volume treats of the counties, cities, towns and villages; antiquities of New-York and of the western states; origin, manners, &c. of the aborigines; discovery and settlement of the country, and civil history to 1750. The third volume brings down the civil history of the colony, to the revolution—and of the state, from that time to 1829.

It is evident from the slightest examination of this work, that its author has bestowed much diligent and laborious research upon the natural history of the state; and he has certainly collected many important facts, and recorded many interesting observations, in reference to that branch of his subject; but it is equally apparent, that the greatest portion of his work is a mere compilation from other publications, that much of it is inapplicable to New-York, and that many parts are exceedingly imperfect.

In his account of the colony of New-Netherlands, Mr. Macauley has intermixed, with abstracts from Smith, numerous passages from the early history of New-England, and nearly the whole of Mr. Wood's valuable notes on the history of Long Island; but he has given us little information, beyond the meagre notices of Smith, concerning the condition or progress of the colony. It seems never to have occurred to him to examine the Dutch records in the secretary's office, though they have been placed, by the provident attention of the legislature, within the reach of all who are desirous to consult them.

From the surrender of the colony to the English in 1664, to the year 1732, Mr. Macauley abstracts largely from Smith; though he has omitted some interesting details, and has broken up the paragraphs of his text-book into a series of insulated facts, resembling rather the arrangement of a chronological table, than a connected narrative. From 1732 to 1747, he follows in like manner, the continuation of Smith's history, inserted in the Albany edition of 1814; from 1747 to the close of the revolutionary war, the colonial and state laws, Williams' history of Vermont, and Marshall's and Ramsay's lives of Washington, are the only authorities consulted. Not only have the documents in the secretary's office and the New-York historical society, been wholly overlooked, but it is perfectly evident that even the printed journals of the colonial assembly have also been disregarded. The civil history of the state, from the close of the revolutionary war to the present period, including an account of its frame of government and its literary and other institutions, is compressed into less than fifty pages; but though the matter be brief, the errors are numerous and provoking.

Thus, he informs us, that after the revolution, the state government "threw obstacles in the way" of settlements in the interior; that the act of the 5th of May, 1786, "for the sale of the unappropriated lands," by which the commissioners of the land-office were created, was intended for the special benefit of a few individuals, their friends and connexions; that the party, which in 1787 urged the formation of a new and more perfect confederacy between the states, "contended for the allowance of public and private engagements, and was friendly to a regular administration of justice;" that the other party "viewed with tenderness the case of the debtor—thought it harsh to exact a compliance with contracts—was in favor of relaxing the administration of justice, and resisted every attempt to transfer from its own hands into those of congress, those powers which were essential to the welfare and preservation of the union." In this latter party, he includes one of the most distinguished of the patriot fathers of this state—George Clinton; and asserts that this venerable statesman, with several of the leading men of New-York, opposed the federal constitution, because "they foresaw that the establishment of a federal government would abridge their power;" and he closes what he calls "an outline of the origin of parties in the United States," with the bold assertion—that the anti-federalists "were the enemies of the union of the states."*

Under the head of the literature of the state, we are informed, that "there are about thirty-six academies," when the report of the regents of the university for the year 1829, published several months before the appearance of his volume, would have given him the names of fifty-six academies, then actually subject to their visitation, without enumerating those incorporated by special laws and not under their con-

* Macauley's History, vol. III. p. 427 to 440.

trol.* That report, and former documents of the like nature, if perused with even a slight degree of care, would also have prevented him from aspersing the character of our literary institutions and public officers, by the assertion, that in order "to make a parade and draw more money from the state than ought to be drawn," many are returned as students in the academies, "who neither know nor understand any thing beyond reading, some writing and arithmetic;" and that the regents of the university "might easily prevent" these abuses, were they "inclined" to do so.†

But if the deficiencies and mistakes already pointed out, excite surprize, what shall we say of Mr. Macauley's account of the common schools? His work was published in 1829, and yet he informs us that he is unable to state "with certainty, the number of common schools in the state," for any year later than 1823, and he then gives the aggregate from "Spafford's gazetteer"!‡ It is almost incredible that any man in this state, with any pretensions to intelligence, could be ignorant, that minute and accurate returns are annually made to the superintendent of common schools; that the results of these returns are uniformly stated in the annual messages of the executive; and that copious abstracts are annually reported by the superintendent to the legislature, which are printed in the newspapers and in pamphlets; and yet it is obvious from the meagreness and the simplicity of Mr. Macauley's statement, that he is such a man.

Mr. Macauley's work is also defaced, by numerous mistakes in dates, and in the names of individuals. Many of these are probably to be set down as errors of the press; but there are others which must have proceeded from the carelessness of the writer. Thus we are informed, in the list of persons who have administered the government of the colony and state of New-York, that Governor Clinton died on the *ninth* instead of the *eleventh* of February, 1828; and that the government then devolved on *Joshua* Pitcher, lieutenant-governor of the state. In the same list, there are several important errors in dates, and six instances in which the names of persons who have administered the government are misspelt.

* Macauley's History, vol. III. p. 435. † Ib. ‡ Ib. p. 448.

These are small things, but they enter into the elements of history, and might easily have been stated with perfect accuracy. (3)

I might point out many other errors equally unpardonable; but I am persuaded that the topic would soon become tiresome. My apology for dwelling upon it at all, must be found in the fact, that this work has gone abroad, throughout the union and to foreign nations; and that as the ill-judged letters of commendation which accompanied the proposals, are prefixed to it, there is reason to apprehend, that it may be received by many of its readers, as an authentic record of undoubted facts. As such it has been quoted abroad, and in some of our sister states. In the last number of Silliman's journal of science and arts, it is said by a correspondent, to be "a valuable, though not a very agreeable book;" and we are told that "whoever will persevere in the labor of reading it, will obtain a thorough knowledge of the origin and settlement of the state, of its progress in population and government, and of its aspects and resources." It is sufficiently mortifying to the pride of a New-Yorker, that a work so erroneous and imperfect, should be circulated among those, whose every-day knowledge enables them to discover most of its defects, and to avoid being misled by them; still more so, that it should be read and quoted by strangers, as an accurate exhibition of the progress and condition of our state.

I turn with pleasure from the errors of Mr. Macauley to the unpretending summary prepared by Mr. F. J. Eastman, for the use of schools. This little volume is in general well adapted to the purpose for which it was intended, and deserves a more extensive patronage than it appears to have received.

It must be admitted, that the results to which we are led by this brief review of the several works devoted to the general history of our state, are neither satisfactory nor encouraging. There seems to have been, on the part of our best writers, a decided reluctance to encounter this task; arising, probably, from an apprehension that its execution would impose on those who should undertake it, a degree of labor and

(3) See Note 3.

research not merited by the subject. That considerable time and much laborious investigation, will be found indispensable to the preparation of a complete history of New-York, is not to be doubted; and I know not the object, of a literary nature, to which the first talent of the state, could be more honorably applied. Almost every other original member of the American confederacy, has received from some one of its gifted sons, a connected account of its progress, from its commencement to a recent date; but the history of New-York is yet to be written. Our very pre-eminence in many other respects, renders our deficiency in this, the more inexcusable.

The indifference of our writers, to this subject, not only impeaches their patriotism and literary enterprize, but is not very creditable to their judgment. The general features of our history are more varied, and its details more interesting, than those of most, perhaps of any other, of our sister states; and I am persuaded that the work might be made, by an able writer, not only valuable and instructive, but entertaining and popular. Some of the particulars by which our local annals are favorably distinguished, may properly be enumerated.

1. Among the aboriginal inhabitants of this territory, we have the powerful confederacy of the *Five*, or as they were subsequently called, the *Six Nations*. I am aware that minute disquisitions on the antiquities and history of the natives of this part of our continent, are not very attractive; but it must be remembered, that these nations were greatly distinguished among their countrymen; that during the whole period of our colonial history, they sustained an important relation to the government; and that even during the revolutionary war, their influence and exertions were by no means contemptible. Their early history, as exhibited by Dr. Colden, in 1747, places them on high ground as the conquerors of neighboring tribes and the allies of the English; and the discourse of the late Governor Clinton, on their history, character and antiquities, delivered before the New-York Historical Society, in 1811, is not only an honorable proof of his abilities, but a striking illustration of the interest with which real talent can invest subjects of this sort.

2. The possession of our territory by the *Dutch*, for half a century, has also an important bearing on our history. It has

been the fashion to speak of the Dutch colonial annals as dry and unimportant; and it is not to be denied, that the details of colonization are usually meagre and uninteresting; but in opposition to the received opinion, I venture to predict, that when the settlement and progress of the New-Netherlands, with correct notices of its inhabitants, their institutions, principles and manners, and of the consequences which have resulted from their amalgamation with emigrants from Europe and New-England, shall be embodied in classic story by a philosophic pen, this portion of our history will be found to comprise facts and topics of peculiar interest and importance.

3. Our history as an English colony, possesses, in common with that of the other states, the various incidents growing out of the wars with the French and their savage allies—the contests between the colonial assemblies and their governors—the political parties which, from time to time, divided the sentiments of the people—the opposition to the arbitrary policy of the parent country—and the measures preparatory to the revolution. It is distinguished, by the peculiar condition of society arising from the general prevalence of the habits and language of the first settlers, and by many events of local interest, among which may be enumerated—the usurpation of the government by Leisler, and the incidents which grew out of it—the visit to our coast, and the proceedings whilst here, of the renowned pirate, Captain Kidd—the contentions of the leading religious societies—the struggle for the liberty of the press in the case of Zenger—the disputes concerning the institution and powers of the court of chancery—the negro plot, and several popular commotions—the controversy with the hardy sons of the Green Mountain—and the transactions, throughout the whole period, with the Indians resident in the colony.

4. The history of New-York, as an independent state, is rich in facts and consequences of the greatest variety and importance. It is connected with many of the most important events in the war of the revolution, and in that of 1812. In each of those contests our frontiers were exposed to invasion; and in each, our territory, often the theatre of conflict, was illustrated by the most splendid triumphs—triumphs, whose influence is felt to the present hour. It is not too much to say

that the momentous question, whether liberty was to be hoped or struggled for, with all its amazing consequences, was decided on the plains of Saratoga; and that the foundations of our independence were laid anew, on the banks and waters of Champlain.

Our civil history, since the era of the revolution, is equally pregnant with striking events. Under the operation of the free principles then established, the state has rapidly advanced in all the attributes of greatness. No other country can be named, in which forty years have made so many and such extensive changes. Our population swelled from 340,000 to two millions—our improved lands from one million acres to eight—55 counties separately organized—757 towns—5 incorporated cities, one of which contains more than 200,000 inhabitants—93 incorporated villages, many of which are populous and flourishing—several colleges, and numerous institutions for instruction in general literature and in medical science—select, common, and free schools, sufficient in number to educate all the children of the republic—penitentiary establishments, in which the great problem, whether the ends of criminal justice can be united with the melioration of the penal code, has at length been solved; and happily for mankind, solved in the affirmative—484 miles of canal navigation constructed at the public expense, and owned by the state, and 81 miles constructed and owned by an incorporated company—salt springs, whose annual produce amounts to near a million and a half of bushels—1,406 post-offices—73 steamboats, plying wholly or partly in the waters of the state—211 newspapers, 14 of which are published daily—214 incorporated manufacturing companies, and several hundred manufactories owned by individuals or associations not incorporated—44 banks, and 53 insurance companies, now in operation—350 turnpike and bridge companies—5 savings banks—numerous literary, scientific and benevolent institutions—and a militia of nearly 200,000.* These are some of the results to be recorded in the recent history of New-York. The several steps in a career so rapid and illustrious, ought not to be unknown. We owe it to ourselves and to the world, to furnish a modest

* For several of the details here enumerated, I am indebted to Williams' *New-York Annual Register* for the year 1830—a work of great merit and utility.

but faithful record of our progress. Let the members of the ALBANY INSTITUTE perform their portion of the work, by making such enquiries, and collecting such materials, as may be found within their reach; and let us indulge the hope that the reproach which now rests on this department of our literature, may ere long be successfully removed.

Interesting, however, as is the past history of our state, and useful as our labors in this department of learning may be, we are invited to the higher and nobler duty of assisting in the preparation of materials for its *future history*, and this not merely by collecting and preserving memorials of passing transactions—though such labors have their use—but by contributing to the improvement of the present generation, and especially of the younger part of it. The general diffusion of knowledge will furnish the most valuable materials for the future annalist, and give birth to results which will reflect glory from his page. As the great object of our association is practical and permanent utility, rather than scientific display, or present reputation, I shall make no apology for dwelling at length, on some of the modes in which we have it in our power to contribute to this end.

1. Permit me then to remind you, that the Albany Institute, if its members will but nerve themselves to the task, may be made the instrument of extending throughout the state, by a proper attention *to the useful arts and to the physical sciences*, benefits the most permanent. A great part of the state is yet waste and unsettled, and probably, considerable portions are incapable of cultivation; but the general fertility of its soil; its peculiar position in reference to the ocean, and to our great inland seas; its commercial advantages; its great extent of artificial navigation; all unite to encourage the expectation, that its population will continue to increase, at least for the next century, in a ratio nearly as great as that which has signalized the last.

It is obvious, therefore, that every thing connected with those arts which minister to the wants, the comforts, and the elegancies of life, is entitled, with us, to peculiar and increasing interest.

As agriculture furnishes to all classes of society, the chief support of animal life, and is the principal basis of national wealth, its improvement has ever been considered, by reflecting minds, an object of primary importance. Having no practical knowledge of the art, I shall not enter into details; but I will venture to say, that there is, in many parts of the state, great room for improvement, if not in the mode of cultivation, at least in the quality of the articles produced. On this latter point, those who have no knowledge of husbandry, may yet be permitted to express an opinion. To illustrate what is intended by these remarks, and at the same time to avoid prolixity, a single article is selected—it shall be an humble one—THE POTATOE.

The value of this vegetable, as an article of food, not only for man, but for various domestic animals, is well understood. It must also be well known, that there are many varieties, differing greatly in flavor, in nutrition, and in healthfulness. Indeed there is no article of food in which diversities of this sort exist to so great a degree; as will readily be admitted, by those who have compared the *kidney* or *pink-eye*, (varieties recently introduced) with the strong, clammy, and indigestible roots, formerly grown in such abundance in this vicinity. I do not know how it may be in other parts of the state, but I am persuaded that in this city, four-fifths of the potatoes brought to market are of the old varieties. Here then is a subject for improvement—one too of great importance. Probably three fourths of our population use the potatoe as a part of their daily food; and surely the supplying of so many persons with the article, in a form the most healthful, palatable and nutritious, cannot be a small question.

This however is but a narrow view of the subject. We are not to limit our reflections to our present population. We are to look forward to the time, when even the sterile and mountainous regions which are now rarely trodden by the foot of man, will have their thousands of human beings, whose sustenance is to spring almost exclusively from the soil. On what are they to be subsisted? Doubtless a great proportion of them on the potatoe; for among the valuable qualities of this vegetable, may be enumerated the facts, that it may be grown where wheat and other bread corns will not succeed; that it may be cultivated with success in almost every variety of soil; and that it yields an abundant return to the labors of the cultivator, and is almost always a sure crop. Next therefore to the cultivation and improvement of wheat, the great staple production of this state, there is nothing more justly entitled to the attention of agriculturists than the potatoe; and he who shall persuade our farmers to abandon the inferior qualities, and to select and perpetuate the best, will not only deserve, but I doubt not receive, the honors of a *public benefactor.* I am happy to add, that one of our most scientific and enlightened agriculturists—(one too who has already laid the horticulture and husbandry of New-York under great obligations,) is now devoting much of his attention to the cultivation of the potatoe. To wish him the highest success in his endeavors—is not less the dictate of patriotism and philanthropy, than of kind feeling and personal respect.*

But my reference to this vegetable must not terminate with the observations just made. It furnishes one of the most interesting and beautiful illustrations of the benefits which science has conferred on mankind.

The potatoe is a native of America; and though the honor of its introduction into Europe has been divided between Sir Walter Raleigh and others, yet it admits of no doubt that the old world is indebted for this addition to its products, to the science of navigation and the labors of the naturalist. Throughout all Europe, it is now a most important article of food, and its introduction into that continent has more than indemnified it for all it has lost by emigration to the new world. The Irish were the first who turned it to account, and it now forms, as is well known, the principal food of their laboring population. The French proscribed it, because it was imagined that various disorders were occasioned by its use. It was more than two centuries before the popular prejudices existing against it in that country, were entirely overcome, and then only by the instrumentality of a scientific chemist—the distinguished PARMENTIER. The zealous and successful exertions of this benevolent man, were so honorable to his

*JESSE BUEL, Esq. The late Chief Justice SPENCER, whose time is now chiefly devoted to the honorable pursuits of practical agriculture, has also bestowed much care on the cultivation of the potatoe, and has succeeded in producing the best qualities.

character and so useful to his species, that I cannot resist the opportunity of noticing those to which I have referred, a little more particularly. He was employed, during the war of 1756, in the hospital department of the army of Hanover, and in consequence of his zeal in the pursuit of knowledge, which often led him to imprudent exposures, he was five times taken prisoner, and more than once subjected to the horrors of famine. Whilst in prison he frequently had no other food than the potatoe, then beginning to be cultivated, though neither valued nor understood, in the German states. His scientific knowledge enabled him to analyze the qualities of the root, and to discover the uses to which it could be applied. After the peace of 1763, he returned to Paris, and pursued with ardor every branch of science connected with the support of animal life; and it was not long before he had an opportunity of rendering his knowledge most useful to the public. The dearth in 1769 called the attention of the French ministers and *savans* to the vegetables which were calculated to supply the place of bread corn; and the potatoe was introduced into several districts. The old clamor was revived; and the vegetable was again proscribed, and would have been rejected as poisonous, if Parmentier, in a prize discourse submitted to the academy of Besancon in 1773, on the "vegetables which in times of scarcity, may supply the place of those that are usually employed for the nourishment of man," and in a "chemical examination of the potatoe" submitted to the comptroller general in the same year, had not vindicated its character and demonstrated its usefulness. Nor did his exertions stop here. He cultivated it himself; he persuaded the nobility to place it on their tables; he induced the king to wear a bouquet of potatoe-blossoms in full court, on the day of a solemn *fête*; he studied the most palatable modes of culinary preparation; and on one occasion, he gave a dinner consisting only of potatoes, but of potatoes served up in twenty different forms. The opposition he was obliged te encounter may be judged of from the fact, that when it was proposed during the revolution, to elect him to a municipal office, he was opposed on the ground that "*he would make the common people eat nothing but potatoes*." for, (said one of the voters) "*it is he who in-*

vented them!" These efforts were continued, in connexion with many others of the like nature, during a long life devoted to the welfare of mankind. His favorite vegetable came into general use; and with complete success. Whole districts formerly barren were fertilized and rendered habitable; and his old age was crowned with the delightful reflection, that on two several occasions, great numbers of his countrymen had been saved from the horrors of famine, through his instrumentality.*

The principle of these remarks might be extended to every other department of husbandry, and to every other of its products. The thinness of our population, and the facilities for obtaining land, have heretofore contributed to keep down the character of our agriculture; but the time has arrived when it begins to demand the closest attention. Not only is our population constantly augmenting, but our best soils having been first brought into cultivation, we must rely on the improvements of the future, to make not only our inferior soils productive, but those of the first quality, also, more productive than heretofore. To effect this, resort must be had to the physical, mechanical and experimental sciences, all of which have a direct connexion with the art of agriculture, and for that reason alone, independently of other considerations, are entitled to our special regard.

In regard to the other useful arts, I can only observe, that most of them are founded entirely on the discoveries of science; and that science is to each of them, a most valuable auxiliary. Look for instance at the influence exerted on the arts, by the discovery and improvement of machinery. The whole civilized world has rapidly advanced in wealth, and in the means of happiness, in consequence of the wonderful discoveries of this sort made during the last century. Prior to the American revolution, cotton cloths were as expensive as silk; now they are worn by the poorest individuals. Why is this? Simply because Hargreaves, Watt, Arkwright, and our own Whitney, by increasing the facility of production, have brought them within the reach of all classes of society.

* *Parmentier* died on the 17th of December, 1814, at the age of 76. For these particulars of his character and services, I am indebted to the interesting eulogy of CUVIER, delivered before the National Institute on the 9th of January, 1815.

The benefits rendered by science in the invention of machinery, are at once permanent and expansive. When you have invented a new and successful machine, you have not only the power of constructing an indefinite number of copies; but each copy is generally less expensive and more perfect than its model; and what is still more important, the scientific mechanist will be continually discovering new uses, to which the machine itself, or some of its parts, or the principle on which it is founded, may be applied. Among the members of this association, there are several, whose talents have been frequently applied to the illustration of mechanics and the construction of machinery. The Institute looks to them for a continuance of their labors: there are none which promise to be more useful to the state; for notwithstanding the perfection to which machinery has been brought, there is nothing in the past history of the human mind to require, or to countenance, the belief, that the wonders of inventive art have reached their limit. On the contrary, every portion of that history, is calculated to convince us, that the worlds of mind and of matter, are incapable of exhaustion.

The improvements in the steam engine, and the various uses to which it is applied, are trite topics of remark; but as they furnish the readiest and perhaps the most striking illustration of the principles I have stated, you will permit me to refer to them. The first successful application of the steam engine to any useful purpose of which we have any certain knowledge, was the raising of water from mines, about the close of the 17th century. I do not mean to trace its subsequent history, but look at its present manifold and useful operations. It grinds bread corn; it spins; it weaves; it makes shoes; it makes paper; it prints; it propels carriages and vessels; it is used to promote the growth of vegetables; to cook them and other articles of food; to heat houses and apartments; to boil the coppers in breweries and dye-houses; to cure various diseases in warm and vapor baths; to bleach cloths, and to cleanse and wash the garments into which they are made; and according to a late article of intelligence which I have somewhere seen, to destroy vermin in vessels. (4)

(4) See Note 4.

To what new uses it is hereafter to be applied, no one can foretell; though we may reasonably conclude that it will be extended to many practical purposes which have not yet been attempted.

But who can foresee its consequences on society, in its application to those arts which formerly required the labors of innumerable men, horses and oxen, all of whom were to be subsisted whilst performing, at immense expense, operations which the steam engine accomplishes, as it were, at a single stroke? Or who can foretell its ultimate consequences on the intercourse of nations in peace, or on maritime warfare and other modes of annoyance or defence, in war? We already find that by rendering navigable many of our numerous rivers, which would otherwise have flowed on with little or no benefit to mankind, it has changed the face of this quarter of the globe; and that by bringing into comparative proximity the most remote portions of the union, it has not only facilitated all the means of inter-communication, and dispensed ten thousand blessings to our people, but has actually removed, what was considered by the founders of our republic, one of the most formidable objections to its perpetuity—I mean the dangers anticipated from the immense extent of our territory.

We see also, from this example, how intimate and wonderful is the connexion between the various branches of science—this improvement in mechanics bearing with great effect on the science of government, and tending, in our case, to give strength and permanence to our free institutions.

Thus much for the general history of this wonder-working agent. The history of each of its particular operations, is equally calculated to excite our admiration in view of the past, and to encourage our expectations in reference to the future. The first steam-boat that plied on the Hudson, after the complete establishment of the invention, performed her passages from New-York to Albany, in an average of from thirty-two to thirty-four hours—a result then deemed, (and justly too) one of the most splendid triumphs of genius and art recorded in the annals of our species. Aware of the disadvantages attending a first experiment, it was naturally expected that when a second passage boat, came to be constructed, her speed would be increased; and when the Car of Neptune and Paragon were completed, such improvements were found to have been made in the plan of the boats, and the construction of their machinery, that the passage was reduced to an average of about thirty hours. About this time an account of the commencement and progress of steam-boat navigation, was drawn up for one of our literary journals, by that venerable and scientific statesman, whose name is so honorably identified with this great improvement, (Chancellor Livingston,) in which, after giving a minute description of the Paragon, the last steam-boat then constructed, he informed the public, that the proprietors had it in contemplation to build one or more new boats in which such improvements would be made, that it was hoped the passage would be performed in twenty-seven hours.* It is needless to trace the history of successive improvements; the fact is before us that the passage has often been performed by the boats of the Messrs. Stevens, in less than eleven hours, and once by the North-America, in ten hours and ten minutes—in reference to which case, Capt. Benson informs me that at least forty minutes may fairly be deducted for the time spent in touching at the different landings, so that the passage was actually performed in nine hours and an half—a distance of one hundred and fifty miles!

In view of facts like these, who will dare to assign limits to the powers and resources of inventive genius? or, who will deem it extravagant to predict, that the splendid discoveries of the present age, will be equalled, perhaps eclipsed, by those of posterity? We might thus go on, indefinitely, to trace out the connexion which exists between the various branches of science and the useful arts; and to show how each contributes, in a thousand forms, to the prosperity of the political and social state; but the time allotted to this discourse, and the notice intended to be bestowed on subjects more immediately connected with my own department of the institute, compel me to pass over this extensive and interesting topic without further enlargement.

2. The practical utility of the studies connected with *Natural History*, is not so obvious, as that of those to which we

* American Medical and Philosophical Register, Vol. II. p. 256.

have referred; but when their nature, influence and connexions are considered, with even a small degree of attention, it will be seen that they are entitled to be ranked among the most useful of our pursuits. Take as an example the science of *geology*, which is considered by many as a mere bundle of idle speculations. Many such speculations are certainly associated with the history of this science, and its amateurs will probably admit that their knowledge of its principles is yet in its infancy. But as every enlargement of the boundaries of knowledge is a positive good, though it may be long before it be turned to practical advantage; this alone would be a sufficient motive for the prosecution of such inquiries and experiments as are calculated to develope those principles, and to establish them on the basis of certainty and reason. Whenever that period shall arrive, it will probably be found, that this science bears to agriculture, mineralogy and chemistry, a relation somewhat similar to that borne by the globe of which it treats, to objects on its surface.

When we descend from the aggregate to particulars, from the study of the earth to that of the minerals in its bowels or on its face—the uses are palpable and direct. And when from the regions of unorganized matter, we step into the worlds of vegetable and animal life, these uses are still more obvious and diversified. Most of them, also, are to be numbered among the discoveries of science; and she is continually enlarging the list; continually presenting to the world, new proofs of the beneficence of God, and new incitements to the study of his works.

A reference to a single and most familiar branch of natural history—that which treats of the domesticated animals—is sufficient for my purpose. Some acquaintance with the character and habits, physiological and otherwise, of these animals, is indispensable to their profitable use, and to the preservation and improvement of their several races. This acquaintance may be acquired, to some considerable extent, by ordinary experience and observation. None, however, but those who are well instructed in this department of natural history, can be said fully to appreciate their value; or to be prepared to make the most of the blessings conferred on us by their creation. And the scientific enquirer is continually discovering new uses to which the most common of the brute creation, whilst in life, or portions of them afterwards, may be made subservient.

A striking illustration of the truth of these remarks, is furnished in the natural history of the cow. This valuable animal is associated with our earliest impressions; with our notions of pastoral life, and of polished society; with the simplest of diets, the most useful of oils, and the most delicate of luxuries; with benefits and uses the most constant, extensive and important. Long, therefore, had her merits been celebrated; the mythology of the ancient world and the natural history of the moderns, had done homage to her character and qualities; yet no one had imagined that the very infirmities of her nature, were to become the instruments, in the hands of science, of arresting the progress of the most fatal scourge which ever visited mankind. Such however is the fact; and "to the last syllable of recorded time," the fame of JENNER will stand connected with the glory of science, and the welfare of the human race!

It would be easy to multiply examples of this sort, and to show from them, how every part of natural history bears on other sciences; on the arts of life; and on the happiness of the social state.

But I pass from these considerations, on which the occasion will not permit me to dwell, to remind you of the intimate connexion of natural history, with some of the most important questions of morals. The earth and its contents; the productions, infinite in number, variety and usefulness, which successively spring up to sustain the existence, and to gratify the senses of its inhabitants; the myriads of living things which teem in every element; the adaptation of each in form and habit, in instinct and qualities, to its peculiar situation; all combine to furnish such convincing proofs of design, wisdom and goodness, that this study alone, would be sufficient to rescue mankind from the insanity of atheism. Well therefore may we assign to it a high rank in the scale of intellectual pursuits, and richly does it deserve the patronage of all who would promote the well-being of our race.

The Albany Institute, without subjecting itself to the imputation of indulging a mistaken vanity, may boast of amateurs in this branch of science, not surpassed, in zeal or proficiency, by any of their cotemporaries. In their enlightened enthusiasm and well directed industry, we have a sure guarantee for the success and utility of our labours in this interesting field of duty.

3. Much good may be done by diligent and continued attention, on the part of the Institute, to the subject of *general education*—a matter which, in dignity and importance, transcends almost every other—for it affects the character and happiness not only of individuals, but of nations, and extends its influence not alone to a particular state and to the present age, but to the world and to posterity.

Not that I suppose that education is all that is required, to secure happiness in the social system. No man whose opinions are founded on a just knowledge of himself, or a careful observation of others; on the history of the world, or on divine revelation; will indulge the hope, that education, alone, however perfect in mode or complete in degree, can eradicate physical or moral evil, or relieve mankind from the miseries they produce. A good education, however, not only enables us to avoid many natural ills, to which we would otherwise be subjected; but it is a powerful antidote to moral evil, whose operations and influences, it circumscribes and counteracts.

Independently of its intrinsic importance, there is, at the present moment, a peculiar fitness in directing your attention to this subject, for at no period in our history, has it awakened so general an interest among our people, or called out so extensive a discussion. In the course of this discussion, several new theories have been advanced, and various plans of general education pressed upon the public; but I have neither the time nor the ability to examine them at large. My purpose merely is, to trace the history of public instruction in the territory now composing the state of New-York; to glance at its present condition; and in connexion with a brief notice of some prominent defects, to suggest a mode in which the Institute may contribute to their removal.

If the colony of New Netherlands had continued under the government of the Dutch, it cannot be doubted that provision would have been made for the education of their youth in the language and literature of the mother country; though the difficulties incident to a feeble and slowly increasing colony, prevented them from doing much towards the accomplishment of this object, while the country was in their hands. The same difficulties, increased by the embarrassments arising from the prevalence of two languages, and from diversities in the character of the inhabitants, prevented the provincial government, after the acquisition of the territory by the English, from taking any efficient measures for the public instruction, until long after the eastern colonies had established some of their most valuable institutions.

In the latter part of Governor Dongan's time—about 1687—a Latin school was set up in the city of New-York; but as the teacher was strongly suspected of being a Jesuit, it appears to have received but little encouragement.* In the interior, there continued for a long time to be a great deficiency of schools for elementary instruction; some districts were entirely destitute; and the few teachers that could be found scattered through the province, were generally incompetent.

The subject was not entirely overlooked by the government, but their measures were rather calculated to retard, than to promote, the diffusion of knowledge. Smith informs us, that the royal instructions expressly provided, that no schoolmaster coming from England, should be permitted to teach in the province, without the license of the bishop of London, and that no person then in the colony, or that should come from other parts, should be allowed to keep school without first obtaining a license from the governor.† Several of the governors—and particularly Lord Cornbury—attempted to execute the power of licensing, in the spirit of the instructions which conferred it. These attempts were often violently resisted, and always odious to a great portion of the people.

The first law on the subject of education enacted in the colony, was passed on the 27th of November, 1702, on the petition of the common council of the city of New-York, rep-

* Smith's History, Albany ed. of 1814, p. 102.

† Smith's History, as published by the New-York historical society, vol. 1, p. 149.

resenting that there was a great necessity for a free school in that city. It provided that a skillful and competent person should be appointed "for the instruction of youth and male children of such parents as are of French and Dutch extraction, as well as of the English, in the languages and other learning usually taught in grammar schools;" that £50 per annum should be levied by tax on the city, for the support of the schoolmaster, who was to be recommended by the common council, but to be licensed and approved by the bishop of London or the governor of the province. This act was limited to the term of seven years, and at the expiration of that period was suffered to expire, in consequence (as is stated in the preamble of a subsequent law) of the misapplication of the monies raised for the payment of the teacher.

The unfortunate result of the financial part of this experiment, seems to have deterred the assembly from any further effort in aid of public education, until 1732, when a law was passed to "encourage a public school in the city of New-York, for teaching Latin, Greek, and mathematics." This act recites, "that good learning is not only a very great accomplishment, but the properest means to attain knowledge, &c.; that the city and county of New York abounds with youths of a genius not inferior to those of other countries; that Mr. Alexander Malcom, by keeping a private school, had given satisfactory proof of his abilities to teach Latin, Greek, and mathematics; but that the income of his school was not sufficient for his support;" and it therefore established a free school for five years, of which Mr. Malcom was to be the master. For its support, forty pounds were to be annually levied on the city of New-York, to which were to be added the residuary proceeds (not exceeding forty pounds per annum) of the moneys to be received from licenses to hawkers and pedlers. For this consideration, Mr. Malcom was to teach twenty youth, to be selected from the several counties, in the proportion of ten from New-York, two from Albany, and one from each of the eight other counties; such youth to be selected by the corporations of the cities of New-York and Albany, and elsewhere by the courts of general sessions. In December, 1737, this act having expired, it was renewed for one year. It was not afterwards renewed; but the school was again continued, and is said to have formed the germ of Columbia college.*

Between 1746 and 1756, several acts were passed, authorizing the raising of moneys by lotteries for the purpose of founding a college in the city of New-York. By the act of the 1st of December, 1756, the moneys so raised were appropriated to that object; and one half ordered to be laid out in the purchase of land and the erection of buildings. Previous to this—on the 31st of October, 1754—a charter had been granted, creating the proposed institution by the name of King's college; and a liberal donation had also been received from the corporation of the Episcopal church. The college was soon after opened for the reception of pupils, and soon became, as you well know, a fountain of light and of extensive good, to the whole province.

No other provisions than those to which I have referred, are to be found in the acts of the colonial legislature, on the subject of education.

On the restoration of peace, and the final establishment of the state government, one of the first points to which the great and good men then at the head of affairs, directed their attention, was the organization of a comprehensive plan for superintending the system of education to be pursued in the higher seminaries, and for the establishing of additional institutions of that nature. With this view, an act was passed on the first of May, 1784, altering the name of King's college to Columbia college, and establishing a governmental corporation, called the University of New-York, and consisting of twenty-one regents, who were clothed with a superintending power over Columbia college and all future colleges and academies. In 1787, the regents were divested of the immediate control of the colleges and academies which were placed under the government of trustees, but subject to the general supervision of the regents, who were also by this act empowered to incorporate colleges and academies.

* Smith's history, as published by the N. Y. historical society, vol. 2, p. 93.—Governor Clinton, in his discourse before the alumni of Columbia college, in 1827, refers to that part of the preamble above quoted, which bears witness to the capacity of the New-York youth, as a proof that, even at that early period, it was thought necessary to vindicate our country from the aspersions of foreigners.

The cause of education received a new impulse from this measure; for though the regents of the university were not, at first, invested with the control of any funds, they devoted much attention to the concerns of the college; encouraged the institution of academies; and pressed upon the legislature, with great zeal and perseverance, the duty of affording timely assistance to the infant seminaries then struggling for existence. Their exertions were successful. In the year 1789, acts were passed providing for the disposition of the public domain in the northern and western parts of the state, and laying it out into townships for settlement. In these acts, lands are specially set apart in the several townships, for the general promotion of literature and for the support, in such townships, of common schools and religious institutions. The lands thus reserved for the towns, are usually known as the "gospel and school lots," and together with other tracts since granted for the like purposes, have been placed under the superintendence of trustees chosen annually by the electors of the several towns, who also direct the mode in which the income of these local funds is to be applied. It was long before any thing was received from them, but they produced during the last year, to the towns in which they are situated, an aggregate revenue of nearly $12,000.

By an act passed in 1790, the regents were authorized to take possession of certain lands, with directions to lease or sell the same, and to apply the proceeds to the advancement of science and literature in the college and academies under their care. The income arising from this appropriation, was increased in 1792, by a grant of £1500 per annum, for five years, to be applied to the same purposes. The monies thus placed under the control of the regents, were applied to the occasional maintenance of promising young men whose parents were too indigent to pay the expense of tuition; to the support of additional teachers in feeble institutions; to the increasing of the compensations of teachers, where the seminaries employing them had not the means of providing adequate salaries; and to the purchase of philosophical apparatus and scientific books, which at that period were only to be procured by importations from Europe. In connexion with the pecuniary aid thus dispensed, great pains were taken to elevate the standard of education in the seminaries connected with the university; and the regents were soon able to congratulate the legislature on the general improvement and prosperity of those institutions. Nor did their efforts terminate when they obtained the means to promote instruction in the higher branches of knowledge. In their annual report for the year 1793, they suggested to the legislature "the numerous advantages which would accrue to the citizens in general, from the institution of *schools* in various parts of the state, for the purpose of instructing children in the lower branches of education;" but nothing being done in pursuance of this suggestion, they again presented the subject in their next annual report, with the declaration that "the numerous infant settlements annually forming in the state, chiefly composed of families in very indigent circumstances, and placed in the most unfavorable situations for instruction, appeared to call loudly for legislative aid in behalf of their rising offspring." During the session of 1794, some attention was devoted to this matter by the legislature, but no law being passed, the regents in 1795 renewed their former suggestions. Governor George Clinton, also, added the weight of an executive recommendation, and the great object was at length accomplished.

On the 9th of April, 1795, an act was passed, "for the encouragement of schools," by which £20,000 were directed to be annually apportioned among the several counties, for the purpose of maintaining schools in the several cities and towns, in which the children of the inhabitants were to be instructed in such branches of knowledge as were useful and necessary "to complete a good English education." The several cities and towns, were also to raise by tax, sums equal to one half the monies to be received by them, which additional sums were to be added to the amounts so received, and to be applied in the same manner. The distribution and application of the moneys, in the several towns, was entrusted to commissioners and trustees, much after the manner now in use. This act, though temporary in its character, may justly be considered as the commencement of that great system of public instruction, which now constitutes the crowning glory of New-York.

The acts of 1792 and 1795, having expired, an act for "the encouragement of literature," was passed on the 3d of April, 1801, by which four lotteries were granted for the raising of $25,000 each—one half to be placed in the hands of the regents of the university, for distribution by them among the academies, and the residue to be paid into the state treasury, to be applied for the encouragement of common schools, in such manner as the legislature should from time to time direct. This act laid the foundation of the LITERATURE AND COMMON SCHOOL FUNDS.

In the mean time, the legislature had made several donations to Columbia and Union colleges, the latter of which was incorporated on the 25th of February, 1795. And since the year 1801, grants of money and land have also been made in numerous instances, and to a large amount, to the several colleges and academies, and particularly to those of the latter institutions which were from time to time incorporated by the legislature. (5)

The *Literature fund* was occasionally, though not largely, increased, until the act of April 1827, by which the legislature made to it an additional grant of $150,000, the income of which, as well as of their former funds, they directed the regents to distribute annually among the incorporated academies and seminaries other than colleges, which were then subject, or should thereafter become subject, to their visitation and control——such distribution to be made in proportion to the number of pupils in each seminary, who, for four months during the preceding year, shall have pursued therein classical studies, or the higher branches of English education, or both. In making this grant, the legislature appear to have had in view, three objects of great importance—the advancement of classical learning—the establishment of comprehensive courses of instruction in the sciences and in the higher branches of English education, with special reference to the education of teachers—and the encouragement of institutions for the instruction of females in the higher departments of knowledge.

In connexion with the latter point, I cannot help noticing

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(5) See Note 5.

the remarkable and interesting contrast between the provisions of the law of 1827—the last relative to general education enacted in this state—and those of the colonial act of 1702—the first on that subject. We have seen that the law of 1702 was expressly confined to *male* children, and that the teacher was to be licensed by the bishop of London or the governor of the province; that of 1827 is not only free from sectarianism, and governmental control, but it embraces within its range both sexes of our youth. These laws are in strict accordance with the spirit of the eras to which they severally belong—I doubt, indeed, whether a more faithful or impressive exhibition of the character of those eras is any where to be met with. It is proper to add, that among the most flourishing institutions now under the care of the regents, are the academies exclusively devoted to the education of young ladies; and that the pupils of two of them compose a large and most interesting portion of my present auditors.

Impressed, equally with the legislature, with a sense of the importance of the great objects intended to be promoted by the act of 1827, the regents of the university have zealously seconded its benevolent designs. By an ordinance passed on the 18th of March, 1828, they prescribed the studies to be pursued and the conditions to be complied with, to entitle an academy to a share of the public monies; and as the terms of this ordinance were considerably in advance of the general course of instruction before in use, its operation was highly beneficial. This, however, is but a collateral advantage—the more direct results of the law of 1827 are to be found in the incorporation of several academies since its passage, and in the great increase in the number of students in classical literature and in the higher branches of English learning, now instructed in the academies. (6)

The *Common School fund*, received no considerable accession until 1805, although the duty of establishing and fostering common schools in every part of the state, was frequently enforced in the speeches of the executive. In April, 1805, an act was passed, "to raise a fund for the encouragement of common schools," by which the net proceeds of 500,000 acres

(6) See Note 6.

of land were appropriated as a permanent fund for the support of common schools, such proceeds to be accumulated until the annual interest should amount to $50,000, after which that interest was to be distributed in such manner as the legislature should direct. Further additions were made to the fund in 1807, 1810, and 1812, in the last of which years an act was passed "for the establishment of common schools." The first apportionment of $50,000 was made in 1814, since which period the inviolability of the fund has been secured by the amended constitution, and its amount so much augmented that its annual income is now about $95,000, to which is annually added from the general fund so much as may be requisite to make $100,000, the amount directed by law to be annually apportioned among the towns. In addition to this sum, a like amount is required to be raised in the several towns, which being added to the moneys received from the state, the whole is distributed amongst the school districts.* This large sum is disbursed amongst more than 8,600 schools, upon a plan so simple and secure, that for several years past, not an instance has occurred, in which the money allotted to a single school district has failed to reach its proper destination. (7)

Besides the institutions which are thus connected with our general system of public instruction, there are in the cities of New-York and Albany, and in almost every other considerable town in the state, Lancasterian and other schools, which, though generally regulated by the municipal authorities of the the places in which they are situated, or by acts of incorporation or other special laws, are, to a greater or less extent, supported by public moneys. In some cases the pupils are taught gratuitously; and in most of them the charges are so moderate, that even the poorest inhabitants may procure for their children the means of education. (8)

This brief review of the history of public instruction in this state, ought not to be closed without a tribute of gratitude to those wise and patriotic public servants, who at the very be-

* The towns are not obliged to raise more than a sum equal to that received from the state, but they have authority to raise twice as much, and in frequent instances this power is exercised. In 1828, nearly $20,000 were thus levied beyond the amount required by law.

(7) See Note 7. (8) See Note 8.

ginning of our career as an independent state, laid the foundation of the policy which has since been pursued. The direction then given to the public councils, has never been abandoned. The promotion of literature and of general instruction, has always been a rallying point which has united the feelings and concentrated the exertions of men, whose opinions on other matters were not only discordant, but irreconcilable. The state has often been shaken to its centre by political collisions; and it has sometimes happened that objects of real importance have, under the influence of feelings engendered by those collisions, been neglected or opposed; but at all times, and under all circumstances, this great interest has received from all men of all parties, a constant and enlightened protection. This single fact, whilst it confers upon our people the highest honor, is sufficient to vindicate the utility of republican institutions.

In reference to the present state of education in the higher literary institutions, I am not possessed of sufficient information to speak very particularly. Judging from the returns made to the regents of the university, and from such means of knowledge as are within the reach of the community at large, I believe it may be said, that the standard of classical education is steadily advancing; and that many branches of science and particularly those connected with the useful arts and adapted to practical purposes, are taught in much greater variety and extent, than heretofore. These branches are cultivated with much success in the academies; Geneva college was established with special reference to instruction in them, and has an English department not connected with the study of the ancient languages; and the trustees of Columbia college, by a recent statute, have established new courses of instruction by popular lectures and by tuition in the college, embracing the modern languages, and most of the sciences connected with commercial pursuits, and with mechanics and manufactures.

But while we notice with pleasure, this enlargement of former systems of education, it is proper to observe, that the term of study remains generally the same. And I fear it must be said of some of our higher seminaries, that too many studies are crowded into a short space of time, and that the pupils are therefore hurried through their academic courses. This—by the way—is characteristic of our countrymen. In education as well as in other matters, every thing must be done with rapidity. The injurious consequences of this system are numerous. The attention of the pupil is distracted by the multifariousness and variety of his studies; he learns a little of many things, but acquires most things superficially; and what is still worse, the habit of superficial examination thus acquired in early life is rarely ever shaken off. It is needless to add, that wherever it exists, it is the fruitful source of error.

This system of instruction has received countenance and currency, from the schemes which are so frequently presented to the public, by teachers who profess to be able to teach many branches of knowledge, and especially the languages, in a very limited number of lessons. The mode of instruction pursued by these teachers, is often well calculated to expedite the progress of the learner; and so far, they may be considered as useful auxiliaries in the cause of knowledge. But the attempt to teach any thing worth knowing, by a few lessons of an hour or two each, is not only contrary to all experience, but to the whole analogy of nature. Here and there, a favored genius may be found, who seems to master, as if by intuition, the most difficult branches of science; but in ordinary cases, the advancement of the mind, in any particular direction, is slow and gradual; and it generally requires years of patient and laborious application, to secure fullness and maturity of knowledge. This law of our nature cannot be overcome; but reason, experience and analogy all concur in demonstrating, that the mental growth may be promoted by favorable methods of cultivation, and that improvements in those methods are not only legitimate objects of desire, but with suitable exertions, of expectation and attainment.

We have witnessed within the last thirty years the discovery of such improvements; some of which have challenged the admiration of the world. Of these, the system of mutual instruction, first brought to maturity and to public notice by Joseph Lancaster, is, I apprehend, decidedly the most important. It has not only led to the greatest results in the schools in which it has been applied; but it has been the instrument of awakening the attention of the whole civilized world to the subject of public instruction; and of bringing forth improvements of the most beneficial character in every department of education. This sublime discovery, however, is best adapted to those large cities or thickly populated countries, in which instruction is required for great numbers of children whose parents are unable to provide for their education. Our sparse population, and the comparative absence of pauperism in the interior of the state, have confined the Lancasterian schools to our cities and large villages; and to such places they will probably continue to be confined, for many years to come. But the system of mutual instruction is founded on principles so simple and philosophical, that to some considerable extent they would seem to be of universal application.

The colleges and academies, however, furnish but a small part of our means of public instruction—the common schools are not only more numerous, but more important. It appears from the superintendent's last annual report, that there are in this state 8,872 district schools, in which there were taught during the last year, 480,041 scholars. During the same period, about 4,500 students were taught in the academies and colleges. It is obvious, therefore, that the great mass of the people receive their education in the common schools; and that the character of the nation must, to a great extent, depend upon the character of these primary institutions.

Whilst the government of this state, through the instrumentality of the common schools, has nobly fulfilled one of the great ends of its institution, their usefulness is impaired by imperfections, which it is not in the power of government to remedy or to prevent. Of these imperfections, the want of competent teachers is perhaps the most prominent. It has always been felt, and to a certain extent, it must ever continue; for, like poetic fire, aptness to teach can never be provided by legislation. If, in addition to this endowment, and to a competent acquaintance with those branches of learning which they undertake to teach, the instructors in our common schools could also be imbued with the spirit of the age, a great desideratum would be obtained. Unfortunately, however, in many parts of the state, the teachers of common schools have been standing still, while the rest of the world were marching forward. The consequence is, that the character of the schools, and of the pupils, is necessarily below the elevated standard to which it should be brought; for when the teacher does not keep pace with the progress of the age, the pupil will assuredly suffer a corresponding retardation.

The importance of educated and competent teachers, is generally admitted by the intelligent and thinking part of our community; but how are they to be procured?

The plan of establishing institutions for the instruction of teachers, as has been done in Prussia, and in some other parts of Europe, has often been suggested, and during the last session, was earnestly pressed upon the legislature, in an elaborate petition from the citizens of Rochester. The anxiety evinced by the framers of that petition, to elevate the character of the common schools, and to place the means of a solid education within the reach of every child in the state, deserve the highest commendation. But they seem not to have considered, that the legislature, by the addition to the literature fund in 1827, did all that the then existing state of our finances permitted, and perhaps all that the exigencies of the case required, for the accomplishment of this object. Indeed, I feel authorized, from the documents in the possession of the regents of the university, to assert, that there are academies in every senate district, in which every branch of science proper for the qualification of common school teachers of the most desirable character, may be pursued with every requisite facility. I confess, therefore, I do not perceive either the necessity or the advantage of establishing institutions specially intended for the instruction of teachers. If, in answer to this, it be said—what cannot be denied—that most of the young men educated in our academies, devote themselves to other and more gainful pursuits; and that only a few of them are to be found in the common schools; may we not reply, that the fact suggested, instead of proving the expediency of establishing institutions for the instruction of teachers, is rather evidence to the contrary; for it demonstrates that, even with our present means, more are produced than are sought for or required, by the inhabitants of the districts. Unless therefore we can increase the demand for well instructed and competent teachers, it would seem idle to suppose that the special preparation of even the best talent of the country, for this duty, would lead to its employment in the common schools. For if persons were to be educated as teachers at the public expense, what guaranty (to use the language of the present able superintendent of common schools,) "what guaranty would there be, that such persons would follow the business of teaching, unless they should be as liberally compensated in a district school, as in the other pursuits of life?"

In countries where stronger governments prevail, and where the lucrative professions are overstocked, and the means of procuring a livelihood, scanty and precarious; institutions may be established for the training of youth to any particular employment, with a reasonable certainty that they will adhere to it through life. It will be long, however, before the like remark can be applicable to us. I see therefore no ground to hope for the general improvement of the teachers in common schools, until those who employ them, shall themselves be first instructed in the duty, importance and advantages of procuring competent instructors.

Defective systems of instruction, and the want of proper school books, continue to be felt in the common schools. Indeed, until within a few years, we have had but few books well adapted to the purposes of elementary instruction. Grammar, as taught in the books formerly in vogue, was even to youth considerably advanced, a cabalistic jargon; its rules were acquired by rote, and applied with but little apprehension of the principles on which they were founded. It is not perhaps more than ten or a dozen years, since the first grammar was produced (Ingersoll's) which was level in any degree to the comprehension of the younger classes of learners; and the merits of this work seem to have been buried in the mass of publications, on the elements of English grammar, which are constantly issuing from the press. So far as the common schools are concerned, it is used in only two towns in the state. In arithmetic, also, until within a short time, the elementary exercises were ill adapted to the capacities of children. Within a few years, the system of Pestalozzi has been introduced in the eastern states, and in some of our schools, with decided success. Its simplicity, and its admirable method of illustration, realize all the principles on which school books ought to be prepared. I might mention many other manuals recently brought out, and admirably adapted to every class of learners.

But the improvements in school books, like those in the modes of instruction, though generally adopted in academies and in the select schools in our large towns, fail of reaching our common schools. It appears from the last report of the secretary of state. that there are now in use more than one hundred different kinds of school books. This want of uniformity is much to be lamented ; but it is still more a subject of regret, that so many inferior books should be retained in common use. The idea has been indulged, that this evil could be remedied by legislation ; and a set of books intended to embrace a complete course of common school education, has been actually prepared and submitted to the examination of the legislature, by a meritorious instructor, with a request that it might be adopted by the legislature, and recommended to popular use. This request—which received countenance from the fact that the work was stated to have been commenced under the auspices of the late Governor Clinton—was seconded by the petition of many respectable citizens, and by the strong recommendations of several of our most distinguished literary characters. The respect to which they are so eminently entitled, forbids the supposition that they can have recommended, without due consideration, a measure so important. When, therefore, I express my decided disapprobation of this project, I fear that I may incur the charge of self-confidence and presumption. But he who can hesitate, from apprehensions of this sort, to state what are the conclusions of his deliberate judgment on a question of such vital interest, would be unworthy the attention of an audience like this. You will therefore permit me to state some of the objections to this plan.

In the first place, it is unsuited to the genius of our institutions and the character of our citizens : the former proceeding on the idea that the people are competent to decide for themselves, on all questions which appeal directly to their interest and intelligence ; and the latter, not only exemplifying the truth of this axiom, but so fully imbued with its influence, that I doubt whether they would more readily submit to legislative direction in this matter, than in regard to the texture or fashion of their children's clothes.

The principle of the measure is not only objectionable; but difficulties would be found in its execution and results. I say nothing of the loss of the books now in use, and the expense of procuring new ones, because it would be wise to submit to very considerable expense for the sake of a very decided benefit. In some of the schools, good books have already been introduced, and it is not certain that any changes in respect to them would be for the better. But admitting the selected books to be superior to all others, how long would they remain so? The human mind, in this age, is neither stationary nor inactive; much of the first talent in Europe and in this country, is devoted to the preparation of school books; and there is every reason to believe that great improvements would soon be made upon any set of books that might be adopted by the legislature. The consequence would be, that the schools would lose the benefit of these improvements, unless the books established by law were either revised or abandoned; in either of which events, a great expense would be incurred. Expenses from the changes of books are undoubtedly incident to the present system, and will ever continue under any; but when they occur, they are usually confined to the substitution of one or two superior books for inferior works of the like nature;—they rarely extend to the whole set used in the school. But whenever a complete set of books shall have been prescribed by law, the substitution of a new edition, or of entirely new works, would produce an immense expense, and the very fact that it would do so, would probably, for many years, delay its accomplishment, leaving the schools exposed, in the interim, to the injury resulting from the use of imperfect books. This objection applies, though not to so great an extent, to the prescribing by law of even a single book.

Again: have not the supporters of this measure overlooked one of the most important principles in our nature—that love of change and novelty, so powerful in every age, and especially in childhood? Or rather, is not the system proposed, directly repugnant to it? The transition from an old book to a new one, is an era in the life of a school boy; independently of its contents, the fact that the book is *new*, is a source of delight, and an incitement to study. He who knows what is in man, has not only made the whole material world, "beauty to the eye and music to the ear;" but he has made it, in accommodation to our nature, various and changeful. Let us not violate this analogy; let us not deprive our youth of this source of innocent and useful pleasure. You will do both, if you confine them within a circle prescribed by law, and out of which, they are to understand from the beginning, they are never to depart. The round will be uniform, but it will soon become monotonous and tiresome. (9)

Without dwelling longer on existing defects, let us enquire how they are to be remedied? For truly unprofitable will these observations have been, if something remedial shall not be either produced or suggested by them. Considering the subject with a just reference to our frame of government, and to the temper and habits of our people, it is hardly to be expected that either of the mischiefs to which we have alluded, can be corrected by legislation. How then is it to be done? I answer—By the general diffusion of knowledge—especially on the subject of education. You must reach the parents of our youth, and the officers of the school districts, and by impressing them with a just sense of the value of education, and of the advantages, in respect to economy and proficiency, which result from the employment of competent teachers, stimulate them to higher efforts. You must reach the instructors in our schools, and by making them acquainted with recent improvements, increase their usefulness, and aid them in the performance of their duties. You must reach the children themselves, and by diffusing instruction, on subjects not within the competency of their teachers, counteract, so far as may be, the evils of defective instruction. And among all the means to be employed for these purposes, I know of none so efficient as the *press*. Several periodicals are now published in New-England, in which the subject of education is treated in a manner well adapted to the use of teachers of the higher grade. They enjoy a considerable circulation in this state;

(9) See note 9.

but not enough to make a very decided impression on the public mind. Nor can they, in the nature of things, be so well adapted to our system and state of society, as if published in this state and conducted with special reference to our local institutions.

We have also several publications intended for the use of children and youth; but as none of them are in general use in the common schools, the introduction of newspapers has been frequently recommended; and there can be no doubt that these repositories of intelligence and instruction, if properly conducted, might be read with great advantage by the senior pupils in our primary institutions. In addition to articles of intelligence, their miscellaneous character renders them peculiary interesting and attractive. Of the 211 newspapers published in this state, there are many which not only fulfill the duty of disseminating early and correct information in regard to passing events; but which surpass in entertainment, even the best conducted magazines, and rival the most labored and valuable periodicals, in the aid they render to the cause of science. But as no one of them is particularly intended for the use of schools, it is no disparagement of their conductors, to say, (what I am sure no one will deny) that there is no newspaper now published in this state, well adapted to that use. Most of them are connected with the political distinctions which from time to time exist among our people; neutrality in this respect being rarely professed, and still more rarely observed. A few are strictly of a religious character; but these again are generally devoted to the inculcation or defence of particular modes of faith. It is obvious that no newspaper devoted to the interest of any particular sect in politics or religion, could be brought into general use in the common schools; still more so, that no attempt of that sort should be countenanced for a moment. Besides, most of the newspapers are more or less filled with advertisements; and they frequently contain articles, even of intelligence, which are unfit for the perusal of youth. The same objections apply, though not to so great an extent, to any attempt to make use of ordinary newspapers with a view to the general improvement of education.

The several objects designated, can therefore only be attained, by establishing a journal of instruction, wisely adapted to the ends proposed, and by placing its management under such auspices as will not only secure public confidence in regard to the general ability with which it shall be conducted, but effectually preclude the operation of any political or sectarian influence. Such a journal is hardly to be expected from individual enterprise; and though a voluntary association might easily be formed which for a season would conduct it with success; yet the want of a fixed and permanent body to whom it could be committed, would greatly diminish, and probably soon destroy, its usefulness.

The central position of our society; the perpetuity of our charter; the fact that the members of the legislature are *ex officiis* members of the Institute, and the connexion with the public authorities which result therefrom; our organization into separate departments; the varied sentiments of our members upon political and religious subjects, all combine to make the Albany Institute the proper body to undertake the publication of such a journal. I am persuaded that we could do so with little inconvenience to ourselves, and with great advantage to the public. And I therefore beg permission to lay before you the outlines of a plan for the accomplishment of this object. I would respectfully propose, that the Institute should publish a "Journal of Instruction," either semi-monthly or weekly, as may be deemed most expedient, to be exclusively devoted to the improvement of the common schools. Convenient portions of each number to be appropriated, 1st, to the useful arts and the physical sciences; 2d, to natural history, and 3d, to history and general literature, including a summary of scientific intelligence both foreign and domestic; one of these portions to be assigned to the corresponding department of the Institute, and each to be filled with such articles, original and selected, as should be prepared by committees to be appointed by the departments from time to time, as may be deemed most expedient. The labor of preparing the matter for the several portions of the paper, would not only be divided, but it could not be arduous; for independently of the useful works constantly issuing from the press, the reviews, and magazines, journals and newspapers published in

Europe and America would furnish from week to week such exhaustless stores of interesting and valuable information, that nearly all the objects of the journal might be obtained by judicious selections. But as opportunities would be afforded for original articles, we should probably receive many from our members. Besides—we should have a journal for the early publication of our transactions; and its existence and the duty of contributing to it, would stimulate the members of the Institute to greater diligence in the cultivation of science.

I do not flatter myself that we could so conduct such a journal, as to avoid all occasion for criticism, but I do believe that we could do it with less liability to just exception, and with greater prospects of usefulness, than any one individual, or any other association. The interest we should all feel in securing and retaining the confidence of the people, and of their representatives—independently of other and higher motives—would excite us to diligent and permanent exertion.

The influence of such a journal if introduced into general circulation; the evils it might prevent, and the good it might accomplish; cannot be estimated by any human arithmetic. You are to consider that either directly or through their parents and teachers, you might reach half a million of souls at a period when they are most susceptible; and that whilst you were making them acquainted with the improvements in the arts, and with the progress of knowledge, the movements of society, and the spirit and character of the age; you might become the instruments of imbuing their young minds with virtuous sentiments, and training them up to usefulness and honor.

It would be easy and delightful to dilate upon the benefits which might result from these humble and unambitious labors, and on the pleasures we should derive from their performance; but the occasion will not allow it. Sufficient however has been said, to present the subject to your consideration, and I trust, to secure to it, an early and favorable decision. (10)

4. Next to the promotion of general education, I consider the cultivation of a *sound popular taste*, and the *encourage-*

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(10) See Note 10.

ment of native talent, as objects richly meriting the attention of the Institute.

The severe studies to which scholars and professional men are required to addict themselves, have comparatively but little influence on the character and conduct of the great mass of the community. It is the every day reading, the works of amusement and instruction, the newspapers and other periodical publications, which give tone and direction to the public sentiment. It was upon this principle remarked by a sagacious observer, "*that if he could write the ballads of a nation, he cared not who wrote its laws.*" This reference to a particular department of popular literature, was doubtless too strong; but it may truly be said, that the laws and every other institution, take much of their complexion—especially in free states—from those works which form the aliment of the reading public and which are selected in accordance with the prevailing literary taste. It requires, therefore, but little reflection to perceive, that the cultivation among us, of a correct literary taste, is intimately connected with the growth of the nation in manly and virtuous sentiments, and of consequence, in prosperity and honor. So far then as we may be able to influence the public mind, let us endeavor to promote a taste for those kinds of composition which are best fitted to enlarge the understanding, to improve the affections, and to quicken and call forth the nobler faculties of our nature.

Efforts of this sort are the more important, especially in reference to our youth, because there are many things in the present state of the world, unfavorable to the acquisition of sound knowledge and to the formation of a correct taste.

A great part of the popular literature of the day, has no higher object than *amusement;* and much of the first talent in this country, and the greater part of the eminent writers in Europe, are engaged in the composition of works of this nature. Many of these works are distinguished by splendid powers of description, just delineations of character, and great beauty of style. Many of them are unexceptionable on the score of morality, and not a few are professedly intended for the promotion of religion—yet nothing can be more certain, than that the constant perusal of these works—even of the best—is calculated to weaken the understanding, and to produce and to keep up an unnatural excitement, alike injurious to the mind and incompatible with the active duties and the dry realities of life. When to this we add, that newspapers and periodical publications are much more numerous and accessible in this country than in any other part of the world, we may easily perceive how great is the danger, that we shall become a nation of light readers and superficial thinkers.

But this is not the worst—for the last two or three years we have been inundated with foreign works of this class, the tone and execution of which are, in many cases, repugnant alike to morality and good taste. It would seem from the encouragement afforded to the booksellers engaged in this system of republication, that these productions meet the taste of our countrymen. I consider this one of the most fearful "signs of the times." What will the next generation know of the simplicity of Addison, the elegance of Goldsmith, or the vigorous thought and sound morality of Johnson—to say nothing of Hooker, Taylor and Bacon, who have already become obsolete—if our booksellers continue to thrust upon us so many of the trashy productions of the London press? And who can calculate the injury which may be done to the literature, the morals and the welfare of the nation, by the indiscriminate perusal of such works?

There is the less reason for these pernicious importations, because we have a rapidly increasing literature of our own, which requires only to be cherished, to become honorable to the nation and useful to mankind. I can only glance at this topic, and the slight notice I can give to it, must be confined to the literature of our own state.

In the early period of our colonial history, there was little room for literary exertion. The first colonists, and their descendants for several generations, were compelled to content themselves with the rudiments of learning. Occupied in reducing the desert to a habitable state; in tilling the soil for their daily bread; or in repelling the attack of invading enemies; they had neither leisure nor inclination for literary pursuits.—You have already heard that until the foundation of Kings college, less than twenty years before the declaration of independence, there were no seminaries within the colony, in which any other than a very indifferent education could be procured. The influence of that institution on the literary character of the state, was truly wonderful; for though the whole number of students educated in the college prior to 1775, was but one hundred, many of them attained to great distinction in their respective professions and in public life. In reference to them and to their Alma Mater, the language of the Roman poet would scarcely be too strong—

> Felix prole virum . . . . . .
> Laeta deum partu, centum complexa nepotes,
> Omnes caelicolas, omnes supera alta tenentes.

Of the elder born of this Titanian progeny, I give you as a specimen—Robert R. Livingston, Gouverneur Morris, and John Jay—each distinguished alike by his genius and erudition, and all illustrious in the annals of their country, for their talents as writers, and their services as statesmen. (11)

The revival of the college, and the establishment of other seminaries, after the revolution, increased the number of our writers; but until within the last fifteen years, though we had great names at home, especially in politics, theology and jurisprudence, we had produced but few writers whose works had acquired any celebrity abroad. Within the short period I have named, a new era has commenced; and New-York has given to her sister states and to the world, many writers of distinguished merit, who have illustrated and adorned various departments of science, history, moral and political philosophy, polite letters and jurisprudence. (12) Two of them—Irving and Cooper—have received from the highest authorities in the old world, in reference not to one, but to several successive productions in the most difficult branches of literature, the tribute of full if not of ungrudged admiration. From the hands of another—also a native of our state, and like them, nurtured in her bosom—Britain and Germany have received a text-book on the complicated science of medical jurisprudence. If we should add to this list, several other living authors, who though born and educated in New-England have

(11) See Note 11. (12) See Note 12.

long resided among us, we should include one of the most gifted female writers* and two of the first poets of the age.†

But without plucking a leaf from the laureate brow of any sister state, we may still twine for New-York the garland of Poesy; and though it be chiefly composed of wild flowers, they are flowers of amaranthine hue and undying fragrance. One of the sweetest has dropped, half-opened only, from a broken stem; and yet it has reflected on the soil which nourished it, a glory that has crossed the broad Atlantic. Whoever reads the London Quarterly Review, for November last, will there find the taste and feeling of the British public, doing homage, through a medium by which our country has often been assailed, to the careless effusions of an untutored girl, who never dreamed, in her wildest visions, that *she* was to win such honor to her native state.‡ When I read this elegant and spontaneous tribute to the intrinsic loveliness of truth, simplicity and virtue, I forgot every feeling of resentment I had harbored towards the conductors of that review. I could only think of them as descendants, with us, from a common lineage —the lineage of Spencer and Sidney, of Shakspeare and of Milton—as brethren of the same family, speaking the same language, worshiping at the same altar, and cherishing the same emotions with ourselves. And when I remembered that the pages of that distinguished journal were to be read, not only by the millions for whose use it was primarily intended, but wherever the energy of Britain had planted her power or conveyed her language, I could not but feel, how much the glory of a nation depended on its authors; and this feeling swelled to an admiring estimate the superiority of letters, when I reflected that the "native wood-notes" warbled by this child of fancy, would probably do more, to make known and to immortalize, the village of her birth, than the splendid victories achieved on its banks and waters!

* It is believed that the author of Redwood may justly be claimed as a resident of New-York.

† Halleck and Bryant.

‡ Lucretia Maria Davidson, of Plattsburgh.

5. I should fail in my duty and I doubt not do injustice to your feelings, not less than to my own, if I omitted to remark, that it is still more important, that we labor, so far as opportunities may permit, *to disseminate the principles, and promote the practice, of sound morality.* In this respect, societies as well as individuals, have their character, and exert their influence. Whether the influence to be exerted by this Institute be extended and permanent, or narrow and ephemeral, let us see to it, that it may be an influence on the side of virtue and religion.

I am the more anxious on this point, because attempts have recently been made to diffuse among our people, under the names of *science* and *free inquiry*, a bold spirit of infidelity and atheism—a spirit, which if it gain currency among us, must ultimately prove fatal to our national character and prosperity. I cannot think this assertion too strong; because all agree that morality is indispensible to public and private happiness, under any form of government, and above all in a republic; and to me, nothing is plainer, than that the surest basis of sound morality is to be found in the religion of the Bible.

More than this. I have no hesitation in saying, that in my humble judgment, the superiority of Europeans and their descendants, in the sciences of government and jurisprudence; in the arts of social life; and in the means of public and private happiness; is mainly to be ascribed to the influence of Christianity. On this point it seems to me there is no room for doubt or cavil. We know from authentic history, what the state of Europe was, before the introduction of the Christian faith: we can trace its subsequent progress; and we can see what it now is. On reviewing the progress of society in that quarter of the globe, we perceive that Christianity has banished from it the institutions of idolatry, and their absurd, licentious and inhuman rites—that she has wholly suppressed the shows of the gladiator, the exposition of infants, the capital punishment of children by their parents, and the abandonment of parents by their children, the evils of polygamy and of unlimited freedom of divorce, and the curse of domestic slavery—that she has elevated the female sex to their just rank in the scale of being—that she has greatly mitigated the horrors of war—that the practices of incest, assassination, poisoning and suicide, and those other nameless enormities, once so prevalent among the most enlightened nations, have fallen into discredit and disuse—and that precisely in proportion to the prevalence of this religion, in its purity and power, has been the advancement of the nations to which we have referred, in all the attributes of greatness.

When we look at our own country we see still more clearly the beneficial influence of the Christian faith. It led to the foundation of most of our republics; it sustained the first colonists in their hazards, sufferings and labors; it has formed, with the most successful and thrifty of their descendants, the basis of their character and institutions; and to a greater or less extent, it has continued to exert through every period of our history, and in every part of our confederacy, a life-giving and salutary influence.

It is no answer to this to say that civilization and knowledge, philosophy and refinement, would have led to these results; for here again the testimony of history and experience is explicit and decisive. Whilst they inform us that ignorance is the mother of superstition and immorality, they also assure us, that mental cultivation affords no security against them. Look at the most polished state of antiquity—at Athens—in the period of her greatest refinement. When her schools of philosophy were in their highest reputation--when she possessed poets and orators, whom it is the boast of the present age to admire and to imitate—when architecture had reached a perfection which has never been surpassed—when her temples contained models in statuary and productions of the pencil, the very fragments of which have ravished the eyes and hearts of succeeding generations—when the institutions of Solon were administered by that illustrious tribunal, which has given to the hill of Mars a portion of its own sanctity and grandeur—when her populace listened with intelligent and discriminating delight to the debates of her profoundest statesmen—when even the fish-women in her markets, could detect the slightest violation of Attic purity—and you will find that even in this "her high and palmy state," her people were a prey to superstitions, which not only tolerated but sanctified, the most licentious and unnatural enormities.

To those who may object, that this proof is drawn from a remote antiquity, and that the enlightened spirit of the present age would instinctively reject the licentious polytheism of ancient Greece, I would reply, by pointing them to the most cultivated portions of the heathen world, at the present hour, as proofs that human nature is still the same, and that superstitions equally unreasonable and mischievous, are yet cherished among men. If to this, it be said, that the reference to these nations is also unjust, because though they possess many of the arts in greater perfection than ourselves, they are yet far behind us, in science and philosophy—the answer is at hand. The fact suggested does undoubtedly exist—'tis indeed true, that whilst the lights of intelligence and virtue are spread abroad wherever the rays of Christianity have fallen, we find elsewhere, nought but clouds and darkness overshadowing the land. But the existence of this state of things may properly be relied on, as decisive proof of the usefulness and superiority of the Christian faith; and how is the argument that results from it, to be overcome or resisted? The diversity to which I have alluded in the present condition of mankind, may fairly be ascribed to diversity in religious faith as its ultimate cause; for such is the nature of Christianity, that wherever her doctrines are known and revered, she cannot but produce the most beneficent results. By inculcating purity of of heart, and holding up a lofty standard of morals, she improves the manners; elevates the moral sense; gives a proper direction to those propensities of our nature, which would otherwise become the fruitful sources of disorder and misery; and erects barriers against many crimes, which the sanctions of human laws would be unable to restrain. By her peculiar doctrines of charity and meekness she tempers with moderation the penal code of individual states; whilst her enlarged benevolence and universal philanthropy, diffuse into the law and through the intercourse of nations, the principles of humanity and justice.

Great efforts have been made by the self-styled friends of *science and free inquiry*, to excite among the most numerous class of our community, a general contempt of all religion, and especially of that in which they have been bred. Yet if there be any class of society, more indebted than all others, to Christianity, it is the laboring and poorer class. Teaching that all men are created equal; that they are endowed with the same unalienable capacities of virtue, improvement and immortality; Christianity comes with special blessings to the poor. It was a distinctive character of her doctrines, that they communicated "glad tidings to the poor"—a principle unknown to the ancient philosophy, and a fact before unheard of in the history of mankind. In accordance with this principle, she opens to the most humble, the field of competition; stimulates him to exertion; and sustains him with the assurance that he is, equally with others, the object of divine regard. If, after all, he fail, as he often will, of obtaining the good things of this life, she indemnifies him for the want of worldly possessions and enjoyments, by inviting him to pleasures, intellectual and sublime, and by setting before him rewards, glorious and enduring. Christianity has not only enabled the poor to claim, with a divine warrant, their equal rights among men; but she has taught the rich that the best return they can make to Providence for its bounty, is to imitate Him who "went about doing good." Hence the numerous institutions for the relief and instruction of the poor, the asylums, and almshouses, and hospitals, the infant, Sunday, and free schools, which belong to Christian nations, and which more than any thing else, distinguish them from the rest of mankind. The same spirit of equality and benevolence pervades the jurisprudence of Christian nations. Wealth is not exempted from the restraints of law, nor can the poor be trampled upon with impunity. In a word, the protection of private rights, the enjoyment of civil liberty, and the even handed distribution of justice, if they do not necessarily depend on the possession of Christian knowledge, are yet to be found in perfection and extent, in precise proportion to the diffusion of such knowledge.

If the truth of any system of religious faith, is to be tested by its effects on the happiness of society and of individuals, (and this undoubtedly is one legitimate source of evidence) then it must be admitted by every candid and impartial enquirer, that if there be any such system now known among men, which deserves to be received as true, Christianity must be the one, and the only one. At all events, until it can be shown by conclusive arguments to be an imposture, it is not only contrary to sound philosophy, but inconsistent with a just regard to the happiness of mankind, to reject a religion productive of so many and such extensive advantages.

If however it can be shown by fair reasoning from established facts, that this beneficent religion, notwithstanding all it has done to meliorate the condition of mankind, is yet founded on falsehood and imposture, then, whatever may be the consequences, IT OUGHT TO BE ABANDONED. This is the dictate not only of unsophisticated reason, but of the highest philosophy; for no temporary advantages, however extensive or diversified, can justify or even excuse the maintenance of a system erected on those foundations. This is the spirit of Christianity herself. She asks our assent, not merely because she inculcates precepts well adapted to promote virtue and happiness; but because the authenticity of her records, and the veracity of their statements, are established by indubitable evidence, and involve in *their* truth, that of the revelation they contain—because her doctrines though not discoverable by human reason, are not repugnant to, but consentaneous with it—and above all, because she meets the necessities of our nature, and supplies what Socrates wanted—something to sustain, and elevate, and purify, the divine, though imperfect and erring, principle within. She calls upon the sons of men; but it is one of the most glorious proofs of her divinity, that she calls them to enquire, examine, and reflect; "to prove"—to test—"all things"—to try them as metals in a furnace—and "to hold fast that which is good," and that alone.

But 'tis time I should conclude; and what direction can more fitly be proposed to you, in reference to the commencement as well as the continuance of your labors, than the divine maxim,

Παντα δοκιμαζετε : το καλον κατεχετε ;

"Prove all things; hold fast that which is good?"

May "good" then—the universal good—the TO KALON of the ancient philosophy (the ineffable Idea of all that is sublime and beautiful in Truth and Virtue) blended with the higher and greater "good" of Christian ethics, be the end and aim, the object and the issue, of all our enquiries and exertions. And from all our studies and pursuits—from the forms of inanimate creation—from the endless varieties of living things—from consciousness, and reason, and the inmost recesses of the soul—from all physical, and mental, and moral science—may we hear the voice of truth—a voice to lead us to the glory of goodness and the immortality of the blest!

NOTES.

NOTE 1.

In connexion with the publication of the posthumous work of Mr. Smith, the New-York Historical Society have also republished the original volume "with the author's last alterations and additions, from the original manuscript." These alterations and additions, as well as the supplementary volume, were obtained by the society from the Hon. *William Smith*, of Canada, a son of the historian. The whole work, as now published, is comprised in two volumes, the geographical summary being subjoined as an Appendix to the first. A biography of Mr. Smith, furnished also by his son, is prefixed to that volume.

The alterations in the original volume consist of several additional notes, and of about fifteen pages of new matter introduced in as many different places, in the text and notes. These additions, though in no instance particularly important, are generally interesting and valuable. The note in page 2, relative to the time of the discovery of this territory by Henry Hudson, as enlarged in the late edition, contains a singular fact which I have thought it might not be uninteresting to present in this place. It seems that in the spring of 1775, the marks of a hatchet were found on the body of a tree in this county, under such circumstances as to give some ground for the belief that they had been made in 1590, seventeen years before Hudson's first voyage. The fact occurred under the observation of Mr. Robert Yates, [then a practical surveyor, but afterwards chief justice of this state] and was by him communicated to Mr. Smith, in the following letter:

"Sir,

In the course of the survey of the patent granted in the year 1672, to Van Hendrichy Van Baale, in the county of Albany, as claimed by the proprietors thereof, the surveyors were particularly directed by the arbitrators appointed for the determination of its contested boundaries, to bore the marked trees standing on and at some distance from the lines. In consequence of it a number of trees were bored. Several, whereof, appeared to be cut or marked, whose respective ages, upon ascertaining the streaks grown over such marks, counted from 110 to 140 years. But what more particularly strikes my attention, and to which I can find no satisfactory solution is, that at the distance of about one mile south-west from a hill called Kych-Uyt, in a pine wilderness, remote from any settlement, one of the axemen, for the sake of keeping him in employ, was ordered, on the seventh of March, 1775, to cut a pitch pine tree of about two feet diameter, whereon was little if any appearance of a mark—about six inches in the tree, a cut or mark was discovered, and the block taken out. In splitting with the grain it opened to our view several cuts of an axe, or other sharp iron tool, the dents whereof appeared, as fresh and new as if the mark had been made within a year. In counting of the rings or streaks grown over these marks, it amounted to one hundred and eighty-five, so that the cut was made in the year 1590, at least 17 years before Hudson's discovery of this country. It is well known, that the natives had no iron tools before their acquaintance and intercourse with the Europeans, and it is this circumstance that involves me in the difficulty of accounting for its mark at that early peirod. Proof of the number of streaks grown over marks, has often in our courts, been allowed to ascertain its age. I have, therefore, been at some pains to discover its certainty, and can, from my own experience, declare that it amounts to demonstration. Among the variety of instances, the two following are the most remarkable:—In the year 1762, I was present when a number of trees were marked on the survey of the township of Kinderhook. In the year 1772, I re-surveyed these lines, and ordered several of those marks to be opened, and thereupon found that all those trees, though of different kinds, invariably counted ten streaks above the marks. I had also been employed in 1768 to re-survey the bounds of a patent which appeared by the deputy surveyor's return to have been originally laid out for the patentee in the year 1738. To satisfy myself as to the certainty of the trees which were shewn me as marked on his survey, I bored a beech tree, whereon the initial letters of his name appeared standing in the corner of one of the sides, and found that the streaks above it counted exactly thirty. I am, sir, your most obedient servant,

ROBERT YATES."

New-York, May 3, 1775.

Mr. Smith states, that the block was brought to the city of New-York and shown to him, and that he informed the discoverer of the curiosity, that the Indians might have gotten the instrument from Canada, which was visited in 1536, 1540, and 1542; or from the English who entered Albemarle Sound in 1582, and in 1585 established a colony at Roanoke, the members of which expanded themselves southward and northward, and had dealings with the Indians above one hundred and thirty miles north-west into their country, &c.&c. It seems to have been taken for granted by the gentlemen who examined these marks, that they were certainly made by an iron tool; a point as to which, the readers of Mr. Smith, at the present day, will probably be incredulous. But whatever may be thought of the inferences attempted to be drawn from the discovery of the marks, the particulars stated by Mr. Yates, as to the regular growth of the pine and the probable age of the tree in question (for if it had acquired but one fourth of its diameter in 185 years it would seem to have been over 740 years old) are curious, and worthy the attention of naturalists.

It is to be hoped that the alterations and additions contained in the recent edition of Mr. Smith's history, will be followed in every future republication. I am sorry to be obliged to point out one important defect in this edition—the preface and dedication prefixed by Mr. Smith to his original work have been omitted. The consequence is, that the dates of the publication and composition of the original work, which were fixed by these papers, do not appear. The preface contained also some valuable observations on the state and prospects of the colony.

It has occurred to me, that it might be interesting to those who have not met with the biographical sketch prefixed to the publication of the Historical Society, to abstract from it some of the leading particulars in the life of Mr. Smith.

William Smith, the historian of the province of New-York, was born in the city of New-York, on the 25th of June, 1728. His father was one of the most eminent lawyers in the province; became a member of the council, and afterwards a judge of the supreme court. The son was educated at Yale college, and bred to the profession of the law, which he pursued for many years with great success in the city of New-York. He is said to have been an eloquent speaker, and to have possessed much professional learning, to which he added an extensive and scientific acquaintance with theology and medicine, and much general knowledge. He was appointed a member of the colonial council in 1769, and during the controversies which followed the passing of the stamp act, took an active part in favor of the mother country. Anxious, however, to remove the subjects of complaint then existing, as well as to prevent the dismemberment of the British empire in America, he drew up a plan of union for the colonies, which was submitted to the minister, Mr. Grenville; but though approved by him, it was not brought forward in parliament.

Upon the commencement of hostilities, Mr. Smith repaired from the city of New-York to his country seat at Haverstraw, where he remained until the 3d of June, 1777. On that day he was brought before the committee of safety, at Kingston, and on being asked whether he considered himself a subject of the independent states of America, replied, "that he did not conceive himself discharged from his oath of allegiance to the British crown;" upon which he was confined for a time in the manor of Livingston, and afterwards sent into New-York, where he remained until its evacuation by the British in 1783. He then went to England, where he resided until 1786, when he removed to Canada, being appointed chief justice of that province, an office which he held until his death, which took place on the 3d of December, 1793. Whilst he held this office (says his biographer) "he managed the court and all its proceedings with singular justice. It was observed by the whole country how much he raised its reputation; and those who held places and offices in it, all declared, not only the impartiality of his judgments, but his generosity, his vast diligence, and his great exactness in trials. It was customary before his time, that all prisoners should be brought into court in the custody of a party of soldiers: he disapproved of this, and established for the first time, the appointment of constables, which has been continued ever since." The character of Judge Smith, both as a public man and in private life, was eminently pure. By his wife, Janet Livingston, the daughter of James Livingston, Esq. of New-York, he had eleven children; several of whom survived him. His descendants, who are numerous and highly respectable, are established partly in the Canadas and partly in Great Britain.

NOTE 2.

The first hundred pages of Mr. Moulton's work are devoted to a discussion of the question, "*By what means was America first peopled?*" Then comes the enquiry, "*whether America was known to Europe before Columbus?*" after which we are brought to a topic, with a branch of which the work might properly have been commenced—"*What Europeans first explored the North American coasts, and discovered them and the harbors of New-York?*" but then nearly an hundred pages are expended before we meet the name of Henry Hudson. The information on these extrinsic points, contained in the work of Mr. Moulton, though but little connected with the history of New-York, is valuable in itself, and does credit to his diligence.

I have noticed in the text, the laborious and useful investigations of Mr. Moulton, in respect to the early history of the colony of New-Netherlands. A single point of prominent importance may be mentioned in this place. Smith mentions the arrival of Governor Van Twiller in 1629, and speaks of him as the first governor of the colony, though he soon after mentions that in the Dutch records of 1638, there is a letter from Governor Kieft (the successor of Van Twiller) dated May 6, 1638, to Peter Minuit, then governor of New-Sweden, in which the former speaks to the latter "of his administration in New-Netherlands"; from which Mr. Smith infers, that Minuit probably preceded Van Twiller in the chief command. Every subsequent writer except Mr. Moulton, has repeated this suggestion, without making any effort to ascertain whether Minuit in fact preceded Van Twiller, or not; and all the lists of our governors and chief magistrates that I have seen, commence with the name of Van Twiller as the first governor, and with the date of 1629 as the epoch at which the government began. But Mr. Moulton has proved, that although Van Twiller visited the New-Netherlands in 1629, and acted for a season as director-general or governor, yet that Minuit actually preceded him in the charge of the colony, he having arrived in 1624, and being in fact the first of the Dutch governors. We find in Mr. Moulton's work, a clear and connected account of Minuit's administration from 1624 to 1629: in the latter year Van Twiller arrived, and acted as chief magistrate for a few months, but Minuit was not superseded. On the contrary it appears that Van Twiller soon returned to Holland, leaving Minuit in command, who was not recalled until after 1630; and that Van Twiller's second arrival, with confirmed authority, did not occur until the spring of 1633. During the interim, between the departure of Minuit and the last arrival of Van Twiller, the council at Manhattan executed the powers of government. [Moulton, part 2. chapters 4 and 6, and general note, p. 427.] In the table subjoined to the next note I have introduced these corrections.

NOTE 3.

Since writing the passage in the text, referring to the errors contained in Mr. Macauley's list of governors, I have met with a very striking illustration of the tendency of such mistakes to creep into other publications, until at length, by their frequent repetition, the truth of the simplest facts is perverted or put in doubt.—Several of the errors referred to, have been adopted in the American annual register, for 1828 and 1829, and in Williams' annual register of New-York for 1830. Neither of these valuable publications repeats all the errors of Mr. Macauley, but it is evident the lists contained in them must have been chiefly copied from his book, because in each of them the death of Governor Clinton is stated to have occurred on the *ninth* of February, 1828, and each of them includes others of his mistakes.

To prevent—so far as this publication may contribute to that end—the repetition of these erroneous statements, I have prepared, with great care, a list of the several governors and other chief magistrates of the colony of New-Netherlands, and of the colony and state of New-York, which I trust will be found correct. The dates (which refer to the period during which the persons named actually administered the government,) have been derived from Moulton, Smith, the journals of the colonial assembly, and documents in the secretary's office.

DUTCH GOVERNORS.

PETER MINUIT, from 1624 to 1630, and perhaps after that year, with the exception of a short time during the year 1629, when Wouter Van Twiller acted as chief magistrate. After Minuit's departure, the council at Manhattan administered the goverument until the spring of 1633, when Van Twiller returned with confirmed authority.

WOUTER VAN TWILLER, from 1633 to 1638.

WILLIAM KIEFT, from 1638 to May 27th, 1647.

PETER STUYVESANT, from May 27th, 1647, to August 27th, 1664, when the city of New-Amsterdam was surrendered to the English.

ANTHONY COLVE, from August 12th, 1673, to October 31st, 1674.

ENGLISH GOVERNORS.

RICHARD NICOLLS, from August 27th, 1664, to May, 1667.

FRANCIS LOVELACE, from May, 1667, to July 30th, 1673, when the fort and city were surrendered to the Dutch, after which Anthony Colve acted as governor, until October 31st, 1674.

Sir EDMOND ANDROSS, from October 31st, 1674, to the beginning of 1681.

ANTHONY BROCKHOLST, president of the council, from 1681 to August 27th, 1683.

THOMAS DONGAN, from August 27th, 1683, to the beginning of the year 1689.

FRANCIS NICHOLSON, lieutenant governor for a short time in 1689, after governor Dongan, and until Leisler assumed the government.

JACOB LEISLER assumed the title of lieutenant governor and administered the government, under that title, from the beginning of 1689 to March 19th, 1691. [Leisler was executed for high treason, but the attainder was afterwards reversed by the British parliament.]

HENRY SLOUGHTER, from March 19th, 1691, to July 23d, 1691.

RICHARD INGOLSBY, president of the council, from July 26th, 1691, to August 29th, 1692. Joseph Dudley was president of the council, but he being absent, the council committed the chief command to Ingolsby, and though Dudley soon returned, he acquiesced in this arrangement.

BENJAMIN FLETCHER, from August 29th, 1692, to August 2d, 1698.

Richard Earl of Bellamont, from August 2d, 1698, to March 5th, 1701. After the death of the Earl of Bellamont, William Smith, as oldest member of the council, claimed a right to act as president, but the council and the assembly decided that the government was vested in a majority of the council, by whom it was administered until May 19th, 1701.
John Nanfan, lieutenant governor, from May 19th, 1701, to May 3d, 1702.
Edward Lord Cornbury, from May 3d, 1702, to December 18th, 1708.
John Lord Lovelace, from December 18th, 1708, to May 5th, 1709.
Richard Ingolsby, from May 5th, 1709, to April 10th, 1710.
Gerardus Beekman, president, &c. from April 10th, 1710, to June 14th, 1711.
Robert Hunter, from June 14th, 1711, to July 31st, 1719.
Peter Schuyler, president, &c. from July 31st, 1719, to September 17th, 1720.
William Burnet, from September 17th, 1720, to April 15th, 1728.
John Montgomerie, from April 15th, 1728, to July 1st, 1731.
Rip Van Dam, president, &c. from July 1st, 1731, to August 1st, 1732.
William Cosby, from August 1st, 1732, to March 10th, 1736.
George Clarke, president, &c. from March 10th, 1736, to October 30th, 1736, when his commission as lieutenant governor was published, after which he administered the government in that capacity until September 22d, 1743.
George Clinton, from September 22d, 1743, to October 10th, 1753.
Sir Danvers Osborn, from October 10th, 1753, to October 12th, 1753, when he committed suicide.
James De Lancey, lieutenant governor, from October 12th, 1753, to Sept. 3d, 1755.
Sir Charles Hardy, from September 3d, 1755, to July 3d, 1757.
James De Lancey, lieutenant governor, from July 3d, 1757, to July 30th, 1759.
Cadwallader Colden, president, &c. from July 30th, 1759, to August, 1761, afterwards lieutenant governor to October 26th, 1761.
Robert Monkton, from October 26th, 1761, to November 15th, 1761.
Cadwallader Colden, lieutenant governor, from November 15th, 1761, to June 12th, 1762.
Robert Monkton, from June 12th, 1762, until about the middle of 1763.
Cadwallader Colden, lieutenant governor, from 1763, to Nov. 13th, 1765.
Sir Henry Moore, from November 13th, 1765, to September 1769.
Cadwallader Colden, lieutenant governor, from Sept. 1769, to October 1770.
John Earl of Dunmore, from October 1770, to July 1771.
William Tryon, from July 1771, to April 1774.
Cadwallader Colden, lieutenant governor, from April 1774, to June 1775.

[From May 1775, until the adoption of the constitution, the state government was administered by committees of safety and the provincial congress.]

GOVERNORS UNDER THE CONSTITUTION.

George Clinton, from July 1777, to July 1st, 1795.
John Jay, from July 1st, 1795, to July 1st, 1801.
George Clinton, from July 1st, 1801, to July 1st, 1804.
Morgan Lewis, from July 1st, 1804, to July 1st, 1807.
Daniel D. Tompkins, from July 1st, 1807, to February 24th, 1817.
John Tayler, lieutenant governor, from February 24th, 1817, to July 1st, 1817.
De Witt Clinton, from July 1st, 1817, to January 1st, 1823.
Joseph C. Yates, from January 1st, 1823, to January 1st, 1825.
De Witt Clinton, from January 1st, 1825, to February 11th, 1828.
Nathaniel Pitcher, lieutenant governor, from February 11th, 1828, to January 1st, 1829.
Martin Van Buren, from January 1st, 1829, to March 12th, 1829.
Enos T. Throop, lieutenant governor, from March 12th, 1829.

NOTE to page 168.

[The following note should have been referred to in p. 168.]

In reference to the usefulness of the *potatoe*, I am happy to find, that the opinion expressed in the discourse, is fully supported by that of Sir HUMPHREY DAVY. In his last and most interesting work (Consolations in Travel) that distinguished philosopher speaks of the potatoe as " perhaps the greatest benefit that the old has derived from the new world," and remarks that it is spreading over Europe, and will continue to nourish an extensive population when the name of the race by whom it was first cultivated in South America is forgotten."

I cannot omit stating in this connexion, that the Albany market during the present year, has exhibited great improvement in the quality of this vegetable and of other productions—a result to which the spirited exertions of the Albany Horticultural Society have not a little contributed.

NOTE 4.

Having been informed that the question was debated among some of my fair auditors whether I had enumerated the " *making of shoes*" among the operations of the steam engine, and that the performance of so complicated an operation by machinery was somewhat doubted, I subjoin an extract from Cuvier's reflections on the progress of the sciences, and on their relations with society, [read before the Royal Institute of France, on the 24th of April, 1816, and to be found in the American register for 1817, vol. 1, p. 309] a short account of the manner in which this result is produced. "The operation is performed in three strokes. A cylinder furnished with nippers cuts out the sole and fixes it to the upper leather; another cylinder makes the holes into which a third drives the small nails already prepared, which it rivets immediately and the shoe is made." The honor of inventing this machine belongs, I believe, to an American, Mr. D. M. Randolph. He obtained a patent in 1809, for a similar machine (though not to be operated by steam) which having been improved by Mr. Brunel, an Englishman, has been introduced into successful use at Battersea. A full account of the original invention and of the improvement, may be found in Tegg's London encyclopædia, article *shoes*.

NOTE 5.

The following statement of the grants made by the state government for the encouragement of literature and science, has been compiled by the writer from official documents, and though necessarily incomplete, yet so far as it extends, it is believed to be correct.

Grants to Columbia College.—

In 1792, for a new wing to the college; library; chemical apparatus, &c.	$19,750 00
From 1792 to 1799, for the support of additional professors, $1875 per annum, ...	13,125 00
Lands at Lake George, ...	2,500 00
Lands at Crown Point and Ticonderoga, estimated in 1814, at .	6,000 00
Profit on 400 shares in Merchants' bank, which the college was authorized by law to subscribe, estimated in 1814, at . .	4,000 00
In 1814, botanic garden (purchased by the state of Dr. Hosack, for $70,000,) estimated in 1819, to be worth	30,000 00
Allowance of $500 per annum to support a professorship of anatomy, from 1797 until 1810, when it was transferred to the College of Physicians and Surgeons, ...	7,000 00
Grant made by the act of the 19th of February, 1819, . .	10,000 00
	$92,375 00

Grants to Union College. [Incorporated in 1795]—

In 1795,	$ 3,750 00
In 1796,	10,000 00
In 1797, $750 annually for 2 years,	1,500 00
In 1800,	10,000 00
Also 10 lots in the military townships, of 550 acres each, which appear, by the report of the trustees, to have been sold for	23,985 46
In 1802, one half of the garrison lands granted by the Regents of the University, 1449 acres, which produced probably	3,000 00
By an act of 1805, raised by four successive lotteries,	80,000 00
By act of 1814, $200,000, with interest, to be raised by lotteries, the whole of which will not probably be realized until the end of the year 1835,	200,000 00
	$332,135 46

Grants to Hamilton College. [Incorporated in 1812]—

In 1812, mortgages were transferred to this college, to the amount of	$50,000 00
In 1814, $40,000, with interest, to be raised by lotteries, the whole of which will not probably be received until the end of the year 1835,	40,000 00
	$90,000 00

College of Physicians and Surgeons of the city of New-York. [Incorporated in 1807]—

By act of 1808, amount raised, and to be raised, by lotteries, estimated by the comptroller in 1819, at	$62,600 00
From 1810 to 1829, $500 per annum, 19 years,	9,500 00
	$71,100 00

College of Physicians and Surgeons of the Western District. [Incorporated in 1812]—

In 1812, mortgages were transferred to this institution to the amount of	$10,000 00
Before granted to the Fairfield Academy, for a chemical and anatomical school,	5,000 00
In 1820, $1000 annually for five years,	5,000 00
	$20,000 00

Moneys distributed among the several academies, by the Regents of the University, from the literature fund—

From 1790 to 1825, in the aggregate (including the sum of $1875 distributed in 1790, in part to Columbia College,)	$75,614 34
1825,	5,500 00
1826,	6,000 00
1827,	6,000 00
1828,	7,080 61
1829,	9,993 88
1830,	10,000 00
	$120,188 83

Grants to academies, made directly by the legislature—

To Oxford Academy.	In 1800, one lot,	550 acres	
Cayuga Academy.	In 1806,	275 acres	
	In 1813, one lot,	550 acres	
Pompey Academy.	In 1813, one lot,	550 acres	
Cortland Academy.	In 1813, one lot	550 acres	
Seneca Academy.	In 1813, one lot,	550 acres	
Onondaga Academy.	In 1814, one lot,	550 acres	
St. Lawrence Academy.	In 1816, one lot,	600 acres	
Delhi Academy.	In 1816,		$6,000 00
Lowville Academy.	In 1818, one lot,	640 acres	
Montgomery Academy.	In 1819, certain quit rents, liquidated afterwards at		1,418 82

Washington Academy.	In 1819, to rebuild the academy, &c.	3,000 00
Albany Female Academy.	In 1822, ...	1,000 00
Middlebury Academy.	In 1823, ...	1,000 00
Mount Pleasant Academy.	In 1824, a mortgage for $1000 and inter't,	1,000 00
Lowville Academy.	In 1824, ...	3,000 00
Red Hook Academy.	In 1824, ...	1,000 00
Auburn Academy.	In 1825, a lot of land, for which,	
in 1827, the state paid	. . . . . .	2,000 00
Fredonia Academy.	In 1825, $350 annually for 5 years,	1,750 00
Onondaga Academy.	In 1825, a lot of land, say 500 acres.	
St. Lawrence Academy.	In 1825, ...	2,500 00
Also a lot of land for the site of their building.		
Ithaca Academy.	In 1825, half a lot of land, 250 acres.	
Johnstown Academy.	In 1826, ...	1,600 00
Lewiston Academy.	In 1826, rents of ferry lot and	
ferry for ten years.		
Franklin Academy.	In 1828, ...	2,000 00
	Acres 5,565	$ 27,268 82

In the above list, the contents of the several lots have, in most cases, been given conjecturally, but according to the general average of lots in the military tract in which most of them are situated. Their average value may probably be set down at 4 dollars per acre.

Miscellaneous appropriations in aid of literature, science and the arts—

Botanic garden in New-York, purchased in 1810 for 70,000 dollars, transferred in 1814, to Columbia College, as above, $40,000 not included above,		$40,000 00
Historical Society in the city of New-York, raised by lotteries,	12,000	
Granted in 1827, ...	5,000	
		17,000 00
To the State Society for the promotion of Agriculture, and for bounties on wolves, cloths, &c. &c.		21,609 48
To the several Agricultural Societies under the acts of 1819 and 1820, including expenses of publications by the Board of Agriculture, &c. &c.		43,424 43
State Library, including salary of librarian, and contingent expenses since 1818, ...		17,808 95
In 1827, to aid D. H. Burr, in preparing a map and atlas of this state, ...	5,000	
In 1829, for same purpose, ...	3,000	
		8,000 00

For this sum, a certain number of copies of the map and atlas were to be furnished by Mr. Burr for the use of the state.

$147,842 86

SUMMARY.

Grants to Columbia College, ...	92,375 00
" Union College, (without including the interest, which is to be raised as well as principal,) . . .	332,135 46
" Hamilton College, without interest, &c. . .	90,000 00
" the College of Physicians and Surgeons in the city of N. York,	71,100 00
" the " " " W. District,	20,000 00
Moneys distributed by the Regents of the University, . .	120,188 83
Grants to academies by the legislature—money, . .	27,268 82
5,565 acres of land, estimated at 4 dollars per acre, .	22,260 00
Miscellaneous appropriations, ...	147,842 86
Total,	$923,170 97

NOTE 6.

The amount of moneys distributed to the academies, from the income of the *literature fund*, has already been stated in the preceding note. The following particulars, exhibiting the present state of that fund, are taken from the last annual report of the comptroller.

Literature fund of the state of New-York, January 1830.

Bonds for lands sold,	$136,851 81
Do. for loans of the capital,	6,600 00
Money in the treasury, being balance of receipts from the capital,	9,766 54
Under the care of the comptroller,	$153,218 35
In the hands of the regents.	
Bank and insurance company stock,	22,212 00
Loans made to individuals,	19,072 50
Six per cent stock,	8,743 00
Five per cent stock,	52,757 01
	$256,002 86

Some changes have been made in the nature of the investments since January, 1830, but the result has not been varied.

Prior to 1827, the distribution of the moneys arising from the literature fund, was submitted to the discretion of the Regents; but the act of April 1827, which augmented that fund, provided that the income of the whole fund should be distributed among the several institutions " in proportion to the number of pupils instructed in each academy or seminary, for six months during the preceding year, who should have pursued classical studies, or the higher branches of English education, or both,"—and also, that no pupil should be deemed to have pursued classical studies, unless he had advanced as far at least as to have read the first book of the Eneid of Virgil in Latin, nor to have pursued the higher branches of English education, unless he had advanced beyond such knowledge of arithmetic (including vulgar and decimal fractions) and such proficiency in English grammar and geography, as are usually taught in common schools. The power of the regents to prescribe other conditions, was also recognized in this act. But during the revision of the laws, the legislature altered the provision just quoted from the act of 1827, and directed in lieu thereof, that the whole income of the literature fund should be annually divided by the regents, into eight equal parts—one to each senate district. The share assigned to each district is then to be distributed among the seminaries established within it, on the principles above specified. It is understood that this alteration was made with the view of encouraging seminaries in the newly settled parts of this state; its operation, however, thus far, has been exceedingly unequal if not unjust, as will appear from the following statement of the distribution of $10,000, made in February 1830, the first under the new statute.

Names of academies incorporated by the regents or which are subject to their visitation in each senate district.	Whole No. of students belonging to academy at the date of report.	No. of students allowed by the regents to have pursued classical studies, or the higher branches of English education, for 4 months of said year.	Amount of money apportioned by the regents out of the literature fund.
First District.			
Erasmus Hall,	101	58	895 00
Oysterbay,	49	7	108 00
Union Hall,	47	16	247 00
		81	$1250 00

	Students.	Clas. Students	At. of money
Second District.			
Delaware,	35	25	205 57
Dutchess county,	125	38	312 46
Kingston,	45	15	123 34
Montgomery,	100	15	123 34
Newburgh,	18	18	148 15
North Salem,	70	20	164 46
Redhook,	41	21	172 68
		152	$1250 00
Third District.			
Albany,	195	96	277 18
Albany Female Seminary,	130	40	115 50
Albany Female Academy,	226	125	360 68
Greenville,	25	12	34 64
Hudson,	45	45	129 93
Kinderhook,	64	69	199 25
Lansingburgh,	82	26	75 07
Schenectady,	30	20	57 75
		433	$1250 00
Fourth District.			
Canajoharie,	64	45	221 45
Cambridge, Washington,	53	49	241 13
Granville,	33	12	59 10
Johnstown,	69	20	98 42
Plattsburgh,	81	33	162 40
St. Lawrence,	117	73	359 24
Washington, (Salem,)	55	22	108 26
		254	$1250 00
Fifth District.			
Bridgewater,	49	33	83 16
Clinton Grammar School,		21	52 92
Fairfield,	52	50	126 00
Hamilton,	75	89	224 28
Lowville,	85	38	95 76
Oneida Institute,	37	33	83 16
Steuben,	11	20	50 48
Seminary of the Oneida & Genesee Con.	103	63	158 76
Utica,	88	74	186 48
Union Literary Society,		75	189 00
		496	$1250 00
Sixth District.			
Cherry-Valley,	45	40	199 20
Cortland,	53	78	388 44
Franklin,	70	20	99 60
Hartwick Seminary,	37	32	159 36
Ithaca,	75	23	114 56
Oxford,	33	28	139 44
Oswego,	53	30	149 40
		251	$1250 00
Seventh District.			
Auburn,	111	31	226 60
Cayuga,		12	87 72
Canandaigua,	72	20	146 20

	Students	Class. Students.	Amt. Money.
Onondaga,	43	14	102 34
Ovid,		27	197 37
Ontario Female Seminary,	72	25	182 75
Pompey,	30	12	87 82
Yates co. Acad. and Female Seminary,	76	30	219 30
		171	$1250 00
Eighth District.			
Buffalo High School,	100	41	266 94
Gaines,	62	19	123 70
Middlebury,	107	39	253 90
Monroe,	66	56	364 57
Rochester High School,	360	37	240 89
		192	$1250 00

Comparative view of the state of education in the higher seminaries in the state of New-York, at the beginning of the years 1790, 1800, 1810, 1820, and 1825, and from that year to 1830, abstracted from the reports made to the legislature during those years, by the Regents of the University, and from the records of the regents.

1790. [Population of the state, 340,120.]

Number of colleges,	1
Academies,	2
Number of students in the college, about	40
Number of scholars in the academies, about	150

1800. [Population 586,050.]

Colleges,	2
Academies,	19
Students in the colleges,	220
Whole number of students in the academies, of whom only a small proportion were classical students,	344

1810. [Population 959,049.]

Colleges,	2
Medical college,	1
Academies,	25
Students in the colleges, about	220
(No report from the Medical College.)	
Whole number of students in the academies, of whom 518 are reported as pursuing classical studies or the higher branches of English education,	1495

1820. [Population 1,372,812.]

Colleges (including the College of Physicians and Surgeons in the city of New-York and in the Western District,)	5
Academies,	30
Students in the colleges,	472
Students in the medical colleges,	196
Whole number of students in the academies during the year 1819, of whom 636 received classical instruction, &c.	2218

1825. [Population 1,616,458.]

Colleges, including *Geneva College*, incorporated this year,	4
Medical colleges,	2
Academies,	38
Students in the colleges,	444
" in the medical colleges,	315
" in the academies, of whom 675 were classical scholars, &c.	2475

1826.	
Colleges,	4
Medical colleges,	2
Academies (no returns from several)	34
Students in the several colleges,	443
" in the medical colleges,	288
" in the academies, of whom 662 were classical students, &c.	2446

1827.	
Colleges,	4
Medical colleges,	2
Academies, from which returns were received,	34
Students in the colleges,	537
" in the medical colleges,	234
" in the academies, of whom 709 were classical students, &c.	2440

1828.	
Colleges,	4
Medical colleges,	2
Academies (7 of which having been incorporated by the legislature, subjected themselves to the visitation of the regents, during this year, for the purpose of participating in the distribution of the increased income of the literature fund)	44
Students in the colleges,	290
(No reports from Geneva and Hamilton colleges.)	
" in the medical colleges,	278
" in the academies, of whom 1240 were classical students, &c.	3050

1829.	
Colleges,	4
Medical colleges,	2
Academies,	48
Students in the colleges, including 97 in the grammar school attached to Columbia college,	381
(No report from Geneva college.)	
" in the medical colleges,	268
" in the academies, of whom 1632 were classical students, &c.	3424

1830. [Population about 2,000,000.]		
Colleges,		4
Medical colleges,		2
Academies,		55
Students in the colleges, including those in the preparatory schools connected with Columbia and Geneva colleges,		506
Students in the medical colleges,		276
Students in the academies, pursuing classical studies and the higher branches of English education,	2030	
Other students,	1705	
Whole number of students in the academies,		3735

For the purpose of exhibiting the nature of the studies pursued by those who are above enumerated as students in *classical literature or the higher branches of English education*, and with the view also of correcting some misapprehensions which appear to prevail on this subject, I subjoin a copy of the ordinance passed by the Regents on the 18th of March, 1828, a strict compliance with which is faithfully enforced by that body.

"The Regents of the University, desirous to establish a more elevated course of instruction in the academies subject to their visitation, by defining with greater certainty the various branches of study which shall entitle the institution in which they are pursued to a distributive share of the income of the literature fund, do ordain and declare as follows:

The distribution of the income of said fund shall be made to each of said academies, in proportion to its number of scholars in the classics, and in the higher branches of English education, or both, under the following restrictions:

1. No students, in any such academy, shall be considered classical scholars within the meaning of this ordinance, until they shall have studied in such academy, or elsewhere, so much of the common elementary prose authors in Latin, as is equal to one half of Corderius, one half of Historia Sacra, one third of Viri Romæ, and two books of Cæsar's Commentaries; and in addition thereto, shall have read the first book of the Æneid of Virgil.

2. No students, in any such academy, shall be considered scholars in the higher branches of English education, within the meaning of this ordinance, until they shall, on examination duly made, be found to have attained to such proficiency in the arts of reading and writing, and to have acquired such knowledge of the elementary rules or operations of arithmetic, commonly called notation, addition, subtraction, multiplication and division, as well in their compound as in their simple forms, and as well in vulgar and decimal fractions as in whole numbers, together with such knowledge of the parts of arithmetic commonly called reduction, practice, the single rule of three direct, and simple interest, as is usually acquired in the medium or average grade of common schools in this state; and until they shall also, on such examination, be found to have studied so much of English grammar as to be able to parse correctly any common prose sentence in the English language, and to render into good English the common examples of bad grammar given in Murray's or some other like grammatical exercises; and shall also have studied, in the ordinary way, some book or treatise in geography, equal in extent to the duodecimo edition of Morse's, Cumming's, Woodbridge's or Willett's geography, as now in ordinary use.

3. No such classical students shall entitle the institution to which they belong to any share of the income of said fund, unless it shall appear from the annual report of such institution, that they have pursued therein, for the space of four months or upwards of the year ending on the date of such report, the studies herein before declared to be preliminary to Virgil, together with the first book of the Æneid of Virgil, or other studies in the classics (either in Latin or Greek) usually pursued subsequent to the first book of the said Æneid; or shall, for a part of said period, have so pursued the said studies, or some of them, (including the said first book of the Æneid, or some of the said studies subsequent thereto,) and for the residue of said period, shall have pursued the higher branches of English education, after they shall have become scholars therein as herein before defined.

4. No such scholars in the higher branches of English education, shall entitle the institution to which they belong to any share of said fund, unless it shall appear from the annual report of said institution, that they, after becoming such scholars, have pursued therein said higher branches of education, or some of them, for the space of four months or upwards of the year ending on the date of such report.

5. All students belonging to any academy, and claimed by it to be classical scholars, or scholars in the higher branches of English education, or both, shall be exercised, at convenient and ordinary intervals, in composition and declamation in the English language."

Besides the academies subject to the visitation of the Regents of the University, there are several academies, high schools, female seminaries, and other select schools, in various parts of the state, in many of which the higher branches of English and classical education are successfully taught. I have no data from which I can state the number of these institutions, or of the scholars instructed in them; I should however think it safe to set down the former at *fifty*, and the latter at 2,000.

NOTE 7.

The present state of the *Common school fund* may be seen by the following table, extracted from the last annual report of the secretary of state, as superintendent of common schools.

This fund consists of the following items:

	Capital.	Estimated revenue for 1830.
Bonds for school fund lands,	$216,132 20	$24,000 00
" for loan to Erie county,	1,500 00	90 00
Loan of 1786,	20,665 00	1,400 00
" of 1792,	317,860 17	19,000 00
" of 1808,	411,352 82	27,000 00
Money in the treasury,	45,091 72	1,800 00
Clerks' fees,		200 00
Bonds for escheated lands,	22,653 33	1,600 00
Canal stock, 5 per cent.	395,826 00	19,891 00
Bank stock, Merchants' Bank,	180,000 00	11,500 00
" Manhattan do	50,000 00	3,500 00
" Middle District do	50,000 00	
	$1,711,081 24	$109,981 00
Revenue received in 1829,		$94,626 25

The following statement will show the amount of moneys distributed from time to time, among the common schools in this state:

1796, from state treasury,	$50,000	
Half that sum raised in the counties by tax,	25,000	
		$75,000
1797, the like sums,		75,000
1800, for the year 1798, the like sums,		75,000
		$225,000

The act of 1795 contemplated the distribution of $50,000 from the state treasury, and the raising of half that amount in the towns, annually, for five years; but in consequence of a deficiency of funds, only three payments were made from the treasury, and the last of them not until 1800.

Distributions from the common school fund, and by means of the moneys annually raised, under the present system of common schools:

1815.	Distributed from school fund,	$50,000	
	Equal amount raised by tax,	50,000	
			$100,000 00
1816.	Distributed from the school fund,	$60,000	
	Equal amount raised by tax,	60,000	
			120,000 00
1817.	The like sums,		120,000 00
1818.	The like sums,		120,000 00
1819.	The like sums,		120,000 00
1820.	Distributed from school fund,	$70,000 00	
	Raised by the towns,	76,418 00	
			146,418 00
1821.	Distributed from school fund,	$80,000	
	Raised by the towns,	80,000	
			160,000 00
1822.	Distributed from school fund,	$80,000 00	
	Raised by the towns,	93,420 00	
			173,420 00

1823.	From school fund, raised by towns and from local funds,			182,820 25
1824.	do	do	do	182,741 81
1825.	do	do	do	182,790 09
1826.	do	do	do	185,720 46
1827.	do	do	do	222,995 77
1828.	do	do	do	232,343 21
1829.	do	do	do	214,840 14
				2,461,089 41
	Distributed under law of 1795, (as above)	-	-	225,000 00
				$2,689,089 41

This statement, though nearly correct, does not include all the moneys actually distributed among the schools. Deficiencies constantly occur in the returns, and so far as they exist, the statement is necessarily imperfect.

Comparative view of the Returns of Common Schools, from 1815 to 1829, inclusive.*

The year in which the report was made to the legislature.	Number of towns from which the returns were made.	Whole No. of school districts in the said town.	Number of school districts from which returns were received.	Number of children taught in the school districts making returns.	No. of children between five and fifteen years of age residing in those districts.
1816	338	2755	2631	140,106	176,449
1817	355	3713	2873	170,386	198,440
1818	374	3264	3228	183,253	218,869
1819	402	4614	3844	210,316	235,871
1820	515	5763	5118	271,877	302,703
1821	545	6332	5429	304,559	317,633
1822	611	6659	5882	332,979	339,258
1823	649	7051	6255	351,173	357,029
1824	656	7382	6705	377,034	373,208
1825	698	7642	6876	402,940	383,500
1826	700	7773	7117	425,586	395,586
1827	721	8114	7550	431,601	411,256
1828	742	8298	7806	441,856	419,216
1829	757	8609	8164	468,205	449,113
1830	773	8872	8292	480,041	468,257

* The reports being made to the legislature at the beginning of the year, embrace the returns for the year previous; and the returns of 1829 embrace the number of children over five and under sixteen.

Local School Funds, as stated in the annual report of the superintendent of common schools, for January 1830:

The following is a list of the principal reservations of this nature, viz :

One lot of 550 acres in each of the 28 townships in the Military tract.

Forty lots of 250 acres each, in the twenty townships west of the Unadilla river, being 10,000 acres.

One lot of 640 acres, in each of the townships of Fayette, Clinton, Greene, Warren, Chenango, Sidney, and Camden, in the counties of Broome and Chenango.

Ten lots of 640 acres each, in the townships along the St. Lawrence.

Sixteen lots of 640 acres each in Totten & Crossfield's purchase.

Income of the local school funds, as received by the towns situated in the following counties, during the year 1829:

Broome, - - - -	$ 231 61
Cayuga, - - - -	1,889 99
Chenango, - - - -	1,031 43
Cortland, - - - -	1,032 03
Madison, - - - -	603 93
Onondaga, - - - -	2,449 07
Otsego, - - - -	89 87
Queens, - - - -	42 14
Seneca, - - - -	2,001 41
St. Lawrence, - - - -	194 76
Tompkins, - - - -	2,136 48
Wayne, - - - -	202 76
	$11,905 48

The amount distributed from these local funds, since 1822, (being from $10,000 to $12,000 per annum) is included in the above statement. I have no means of stating the income of these funds prior to 1822.

The *Lewiston school fund*, created in 1810, is not included in the above enumeration. Until 1826, this fund was under the care of the comptroller, but its annual income was paid over by him for the support of schools in the village of Lewiston. It is now under the care of commissioners appointed by the governor and senate. The capital of this fund in 1826, amounted to about $5,000, besides some lots yet unsold. Whilst it was under the care of the comptroller, $1,579 87 were from time to time paid over, from its income, which now amounts to more than $300 per annum.

The capital of these several local funds must amount to at least $300,000.

NOTE 8.

The free schools in the cities of New-York and Albany, are worthy of particular notice.

Prior to 1805, several of the religious congregations in New-York had established charity schools, for the benefit of the children of poor persons connected with their respective societies. But as many children were unprovided for by these societies, an act was passed in 1805, to incorporate " a society for the establishment of free schools for the education of such poor children as do not belong to or are not provided for by any religious society." The school established by this society was soon so large as to require to be divided; others were established from time to time, so that, in 1825, the society had under its care six separate schools. In 1826, the corporation was organized anew, under the name of " *The Public School Society of New-York.*" A radical change was also made in the principle of the schools—that is to say—the society was required to provide, so far as its means might extend, for the education of all the children in the city, not otherwise provided for, whether such children be or be not the proper objects of gratuitous education, and without regard to the religious sect of their parents; and whilst the corporation was required to receive and educate without charge every child whose parents were unable to pay for its instruction, it was authorized to exact a moderate compensation from those able to make it. (Laws of 1826, ch. 25, p. 19.) The society has now under its care, in 11 different buildings, 21 schools, all of which are in a flourishing condition. It receives a large portion of the common school moneys; has an annuity of $1,500 from the excise moneys raised in the city of New-York; and is entitled to one half of the moneys collected in that city for licenses to venders of lottery tickets, from which source it received, during the year 1829, $4,000. The whole number of children on the registers of these schools, in May

1830, was 6,178. The elementary branches of English education are taught in all the schools, and those pupils who remain long enough, and are sufficiently advanced, are instructed in geography, grammar, &c. The schools are well supplied with maps and globes, and to each there is attached a suitable library for the use of the older scholars. But a small proportion of the scholars are paid for; the whole amount received during the last year for the instruction of pay scholars, being only $1,923 78. The annual expenditures of the society are about $22,000, exclusive of interest on the debts charged on their buildings.

There are several other free schools under the care of different religious and benevolent associations, some of which participate in the moneys distributed from the common school fund; but I have not sufficient information within my reach to state with accuracy either their number or condition.

The rapidly increasing population of the city of New-York, and the peculiar character of a large portion of that population, create in that place a demand for gratuitous education beyond the necessities of other parts of the state; and the legislature have therefore, by various acts, made large appropriations in aid of the free school and other charitable societies. The following is believed to be a correct statement of these appropriations.

Prior to 1805, the moneys apportioned to New-York, under the law of 1795, and raised in that city under that law, were distributed among the free schools belonging to the several religious congregations.

After the establishment of the free school society in 1805, the following sums were granted to that society, out of the excise duties received by the city of New-York, for the erection of buildings and the support of the schools.

In 1807,	$4,000	
1810,	4,000	
1811,	4,000	
1817,	2,000	
		$14,000 00
From 1807 to 1811, annuity of $1000,		4,000 00
From 1811 to 1830, annuity of $1500,		28,500 00
		$46,500 00
In 1827, one half of the moneys received for licenses to venders of lottery tickets, from that year to the present time, say		12,000 00
Granted by legislature from the city funds,		$58,500 00

From the state treasury.

In 1806, to the free school of the Roman Catholic congregation,		1,565 78
In 1810, to the economical school established for the education of the children of French emigrants,	1,000	
Annually after 1810 to 1824,	7,000	
		8,000 00
In 1810, to the African free school,		1,500 00
In 1811, to the school of the Jewish congregation of Shearith Israel,		1,565 78
" to the orphan asylum, $500 annually to 1830,		10,000 00
In 1819, to the free school society,		5,000 00
		$27,631 56

The *Albany Lancaster School society* was incorporated in 1812, from which year until 1830, it received the whole of the common school moneys allotted to the city of Albany. On the 17th of April, 1830, an act was passed, authorizing the establishment of five common schools in the city, among which and the Lancaster School, the proportion of school monies belonging to the city is to be divided. In 1812 the legislature granted to the Lancaster School society an annuity of $500, out of the excise money raised in that city, which has been ever since received. In addition to this grant, the city of Albany, from its corporate funds, appropriated more than $20,000 for a building. This school has ever been one of the most flourishing and useful in the state—its principal, Mr. W. A. T. Dale, having been instructed by Mr. Lancaster himself, and being moreover eminently qualified for the business of teaching. It has educated, either wholly or in part, since 1812, more than 7,000 children, of whom at least 5,000 were instructed gratuitously. Its present average attendance is about 300.

In 1828 the trustees of the Albany Academy, on the application of the trustees of the Lancaster School, generously consented to receive and educate, gratuitously, in the higher branches of study pursued in their institution, a certain number of pupils to be selected from the Lancaster School by its trustees. Various selections were accordingly made from the scholars in the school, and several of the pupils thus selected, are now pursuing their studies in the Academy, and with such diligence and success, that at the semi-annual examinations in January and July 1830, they were among the first scholars in the institution. In an address delivered before the Alumni of Columbia College, in 1826, by WILLIAM BARD, Esq. the advantages which would result from a similar arrangement between the district schools and the county academies, and the duty of the state to make provision for advancing meritorious pupils to the higher seminaries, were strongly enforced. The result of the experiment above mentioned, is well calculated to demonstrate the practicability and importance of the plan suggested by Mr. Bard.

The Lancaster and other free schools in Hudson, Troy, Utica and Schenectady, participate in the distribution of the common school moneys, and are generally in a flourishing condition.

It is also proper to mention, that the gratuitous education of those children, whose parents are unable to pay for their instruction in the common schools, is provided for by the general school law; the trustees of the districts being authorized to exempt indigent persons from the payment of teachers' wages.

The following sums have been granted by law to the institutions for the instruction of deaf and dumb in the city of New-York, and at Canajoharie, but chiefly to the former. They may properly be enumerated among the appropriations made for gratuitous education.

In 1819,	$10,000 00
1821,	2,500 00
1822,	1,231 27
1823,	4,835 02
1824,	3,850 02
1825,	4,519 29
1826,	5,833 82
1827,	5,829 89
1828,	5,892 72
1829,	6,035 00
	$50,527 03
1827, one half of the moneys received in the city of New-York for licenses to venders of lottery tickets,—from that year to the present, say	12,000 00
	$62,527 03

A general summary of the several appropriations made by the state of New-York, for the promotion of education, though not properly within the scope of this note, will yet form an appropriate conclusion to the matters embraced in this and the three preceding notes.

Appropriations in aid of *Literature, Science and the Arts.* Moneys distributed as stated in summary, at end of Note 5, . .	$923,170 97	
Capital of literature fund, as stated in Note 6, .	256,002 86	1,179,173 83
Appropriations for *common schools.* Moneys distributed as stated in Note 6, ...	2,689,089 41	
Capital of school fund, (see Note 7,) . .	1,711,081 21	4,400,170 65
Distributed from *Lewiston school fund* (see Note 7,) prior to 1826, ...	1,579 87	
Income since, probably . . .	1,200 00	
Capital of that and other *local school funds*, .	300,000 00	302,779 87
Granted for *free schools, &c.* From funds of city of New-York, ...	58,500 00	
From funds of city of Albany, . .	9,000 00	
From state treasury for free schools in New-York,	32,631 00	
From do for deaf and dumb, .	62,527 03	162,658 03
Total amount granted by the legislature of New-York, for the promotion of education, exclusive of *interest* on the moneys raised and to be raised by lotteries, which interest may be estimated at $200,000, ...		$6,044,782 38

This is exclusive of the grants made by the several cities; two of which (New-York and Albany) have bestowed large sums in aid of education. The Albany Academy, one of the best public buildings in the state, was erected by the city, out of its local funds, at an expense of $91,802.

Nearly all these appropriations and expenditures have been made since the 1st of January, 1805.

When it is considered that the finances of the state, from the close of the revolutionary war, until after the year 1805, were at a low ebb; and that since that time, we have expended immense sums in constructing roads, bridges, canals and other internal improvements—in the erection of public buildings, penitentiaries, and fortifications—in defending the state from invasion, and sustaining the national cause during the last war—in establishing hospitals and other charitable institutions—and in defraying the ordinary expenses of the executive, judiciary, and legislative departments, and of the militia—it will probably be found that the efforts made by the government of New-York, for the diffusion of useful knowledge among our citizens, during the last twenty-five years, are at least fully proportionate to those made for the like object, during the same period, by any other nation.

If any thing connected with this part of our history, could properly be a subject of regret, it would be—that nearly one eighth of the large amount included in the foregoing statement, was granted from the proceeds of *lotteries*; and that the benefits anticipated from the salutary prohibition against this mode of raising money, contained in our amended constitution, have not yet been realized, and cannot be, until the year 1835—when the lotteries authorized by law and necessarily excepted in the constitution, will be completed. It is, however, no discredit to New-York to have fallen on this point into an error common to the most enlightened nations; and it *is* matter of just pride to her citizens, that she was the first state in the world which denounced lotteries by a fundamental law. If her new constitution contained no other amendment than the following—"No LOTTERY SHALL HEREAFTER BE

AUTHORISED IN THIS STATE; and the legislature shall pass laws to prevent the sale of all lottery tickets within this state, except in lotteries already provided for by law"—its superiority to the former could hardly be denied by any sound statesman or moralist. In consequence of the necessary exception above mentioned, this prohibition has not yet conferred so much benefit on our own people as on our brethren in other states, some of whom have been able to imitate, at once, the example set them. I have been the rather induced to notice this topic, in this place, from having just seen an article copied into our own papers from a recent number of the London Christian Observer, in which the editors of that valuable journal express their surprise that, "so long after the excellent example of England, the American legislatures have not abolished lotteries." So far as New-York is concerned, we are considerably in advance of England. The British parliament did not abandon the system of raising moneys by lotteries, until 1824; the amended constitution of the state of New-York was passed in 1821.

NOTE 9.

The reference in the text, is to the common school manual, prepared by Mr. M. R. Bartlett, formerly an instructor in Utica. The several petitions and recommendations by which the application of Mr. Bartlett was supported, together with a remonstrance from the teachers of schools in the city of New-York, were referred by the assembly to the standing committee of that house on colleges, academies and common schools. Fortunately for the state, that commmittee was composed of members, who felt the deep importance of the subject, and they therefore gave to it a most careful consideration. After my remarks on this subject had been written, but before they were delivered, (viz. on the 19th of April, 1830) this committee presented a report, in which, after a candid examination of the measure proposed, they came to the conclusion, that the prayer of the petitioners ought not to be granted. This report (which was from the pen of LUTHER BRADISH, Esq. chairman of the committee,) has not, to my knowledge, been published in any of our journals—an omission which must be ascribed to the circumstance of its having been presented, with many other matters, at the very close of the legislative session. It is therefore highly probable, that but few persons out of the legislature have had an opportunity of reading it. The intrinsic importance of the subject, and the ability with which it is treated in this valuable document, will, I am sure, commend it to the attention of all who take an interest in our common schools.

After some general observations on the great importance of elementary instruction, and the impolicy of granting to individuals, rights common to all—especially in the republic of letters, which it is justly observed, should be the freest of all republics—the report proceeds:—

"It is admitted by all, that the great multiplicity and variety of elementary books used in our common schools, and the consequent want of a uniform system of instruction in those institutions, is a great evil: That this not only increases the difficulties of teaching, but also retards the progress of learning. It is to remedy this alledged and acknowledged evil, that Mr. Bartlett offers his "Common School Manual," and for which he and the other petitioners in this case ask this extraordinary patronage of government.

In considering the merits of this application it will be proper to inquire,

1st. At what expense to the people of this state this proposed good is to be obtained?

2dly. What is that proposed good, and whether it be equal to its cost; and

3dly. Admitting the good proposed to be equal to its cost, whether it be either wise or just to legislate in the manner desired in this case?

1. The passage of a law asked for in this case, would involve in the outset, an expenditure of about 30,000 dollars. This would be necessary to supply each of the school districts, and of the inspectors of common schools in the several towns in the state, with one copy of the work in question. If the effect of this partial intro-

duction of this work would be what we must not only suppose, but intend it to be in order to justify us in going even to this extent in its encouragement, that the work is to take the place of every other now in the hands of the teachers and learners in our common schools, this would involve a further expense to the people of this state, of an amount equal to the value of the books now in use, and which would be thus rendered nearly valueless, by the entire substitution of the work in question. This may be estimated at least, at $100,000. Add to this the cost of the work substituted, which, allowing only one copy to every five scholars, would be 300,000 dollars. And if to all this we add 40,000 dollars, the amount for one year only of the tax of two cents per gallon on all distilled spirits manufactured or sold in the state, we shall have the large sum of 440,000 dollars, to be paid by the people of this state, for the good thus offered, and in some degree forced upon them by legislative enactment. It will be readily admitted, that before we impose upon the people of this state so enormous a tax, or even any considerable part of it, we should be well satisfied, indeed confidently assured, that the good to be thereby accomplished, is neither questionable in its character, nor doubtful in its magnitude. This leads to the second inquiry proposed.

2. The committee have examined, with great care, the work in question, as far as it is as yet published, and has been submitted to them. They have also had the advantage of repeated personal interviews with its compiler, and have received from him minute and full explanations of the plan, details and execution of the work; but they have been unable to discover in it that peculiar and transcendent merit which only could justify them in recommending the passage of the law asked for, or the introduction of the work into our common schools, even at an expense much less than that which the passage of such a law would involve. On the contrary, they feel themselves constrained by a sense of duty to this house, and to the people of this state, to say, that the work, in their opinion, contains many material and important defects—defects not merely of detail, but of principle. Your committee are aware that, in expressing this opinion of this work, they encounter the influence of strong recommendations in its favor, and array themselves in opposition to the authority of high and respectable names. But they know the facility with which even the most respectable recommendations are often obtained; and feel bound, in charity, even to believe that those in this case, as is stated in most of them, and as is apparent in all, have been given, either upon the authority of others, or from a very cursory and imperfect examination of the work. But if it be otherwise, your committee, while they entertain all proper deference for those respectable gentlemen who have thus lent the sanction of their names to this work; and yield to their opinions in this case, all the authority to which, under the circumstances, they may be entitled, they cannot permit either the one or the other to dissuade them from a fearless and faithful discharge of their duty.

The work in question claims to be a substitute for all others now used in our common schools. It commences with the alphabet, and when completed, it is pretended will contain the necessary instruction upon the following subjects: spelling, pronunciation, reading, elocution, arithmetic, grammar, rhetoric, prosody, geometry, mensuration, mechanical powers, book-keeping, geography, biography, history, natural sciences, law, government, and several other collateral matters. It will be readily perceived, that the range of this work is no less extensive than its plan is singular. Its peculiar feature and professed distinctive excellence are, that in a series of lessons, comprising an entire course of common school education, it presents at every stage of the scholar's progress through this course, a collection of lessons collaterally arranged, and suited to his attainments and capacity at that point of time.

From a careful examination of the work, the committee do not think that in its execution this professed and important object has been attained. On the contrary, they find the work exceedingly defective in its execution, in this fundamental principle. They find brought together, to be presented to the scholar at the same time, lessons which suppose very different attainments, and which require very different degrees of capacity. Your committee also cannot but consider this feature of the plan of the work as deceptive. They cannot but think that the placing together upon the same page, or in the same part of the work, lessons upon a great variety of subjects, would, in practice, be found, to say the least, exceedingly inconvenient. It compels the scholar to look through several volumes for the whole of any one subject of his studies. But it is apprehended that this would be found not merely inconvenient in use, but would lead to serious mischiefs. It destroys that simplicity of arrangement necessary to distinctness of impression, so desirable and so useful in every system of education. The want of these would lead necessarily to confusion, and could not fail to retard instead of accelerating the scholar's progress.

Your committee do not doubt that, under the direction of a discreet and judicious teacher, the studies of the scholars may be not only agreeably but usefully diversified. That variety may not only relieve the monotony and tediousness of exclusive confinement to a single study, but promote that elasticity of intellect which is favorable to the scholar's general progress; but such variety should be admitted with caution and judgment. Your committee attach little value to those modern discoveries or patent modes of instruction which make philosophers of children;—men of literature and science in a dozen lessons; or profess to bring the scholar acquainted with the whole circle of human knowledge almost without effort. They neither know nor believe in, but one mode of becoming *learned* and *wise:* time, attention, and persevering study only can accomplish this.

Your committee are also of opinion that the compiler of this work has not succeeded in its execution, in other important particulars. They cannot approve the system of pronunciation adopted by him. The representation of the sounds of letters by a different combination of letters, instead of conventional marks or figures, leads to confusion, and is, therefore, highly objectionable. This effect might not be produced in the mind of the scholar already considerably advanced, but in that of one learning orthography, it could not fail to be the case. The committee say nothing of the compiler's manner of spelling or pronouncing particular words, in which he does not seem to follow any one known standard or acknowledged authority; nor is he even uniformly consistent with himself. They also forbear to notice particularly the frequent and unnecessary repetition of the same lessons; the numerous errors in orthography, pronunciation or accent, which may be found on almost every page of the work.

In the reading department of this work, your committee are of opinion, that the compiler has been but very little more successful. He has not been judicious in the selection of his lessons in this part of his work. Many of these, especially the early ones, are exceedingly objectionable. In aiming to render them simple and intelligible, they have been made ungrammatical and even vulgar. These, together with the grammatical errors which are found in every part of the work, are calculated to make wrong impressions and form bad habits, at a period of life when impressions are strong, and habits of thought and modes of expression once formed and established, are apt to endure. The committee cannot forbear here to notice the manner in which the compiler, in this part of his work, frequently draws from other sources, without either indicating, or in any way giving credit to the authors from whom he thus borrows. They notice, with still stronger disapprobation, the changes and mutilations made in many beautiful and familiar passages of the most admired and classical authors in the language. This is treading on holy ground. It is warring with the dead. It is changing that cherished identity and marring that admired beauty which have been rendered sacred by time and have become consecrated in the affections of every true lover of letters, and of every friend of justice. These things also lead the youthful mind into error, and cannot be too severely discountenanced.

The committee forbear to enter further into a minute criticism of this work. They would, however, observe, that the treatises on grammar, rhetoric, arithmetic, geometry and mensuration, which it contains, have appeared to them meagre in their matter, deficient in illustration, and wanting often clearness and precision. The language and style of the work generally want that purity and correctness indispensable to every school book.

The committee cannot accord to this work, the merit of economy, which is claimed for it. They feel confident that its use would fully verify the correctness of their opinion upon this point.

3. The committee hasten to the third inquiry proposed. Admitting the work in question to have none of the defects suggested, and that it possesses all the peculiar and superior merit its compiler and its friends claim for it, still the committee could not recommend the passage of the law asked for. If the work have the merit pretended, it will make its way into general use without the aid of any legislative act for that purpose; if it have not such merit, then most certainly would it be wrong to force it into general use by any such legislative act. But even supposing it to have the merit claimed for it—that it is decidedly superior to any other work of the kind—still the committee are of opinion that it would be neither wise nor just to adopt it to the exclusion of all others: For even although this may now be superior to any other work extant, yet, in this age of improvement, who would by law limit the point of perfection? Who would deny to us, upon this great interest of our state and country, the lights of time, and the benefits of experience; or who so hardy as to predict that mind, if left free and unproscribed upon this subject, may not soon improve even upon the work in question? If this be so, would it not be unwise to fasten upon the state, by a legislative act, and at an expense so enormous as that would involve, any system of instruction, however perfect it might seem, or however superior to all others, at the time, it might be acknowledged to be? Instead of promoting, this could not fail ultimately to sacrifice the great interest in question.

But your committee are of opinion that the passage of the law asked for, would be as unjust as it would be impolitic. It would lead necessarily to the sacrifice of the interests of those numerous authors and publishers whose works would be thus proscribed, and rendered valueless. These interests are often the fruits of a life of industry and laborious study. They constitute the entire wealth and sole dependence of the numerous individuals immediately concerned therein. As such, they are entitled to the equal protection of government. It has been well observed by the superintendent of common schools, in his late able annual report to this house, that "the greatest experience, and much of the best talent of the country, are enlisted in this business, and the fruits of their labors are constantly giving them new claims to the approbation of the public." The interests of these numerous, respectable, and useful individuals, should be neither wantonly, unnecessarily, nor uselessly sacrificed. Sacrifices of individual interest, indeed, even to effect objects of great and acknowledged public good, should be made as rarely as possible, and even then with extreme caution; but never to promote individual benefit. The committee have been unable to perceive, either in the petition in this case, or in the work to which it relates, any good or sufficient reason for the sacrifices, both public and private, which the granting of the prayer of the petition would necessarily involve.

But it has been repeatedly stated, that "the plan of this work was the suggestion of the late governor Clinton;" and, "so far as it had progressed up to the time of his lamented death, received his favorable regard and patronage." There has been thence inferred an obligation on the state to complete and adopt what has been thus commenced. It has even been pretended that the faith of the state has been thereby pledged to that effect. The committee believe that there has been gross error upon this point. To disabuse the public in this respect, as well as to do justice to the memory of the late governor Clinton, whose official conduct is here called in question, it will be sufficient to present an extract from an original letter written by that distinguished individual, and which letter has been submitted to the committee. The letter bears date the 24th April, 1827, and is as follows:

"Having no authority to direct the compilation of a common school manual, I have never officially made any communication to Mr. Bartlett of Utica on that subject; but if I recollect right, I think that, on his signifying his intention to write such a work, I expressed my wish that he would execute it; and this I should probably have said to any other person who has exhibited ability in such cases as Mr. B. has done, particularly in an introduction to astronomy. Mr. B. shewed me his manual last winter, but having only time to glance at it, I gave a recommendation in its favor qualified by this rapid and general view; and in so doing, I had no intention to disparage the merits or diminish the sale of any similar and contemporary publications of merit."

From this extract it will be seen, that so far from the plan of this work being suggested, or its execution directed by the late governor Clinton, he merely expressed a wish when that plan was submitted to him by Mr. Bartlett, that it might be executed. Instead of supposing, however, that this work was to be adopted by the state, to the exclusion of all others, he expressly says, that in any recommendation of it which he had given, upon an imperfect examination, "he had no intention to disparage the merits or diminish the sale of any contemporary publications of merit."

In every view which the committee have been able to take of this subject; whether they consider the character of the work in question; the nature and importance of the principles involved in this application; or the extent and magnitude of the interests, both public and private, to be affected by its decision, the committee are unanimously of opinion that it would be as impolitic as it would be unjust to legislate in the manner desired in this case. They therefore submit for the consideration of the house, the following resolution:

Resolved, That the prayer of the petitioners ought not to be granted."

It will be perceived that the committee have expressed a very decided opinion *as to the execution of the work* prepared by Mr. Bartlett—a point to which I carefully avoided making any allusion, because I had not given the books such an examination as would have justified me in speaking on that subject. The well known accuracy and the enlightened judgment of the writer of the report, may however be relied upon with entire safety; and if so, it would seem—independently of objections to the principle of the measure—that the books proposed were fatally defective.

Here then we have another instance—(the injudicious recommendations of Mr. Macauley's history have already been alluded to)—of the injurious consequences resulting from that amiable facility which so often induces our distinguished men to lend their names to applicants for public favor. If the decision of this interesting question had depended on the authority of *names*, the books of Mr. Bartlett, with all their imperfections, would have been entailed on the common schools.

NOTE 10.

Immediately after the delivery of this address, the Institute passed a resolution declaring that they deemed the suggestions contained in it relative to the establishment of a journal of education, of great importance; and they appointed a committee "to consider of and digest a plan for conducting the same, together with estimates of the expense, &c." A prospectus of the proposed publication, will soon be submitted to the consideration of our citizens, and if sufficient patronage shall be afforded, arrangements will be made for commencing it without delay.

NOTE 11.

The whole number of persons on whom the degree of A. B. was conferred by King's college, prior to 1775, as appears from the catalogue, was actually but *one hundred*. The following abstract will show the number in each year.

1758, ...	10
1759, ...	2
1760, ...	6
1761, ...	5
1762, ...	9
1763, ...	2

1764, ...	3
1765, ...	5
1766, ...	11
1767, ...	2
1768, ...	7
1769, ...	1
1770, ...	8
1771, ...	6
1772, ...	6
1773, ...	5
1774, ...	12
	100

The general paucity of the annual classes, and the striking inequalities in their numbers, are indicative not only of the infancy of the college, but of a general indifference to the advantages of education; and serve to present, in still bolder relief, the facts stated in the text. In addition to the illustrious triad there mentioned, we find among the hundred, Samuel Provost, Samuel Seabury, and Benjamin Moore, who were afterwards bishops of the American Protestant Episcopal church; Isaac Wilkins, much distinguished as a writer at the commencement of the revolution; Richard Harison, Peter Van Schaack, Egbert Benson and Robert Troup, eminent at the bar; and many other able and enlightened men. Alexander Hamilton commenced his collegiate course in this institution within the period to which I have referred; but before the termination of that course, the college was broken up by the commencement of hostilities. I have not included this great man among the sons of King's college—though our state is not only exclusively entitled to the honor of his academic education, but was his chosen residence—because his fame belongs to the nation, or rather to the whole western hemisphere; and because I am unwilling, for the sake of elevating New-York, to appropriate to *her*, what may justly be deemed one of the most splendid portions of our heritage as Americans.

NOTE 12.

Prior to 1815, the native literature of New-York, which had attained any celebrity, consisted almost exclusively, of the veracious history of DEIDRICH KNICKERBOCKER, and the two volumes containing the numbers of SALMAGUNDI. The success of these lively and elegant performances, seems not only to have decided the character of their authors, but to have given a new direction to the taste of the community in which they lived. Their devotion to letters has ever since continued; for several years they were almost the only natives of our state who possessed either leisure or inclination for such pursuits; and now, after the lapse of more than twenty years, they yet stand at the head of their respective departments—a superiority which is the just reward of brilliant talent, long and faithfully exerted in literary labours. How many have imitated their example, or been inspired by their success, it is impossible to calculate; though it is easy to see, that the loss of their productions would sadly diminish our literary wealth.

Of the three contributors to SALMAGUNDI, only one (Washington Irving) has yet acquired much distinction on the other side of the Atlantic; though Paulding unites much of the humour and satirical talent of Swift, with the grace and vivacity of Goldsmith; and though the productions of Verplanck might well be placed on the same shelf with those of Johnson and Paley.

Since 1815, the number of our native writers has greatly increased, as will appear by the following enumeration of some of the most conspicuous, which, I presume, will be deemed sufficient to justify the statement in the text.—Drs. Bard, Hosack, Mitchell, T. R. Beck, J. B. Beck, L. C. Beck, Mott, Torrey, Francis, Van Rensselaer, and Griscom; Professors Renwick, Eaton and Anderson; Surveyor-General De Witt; Washington Irving, J. M. Mason, J. B. Romeyn, J. H. Hobart, J. Kent, E. Livingston, (now of Louisiana,) G. C. Verplank, De Witt Clinton, J. K.

Paulding, J. F. Cooper, C. D. Colden, W. A. Duer, J. T. Irving; Professors M'Vickar, Anthon and Moore; R. C. Sands, J. G. Brooks, W. Leggett, and P. M. Wetmore, &c. &c. My estimate of the influence of *newspapers*, in a country like ours, has been stated in the Discourse; it will not therefore be thought singular if I add to this list, two native writers of distinguished ability in this important department—the Editors of the New-York American and of the Albany Argus.

It is proper to remark, that some of the persons I have named, had commenced their literary career prior to the date specified, though with the exceptions above mentioned, but few of them were much known out of our own state; and that the names of several excellent writers have been omitted, not because their merits were forgotten, but because they have so seldom favored the public with their productions, that to have included them in a list of *authors*, would perhaps have looked like an endeavor to eke out the catalogue. Some names have also been omitted, in consequence of a want of knowledge, on the part of the writer, as to the place of their nativity.

ERRATA.

Page 186, line 15, for "the languages," read "the modern languages."
Page 197, line 4 from bottom of page, for "attack," read "attacks."
Page 199, line 5 from bottom of page, after "estimate," insert "of."

ART. XXI. *Notice of the* GRAPHITE *of Ticonderoga.* *By* GEORGE W. CLINTON.

Read February 14, 1827.

Though graphite, plumbago, or common blacklead, is very generally diffused, yet it seldom exists of the requisite purity for employment in the arts, in sufficient quantity to compensate the enterprising for the expense incurred in preparing it for market. A single locality in England, has long supplied the greatest part of Europe and of our own country, and it is now an object of some importance, to ascertain whether a sufficiency of this article can be afforded by our own mountains, to obviate the necessity of resorting for it to foreign climes. Reports of its existence in some of the southern states, have reached us. Schoolcraft, in his "View of the lead mines of Missouri," says, that there is much plumbago in that state; and in New-Hampshire it has been discovered in large quantities. I have it upon good authority, that it has been found in abundance and of good quality, in St. Lawrence county, in this state, but, from a want of enterprize or of capital, or more probably of a general knowledge of its existence and its value, it remains unnoticed. In Essex county, however, it is a source of profit to a few of our citizens, and such is the position of this locality, that from it we must expect our principal supplies, in case that war or some other cause, should prevent the admission of the foreign article. As nothing respecting it has, to my knowledge, been given to the public, save a short notice in the sixth volume of Silliman's Journal, by Professor Hall, I hope that the following facts, collected during a short visit in 1825, may be interesting.

It is found more or less plentifully disseminated in minute foliated masses, in all the gneiss in the vicinity: but the principal deposit is on Cobble-Hill, about 2½ miles northwest of the village of Alexandria, in clefts, in a primitive rock, called graphite granite by Professor Hall, and gneiss by Cleaveland. Several of these fissures or veins, have been discovered, all of them running north and south, except the smallest and least productive, which lies east and west. The largest was discovered by a man, who passing over the mountain with an axe in his hand, by an accidental stroke laid bare the glittering treasure. It is visible on the surface for about four rods, and one extremity passes under the gneiss, apparently unimpaired in size. It varies from four inches to two feet in width, and has been removed in some places, to the depth of from ten to twelve feet, by means of chisels fixed on poles, without any diminution in the productiveness of the vein. A description of the mineral would be unnecessary, as the cabinet of the Institute contains excellent specimens from this locality. It is separated from the walls of the fissure, by a thin layer of quartz, with sometimes a little feldspar, and is sometimes traversed by small seams and veins of the same. The proprietors of the mines, being farmers, only devote the time not consumed in the business of their occupation, to procuring it. They were formerly accustomed to grind it in their own mills, and send it in this state to market; an operation that can be there performed at a comparatively trifling expense, on account of the great water power afforded by the "outlet" of Lake George. But an individual managed to get the business of preparing it in his own hands, and finding that much time was consumed in grinding it on account of its "caking," as it is technically termed, he hit upon a very ingenious expedient to lessen this source of trouble: before milling he mixed with it a considerable portion of the Crown Point iron ore, the hard angular fragments of which succeeded quickly and effectually in reducing it to an uniform powder. But there exists one objection to this mode of preparation; it unluckily unfits it for all the purposes to which it is applied in the arts. The iron ore rapidly destroys machinery when applied to diminish friction; its grittiness would render pencils of the prepared blacklead of Ticonderoga, of little use; crucibles constructed of it could hardly be expected to withstand a white heat; and stoves and other iron articles blackened with it, have been known in a short time to put on a dusky red. The consequence is, that the proprietors are now obliged to send it to New-York in a crude state.

A mineral, stated to be granular graphite, is sold by a vendor of specimens in Alexandria; it is in irregular nodules of various sizes, and is generally supposed to be obtained from near Rogers' Rock. A specimen weighing fifteen pounds, was exhibited for sale. I was fortunate enough to procure some smaller specimens, at a moderate price. On my return home, entertaining some doubts respecting its nature, I proceeded to examine it, and the following results were obtained

A large piece heated by the blowpipe, was immediately covered with a watery exudation from its pores. On charcoal *per se* it was evidently acted upon by the blowpipe, partially consuming and leaving a white crust; with borax it was partially acted on with effervescence. The foliated part was not at all affected *per se*, or with borax, by the highest heat I could raise.

Acids act upon it, and carbonic acid amounting to 8.5 grs. in 100 is evolved. The residue before the blowpipe, burned with scintillations. The mineral itself is in irregular masses, presenting externally somewhat of a botryoidal appearance, and from its surface, scales can be detached, resembling in every respect the foliated graphite; they are likewise, though more rarely, to be found in its substance. It is irregularly granular, and of a lighter color than the foliated plumbago.

My opinion, which I believe is warranted by the above facts, is, that it is a made mineral, and most probably composed of the prepared black lead of Ticonderoga, and powdered carbonate of lime, a little charcoal being added to heighten the color, made into a paste of due consistency with water or some other liquid, and moulded into a proper form. If moral evidence be requisite in favor of this opinion, it may be remarked that these specimens are not now found, save by one who derives his principal support from the sale of minerals to the casual visitors of Lake George. That true granular graphite has been here obtained, is proved by the assertion of Professor Hall. But little of it being found, and that little being exhausted, the above ingenious expedient was probably hit upon, in order to supply the demands of mineralogists who are always eager to secure every known variety of a mineral.

It may perhaps not be improper to remark here, that in June last, Mr. Eaton's party on the canal, found plumbago in small scales in the red marl of Salina. It sometimes exists also as a thin coating (distinct from the common glazing of our slate) on the argillite on the banks of the Hudson, opposite Troy, and at Crystal Hill.

ART. XXII. *On the* APPARENT RADIATION OF COLD. *By* BENJAMIN F. JOSLIN, M. D. *Prof. Math. Union College. Corresponding Member.*

Read September 21, 1830.

In a well known experiment with two concave specula, a calorific principle is evidently radiated and reflected, and moves in right lines with great velocity. The celebrated Florentine experiments, a modification of the former, seems at first sight to establish no less conclusively the radiation of a frigorific principle, which observes the same laws as radiant heat. "It becomes therefore a problem of some interest," as Dr. Murray observes, "to give an explanation of this phenomenon, which shall accord with the doctrine that cold is simply the negation of heat." M. Prevost has, in my opinion given a satisfactory solution of this interesting problem, in his highly ingenious yet simple theory. With this distinguished philosopher the idea originated, that a mutual participation of radiant caloric takes place between bodies at all temperatures, and that a warm body has its temperature reduced by a cold one in its vicinity, merely in consequence of receiving only a partial compensation for the rays it has emitted. This hypothesis, however, has not been universally adopted. It has been rejected by many philosophers, and among others, by the late celebrated Dr. Murray, and by the author of the article on "Cold," in that valuable scientific work, the New Edinburgh Encyclopaedia. The latter remarks, that "this explanation, depending upon the assumed principle that bodies at all temperatures radiate caloric, in a degree proportional to the quantity of that power which they contain, is totally inconsistent with the most obvious facts attending the cooling of bodies. For if it were true, that a mutual participation of temperature takes place between the hotter and the colder body, until they arrive at the same temperature, and that this reciprocal action even goes on after an equilibrium is established between them, it is evident that a hot body ought to cool more slowly when it is placed near a large body of inferior temperature, than near a small one. But the fact is precisely the reverse."

The answer to this is obvious. The intensity of calorific emanations, in consequence of their rectilinear and divergent courses, is inversely as the distance from the point whence they emanated; whilst two surfaces of a similar figure, being placed at different distances from a thermometer, and subtending equal angles at it, have their number of radiatory points directly as the square of their distances. Therefore the number of rays received from them by the thermometer, will be equal, whilst the surfaces possess the same temperature and radiating power, provided no rays are intercepted by the intervening medium ; and if their distance be varied, their influence will be as their apparent magnitude ; if this be constant, their calorific or refrigerant influence varies with their temperature. Therefore, whilst a cold body in a warm chamber supplies a thermometer in its vicinity, with some calorific emanations, it intercepts a greater number which would have been received from the warmer walls of the apartment, and thus prevents that equivalent return which the thermometer had before received for its own radiation. For it subtends the same angle at the thermometer, as the portion of wall whose rays it intercepts, and it is of inferior temperature. Now it is evident, that a large cold body will at the same distance intercept rays still more numerous, and in still greater excess, above those which it supplies, and consequently that it will exert a cooling agency still more powerful.

An other and more plausible objection to this theory, [vide Murray's Chem. vol. 1, and Edin. Encyclop. Art. "Cold,"] is founded on the following experiment. A cubical vessel, having one of its sides covered with lampblack, and another left with a metallic surface, was filled with a frigorific mixture and placed in the focus of a metallic reflector, having the surface of a parabolic conoid. A thermometer was placed in the focus of the generating parabola of an equal and similar mirror placed opposite the former, at the distance of some feet, with their axes coincident. The thermometer suffered the greatest reduction of temperature when the *painted* side of the cold body was presented towards that mirror in whose focus the cold body was situated, and the least when the metallic surface was presented. Dr. Murray, alluding to M. Prevost's theory, remarks, that " this explanation appears at first view, not unsatisfactory, but it will be found deficient when applied to all the phenomena, and in particular, appears inconsistent with the effects of different surfaces, in radiating cold. The principle is, that the cold surface is radiating caloric towards the thermometer, only in a smaller quantity than the thermometer radiates to it. Of course, of different surfaces, which at a given temperature, radiate different quantities of caloric, that which radiates least must be least powerful in returning caloric to the thermometer, and must therefore have least effect in counteracting the reduction of its temperature ;

in other words, must produce the greatest cold. A blackened surface, we have seen, is that which, at a given temperature, radiates the largest quantity of caloric, and a metallic surface, that which radiates least. Were Prevost's explanation just, therefore, the blackened surface is the one which, in the experiment on radiant cold, ought to produce the least cooling effect, and the metallic surface the greatest, because the former gives off more caloric by radiation than the latter. But the fact is the reverse; the cold being greatest when the blackened surface, and least when the metallic surface, is opposed to the mirror."

In examining the objection, we may observe that the two mirrors subtend equal angles at the bodies, in their respective foci, and consequently intercept equal proportions of the caloric radiated from the nearest surfaces of these bodies; and from their form and position, and the known laws of reflection, they condense upon the body situated in either focus, all the rays which the mirror most remote from it receives from the body in its own focus, with the exception of the rays absorbed by the reflectors and those intercepted by the air. Therefore the ratio between those portions of caloric, which the two bodies receive from each other in this experiment, is the same as would exist in a case of direct interchange by radiation, when no mirrors are employed: and if the cold body have its whole surface alike painted or alike metallic, the same proportion of all the rays which emanate from it, will be received by the thermometer, as the thermometer will receive of all those emanating from the cold body. Therefore, by supposing the experiments to be made in this manner, with a thermometer in one focus, and a metallic body in the other, which has in one experiment its *whole* surface painted, and in another its *whole* surface unpainted, and by assuming that *all* the rays emanating from this body, reach the thermometer, and all those from the thermometer reach the metallic body, I shall add to the simplicity, without impairing the strictness of the demonstration, in proving that the above mentioned experiments confirm instead of subverting the theory against which they are alleged.

In any chamber where no fire or other *source* of heat or cold exists, to disturb the equilibrium, every article of furniture, and in short, all inanimate objects within it, (whatever be their difference of radiating power resulting from color, texture or any other cause) are of the same temperature.

From this equilibrium of temperature preserved among bodies in proximity to each other, however various their surfaces, it may be inferred that the *reflecting power* of any surface increases, whilst the *radiating power diminishes*, and vice versa, and that *their sum is constant;* and also, that the sum of the radiated and reflected *caloric* proceeding from any surface, is always a *constant quantity* whilst the temperature of the surface is constant, and that of the surfaces of surrounding bodies equal to its own, whatever change its power of radiation may undergo, by painting, polishing or any other means. Therefore if a metallic body be of the same temperature as a thermometer in its vicinity, the latter cannot be affected by merely changing the surface of the former, its temperature remaining unchanged.

These principles being premised, suppose experiments to be made simultaneously, and with similar apparatus, in two chambers, A and B, and that metallic bodies, of the same temperature, are employed in both chambers, but that the temperatures of the chambers are different. In A suppose the temperature of the air and consequently of the thermometer, be equal to that of the metallic body. In B let the air and thermometer be at a higher temperature. Then *the body in B is cold*, considered with reference to the thermometer.

Experiment 1st. Cover both bodies with a black pigment which increases the radiating and consequently diminishes the reflecting power. Let r represent the quantity of *caloric reflected* from the body situated in A during the first instant, and ϱ the quantity *radiated* from the same. Let r' be the quantity *reflected* from that *in B*, and ϱ' the quantity *radiated* by it. As the sum of the radiated and reflected caloric includes all that can be sent from either body to its thermometer, it follows that $r+\varrho$ is the amount given off by the painted body in A, and $r'+\varrho'$ by that in B.

Experiment 2d. Remove the paint from both, and also restore to the bodies and the thermometer the temperatures which they respectively had in the first experiment. By this operation the quantities radiated from both bodies are diminished in some equal ratio; for their temperatures are unchanged, and their radiating powers diminished in the same ratio; and the temperatures being equal and unchanged by this operation, the quantity radiated will be as the radiating power. By the same operation, the number of *reflected* rays from each is *increased*, by which means the bodies return to their respective thermometers a *greater proportion* of the calorific emanations of the latter. Now the quantity reflected from any surface, must always be in the compound ratio of the *reflecting power* and the number of *incident rays ;* and, as in this case, the reflecting powers of these bodies are augmented in the same ratio, and the numberof incident rays incapable of being affected by the removal of the pigment, it follows that the increments of reflection from the two bodies have the same ratio to the quantities which they respectively reflected before the removal of the pigment; i. e. the *quantities reflected from both* are *increased in the same equal ratio.* And it has been proved, that the quantities *radiated* from both, are *diminished* in the same equal ratio. Let i be the ratio in which the reflection has been increased, and d that in which the radiation has been diminished in both. Then according to the preceding principles and notation, $r+\varrho$ expresses the caloric given off in experiment 1, by the painted surface of the body in A, $r'+\varrho'$ by that in B; and in experiment 2, the whole amount from the metallic surface of the body in A is $r\times i+\frac{\varrho}{d}$, and from that in B $r'\times i+\frac{\varrho}{d}$. It only remains now to demonstrate the value of this last expression to be greater than that of $r'+\varrho'$.

If unequal quantities be multiplied by equals, the greater will receive a greater increment than the less: Now r' is greater than r, for the reflecting powers of the two bodies are equal, but the number of incident rays are greater in the warm atmosphere, in consequence of the higher temperature of the thermometer from which they emanate. Hence in the products $r'\times i$ and $r\times i$, r' in the first is more increased than r in the last, by the common factor i. That is $r'i-r'>ri-r$, for each side, is an expression for one of the increments.

Again, $\varrho'=\varrho$ for the radiation from a body, is not affected by the temperature of surrounding bodies or that of the ambient air. Hence $\frac{\varrho'}{d}=\frac{\varrho}{d}$. Adding this to the above, we obtain

$$r'i+\frac{\varrho'}{d}-r'>ri+\frac{\varrho}{d}-r.$$

By subtracting from one side ϱ', and from the other its equal ϱ, we obtain

$$ri'+\frac{\varrho'}{d}-(r'+\varrho')>ri+\frac{\varrho}{d}-(r+\varrho).$$

But $r+\varrho$ the amount of reflection and radiation from the painted metallic body in the chamber A, in experiment 1, has been shown to be equal to $ri+\frac{\varrho}{d}$, the amount of reflection and radiation from the same body in experiment 2, when the pigment is removed. Therefore $r'i + \frac{\varrho'}{d} > r' + \varrho'$. That is to say, the whole amount of calorific rays reflected and radiated from the metallic body, in an atmosphere to which it is relatively cold, will be increased by removing the pigment which covers its surface and augments its radiating power; and a thermometer near it, or at a distance, if reflectors be employed, will *indicate an elevation of temperature*, notwithstanding the *diminution of the radiating power* of the body by this operation. This is the proposition which was to be demonstrated. It is therefore obvious, that the elegant theory of radiant heat proposed by M. Prevost, is reconcileable with these phenomena, and receives additional support from those experiments which some eminent chemists have adduced for its refutation.

The foregoing investigation suggests a general formula, for expressing the ratio of the reflecting to the absorbent and radiating powers of bodies. The reviewer of Prof. Leslie's Experimental Enquiry on Heat,* remarks, that "the reflecting powers of bodies, bear *some* inverse ratio to their absorbent and projecting (i. e. radiating) powers, although so many circumstances unite in modifying the proportion, that we are unable, as yet, to express it by *one general law*." I shall state the general law, according to which these powers *vary*. Is not this the only sense in which the *nature of the case* can ever *admit* of a general law?

From the term absorption, (which though now sanctioned by general use, appears to me not happily chosen,) we must not be led to suppose that bodies have a positive power of imbibing caloric, or of *conveying it inwards* from their surfaces, the least conceivable distance, independently of conduction. Those incident rays which are not reflected, are necessarily retained at the surface on which they impinged. Hence the sum of the *reflecting* and *absorbent powers* is a *constant* quantity; and we have shown that the sum of the reflecting and radiating powers is constant. From this, and from the fact that a change in the surfaces of neighboring bodies does not disturb their equilibrium of temperature, it may be inferred that the radiating and absorbent powers of any body are equal, and increase or diminish in the same ratio. It is therefore only necessary to express the law by which the radiating and reflecting powers vary. These being *caeteris paribus* as the *quan-*

* Vide Edinburgh Review.

tities radiated and reflected, we shall apply the same principles, and employ a similar notation.

Let r be the reflecting power of any surface, the ϱ radiating power, and x any ratio in which the reflecting power of this surface is changed or the ratio which it bears to the reflecting power of other surfaces. Then r will be an integer or a proper fraction according as the reflecting power is increased or diminished; rx will be the resulting reflecting power, $r+\varrho-rx$ the radiating power, and $\frac{rx}{r+\varrho-rx}$ is the *general formula* for expressing in all cases the *ratio* of the *reflecting to the absorbent* and radiating powers.

ART. XXIII. *Elements of the* SOLAR ECLIPSE *of February 12th, 1831: Together with a particular Calculation for the Latitude and Longitude of Albany. By* STEPHEN ALEXANDER, A. M. *Corresponding Member.* (With a Plate.)

Read September 21, 1830.

FROM the earliest ages, the study of the celestial phenomena has ever been an object of the most lively interest; an interest prompted alike by the sublime nature of the pursuit itself, and the important practical results which have attended it. Since that important period when the publication of the Novum Organum shed upon the path of the philosopher a light which has shone forth with a brightness continually increasing as the mists of ignorance and error, which attended its dawn, have been dispelled, the advances both in Physical and Practical Astronomy, have surpassed the most sanguine expectations. In no other department of science have the principles of the inductive method of reasoning been more happily illustrated, or has patient perseverance been rewarded by more sublime and beautiful results. By the researches of modern astronomers, have been developed those laws by which the entire planetary system has been regulated since that remote period, when, first touched by the finger of the ALMIGHTY, it commenced its vast and rapid revolution: laws in themselves simple, yet productive of effects the most complicated and difficult of investigation.

The phenomena of the heavens tho' always interesting, are yet sometimes rendered more particularly worthy of attention, by the recurrence of events remarkable on account of their rarity, or, as contributing in an essential degree, when observed with care, to the greater perfection of astronomical science. Among phenomena of this kind, *solar eclipses*, and particularly those of a large size, are universally allotted a prominent place, inasmuch as they afford one of the best means, known for determining the difference of longitude between the places at which they are observed, or when observed at a place whose longitude is well known, for correcting the small *errors* to which the most approved *solar and lunar tables* are still subject.

For the purpose of facilitating the objects last mentioned, the elements of the eclipse which forms the subject of this paper, were calculated with great care, the value of each equation having been obtained within the nearest thousandth of a second. The solar tables used, were those of Delambre, to which were applied the corrections indicated by Bessel. The lunar tables, both of Damoiseau and Burckhardt, have been employed, in the hope that observations may be made at those places in our country, whose longitude has been previously determined, and thus the number of tests, by which their respective merits must be ascertained, be somewhat increased. On the importance of these, it is deemed unnecessary to insist. It is proper to state, that the first and two last longitudes derived from Damoiseau's tables, as stated in the elements, were obtained by applying the hourly motion computed for the second period, and the last but one respectively.

From the elements as now presented, their values for any intermediate period of time, may be readily deduced by the application of simple proportion and the equations of second and third differences. The well known formulæ for these respective equations, are $\frac{x(x-1)\,d''}{2}$ and $\frac{x(x-1)(x-2)\,d'''}{2.3}$ where x is the interval, d'' and d''' the second and third differences. The factor $\frac{x(x-1)}{2}$ correspondent to every hundredth of the interval, will be found in the first of the tables, subjoined to the elements of the general eclipse, and the factor $\frac{x(x-1)(x-2)}{2.3}$ for every twentieth, in the second. The first of these has been used in the computation of the equations, wherever the accuracy of the tables admitted of its application. The Nutation of Bessel has been employed in the computation, both of the solar and lunar elements, and in accordance therewith the epoch of the lunar tables has been diminished by 0″ 455 of the sexagesimal division of the circle.

In the computation of the sun's horizontal parallax, 8″60544 has been taken for the mean parallax.

In computing the particular eclipse for Albany, an elipticity of $\frac{1}{309}$ has been employed in the reduction of the latitude of the place, and moon's equatorial parallax.

Elements of the General Eclipse. Tables of Delambre and Bessel.

Mean time at Paris	Sun's Longitude.	1st. Dif.	2nd.	3rd.	4th.	Latitude.	Sun's R Asscension.	1st. Dif.	2nd.	3rd.	4th.
2h 24m	10s 23° 10′ 48″ 4945					0″0118 N	10s 25° 31′ 13″ 384				
		2′ 31″ 6000						2′ 27″ 440			
3 24	10 23 13 20 0945		— 0021			0 0069 N	10 25 33 40 824		+ .003		
		2 31 5979		+ 0048				2 27 .443		— .046	
4 24	10 23 15 51 6924		+ 0027		— 0091	0 0019 N	10 25 36 8 267		— .043		+ .098
		2 31 6006		— 0043				2 27 400		+ .052	
5 24	10 23 18 23 2930		— 0016		+ 0094	0 0031 S	10 25 38 35 667		+ .009		— .066
		2 31 5990		+ 0031				2 27 409		— .014	
6 24	10 23 20 54 8920		+ 0025		— 0084	0 0080 S	10 25 41 3 676		— .005		— .017
		2 31 6015		— 0043				2 27 394		— .031	
7 24	10 23 23 26 4928		— 0018			0 0111 S	10 25 43 30 470		— .036		
		2 31 5990						2 27 358			
8 24	10 13 25 58 0918					0 0181 S	10 25 45 57 828				

Mean time at Paris.	Sun's Declina. S.	Dif.	Equation of Time.	Sun's Semi Diameter.
2h 24m	13° 48′ 9″ 590		14′ 34″ 045	16′ 13″ 418
		49″772		
3 24	13 47 19 818		14 34 019	16 13 410
		49 794		
4 24	13 46 30 024		14 33 992	16 13 402
		49 815		
5 24	13 45 40 209		14 33 962	16 13 394
		49 844		
6 24	13 44 50 365		14 33 934	16 13 386
		49 866		
7 24	13 44 0 499		14 33 903	16 13 378
		49 887		
8 24	13 43 10 612		14 33 872	16 13 370

Obliquity of the Ecliptic.
23° 27′ 32″ 807

Sun's Horizontal Parallax 8″7130.

By the Tables of DAMOISEAU.

Mean time at Paris.	Moon's Longitude.	1st. Diff.	2d. Diff.	3d. Diff.	4th Diff.
2h 22′ 28″	10s 21° 37′ 29″ 0870				
		33′ 33″ 6158			
3 22 28	10 22 11 2 7028		1″8147		
		33 35 3305		+ .1056	
4 22 28	10 22 44 38 0333		1 6091		+ 1784
		33 36 9396		+ .0728	
5 22 28	10 23 18 14 9729		1 6819		+ 0128
		33 38 6215		+ .0866	
6 22 28	10 23 51 53 5944		1 7685		— 1799
		33 40 3900		— .0933	
7 22 28	10 24 25 33 9844		1 6752		
		33 42 0652			
8 22 28	10 24 59 16 0496				

Moon's Latitude N.	1st. Diff.	2d. Diff.	3d. Diff
48′ 14″ 9254			
	— 3′ 4″ 2309		
45 10 6945		— 0″4504	
	3 4 6813		+ .0720
42 6 0132		0 3784	
	3 5 0597		— .0564
39 0 9535		0 4358½	
	3 5 4955½		+ .4691½
35 55 4579½		0 9049	
	3 6 4004½		
32 49 0575			

Mean time at Paris.	Moon's Equatorial Parallax			Moon's Horizontal Semidiameter.		
3h 22′ 28″	57′ 34″ 6576			15′ 41″ 3942		
		1′4846			+ .4045	
4 22 28	57 36 1422		+ .0370	15 41 7987		+ .0085
		1 5116			+ .4120	
5 22 28	57 37 6538		— .0003	15 42 2107		— .0003
		1 5113			+ .4117	
6 22 28	57 39 1651		— .0415	15 42 6224		+ .0108
		1 4708			+ .4009	
7 22 28	57 40 6369		— .3005	15 43 0233		+ .0823
		1 1693			+ .3186	
7 22 28	57 41 8052			15 43 3419		

By the Tables of BURCKHARDT.

Mean time at Paris.	Moon's Longitude.	1st. Diff.	2nd.	3rd.	4th.
2h 24′	10 21° 38′ 18″ 449				
		33′ 33″ 843	+		
3 24	10 22 11 52 292		1.792	−	
		33 35 635		.236	+
4 24	10 22 45 27 327		1.556	+	.447
		33 37 191		.211	−
5 24	10 23 19 5 018		1.767	−	.292
		33 38 958		.081	+
6 24	10 23 52 43 976		1.686	+	.127
		33 40 644		.046	
7 24	10 24 26 24 620		1 732		
		33 52 376			
8 24	10 25 0 6 996				

	Moon's Latitude N.	1st. Diff.	2nd.	3rd.	4th.
2h 24′	0° 51′ 16″ 282				
		3′ 3″ 702	−		
3 24	0 48 12 580		0″540	+	
		3 4 242		.240	+
4 24	0 35 8 338		0 300	−	395
		3 4 542		.155	+
5 24	0 42 3 796		0 455	+	267
		3 4 997		.112	−
6 24	0 38 58 799		0 343	−	249½
		3 5 340		.137½	
7 24	0 35 53 459		0 480½		
		3 5 820½			
8 24	0 32 47 638½				

	Moon's Equatorial Parallax.	1st. Diff	2nd.	Moon's Horizontal Semidiameter.	Diff.
2h 24′	57′ 31″ 378			15′ 40″ 5005	
		1″588	−		.4055
3 24	57 32 866		.137½	15 40 9060	
		1 450½	−		.3952½
4 24	57 34 316½		.026½	15 41 3012½	
		1 424	+		.3880½
5 24	57 35 740½		.012½	15 41 6893	
		1 436½	+		.3912
6 24	57 37 176		.025½	15 42 0805	
		1 461			.3981
7 24	57 38 637		.023	15 42 4786	
		1 484			.4044
8 24	57 40 121			15 42 8830	

GEOCENTRIC CONJUNCTION as obtained by computing from the Tables of

	M.time Paris.	Ap.time Paris	M.time Albany	Ap.ti.Albany	Lon. of ☉ & ☽	☽'s Lat. N	☉'s Lat. S.
Delambre, Bessel and Damoiseau,	5h 22′ 36″574	5h 8′ 02″611	0h 17′ 21″045	0h 2′ 47″082	10s 23° 18′ 19″7798	42′ 5″5719	0″0031
Delambre, Bessel and Burckhardt,	5h 22′ 39″520	5h 8′ 05″557	0h 17′ 23″991	0h 2′ 50″028	10s 23° 18′ 19″904	42′ 7″927	

Tables of the Factors for obtaining the Equations of Second and Third Differences.

TABLE I. Containing the factor $\frac{x(x-1)}{2}$. Argument x. This factor is always negative.

.0	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	0.0000	0.00495	0.00980	0.01455	0.01920	0.02375	0.02820	0.03255	0.03680	0.04095
.1	0.04500	0.04895	0 05280	0.05655	0.0602	0.06375	0.06720	0.07055	0.07380	0.07695
.2	0.08000	0.08295	0.08580	0.08855	0.09120	0.09375	0.09620	0.09855	0.10080	0.10295
.3	0.10500	0.10695	0.10880	0.11055	0.11220	0.11375	0.11520	0.11655	0.11780	0.11895
.4	0.12000	0.12095	0.12180	0.12255	0.12320	0.12375	0.12420	0.12455	0.12480	0.12495
.5	0 12500	0.12495	0.12480	0.12455	0.12420	0.12375	0.12320	0.12255	0.12180	0.12095
.6	0.12000	0.11895	0.11780	0.11655	0.11520	0.11375	0.11220	0.11055	0.10880	0.10695
.7	0.105	0.10295	0.10080	0.09855	0.09620	0.09375	0.09120	0.08855	0.08580	0.08295
.8	0.08000	0.07695	0.07380	0.07055	0.06720	0.06375	0.06020	0.05655	0.05280	0.04895
.9	0.04500	0.04095	0.03680	0.03255	0.02820	0.02375	0.01920	0.01455	0.00980	0.00495

TABLE II. Containing the factor $\frac{x(x-1)(x-2)}{2.3}$ This factor is always positive.

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
00	0.00000	.02850	.0480000	.0595000	.0640000	.0625000	.0560000	.0455000	.0320000	.0165000
05	.0154375	.0393125	.0546875	.0625625	.0639375	.0598125	.0511875	.0390625	.0244375	.0083125

Elements used in computing the particular Eclipse for Albany—Latitude 42° 39′ N. Long. W. of {Paris 76°18′52″.98 / Greenwich 73°48′35″.2}

	For the Beginning.		For the greatest obscuration and apparent conjunction.		For the End.	
Instants assumed, Paris mean time.	4h 37′	4h 38′	6h 9′ 30″	6h 10′ 30″	7h 36′	7h 37′
Sun's Longitude.	323° 16′ 24″5392	323° 16′ 27″0658	323° 20′ 18″2553	323° 20′ 20″782	323° 23′ 59″3355	323° 23′ 56″8123
" Right Ascension,	325° 36′ 40″1456	325° 36′ 42″6305	325° 40′ 27″4516	325° 40′ 29″9085	325° 43′ 59″9440	325° 44′ 2″4001
R Ascension of the Meridian,	314° 54′ 17″4331	315° 9′ 19″9255	338° 5′ 35″132	338° 20′ 37″596	359° 46′ 38″562	0° 1′ 41″0259½
Moon's true Longitude. } Damoiseau,	322° 52′ 46″ 4313	322° 53′ 20″0399	323° 44′ 37″1950	323° 45′ 10″8474	324° 33′ 9″9229	324° 33′ 43″6162
Burckhardt,	322° 52′ 44″7311½	322° 53′ 18″3427	323° 44′ 35″9013	323° 45′ 9″5606	324° 33′ 8″9581	324° 33′ 42″6563
Moon's true Latitude N. } Damoiseau,	44′ 25″9922	44′ 22″9158	39′ 40″9675	39′ 37″8824	35′ 13″4767	35′ 10″3725
Burckhardt,	44′ 28″398	44′ 25″3247	39′ 43″5341	39′ 40″4488	35′ 16″3289	35′ 13″2333
Longitude of Nonagesimal,	337° 59′ 13″937	338° 16′ 18″602	1° 21′ 47″373	1° 35′ 25″381	19° 50′ 17″822	20° 2′ 28″910
Altitude of Nonagesimal,	34° 10′ 26″248	34° 15′ 59″641	43° 12′ 19″698	43° 18′ 18″785	51° 38′ 56″785	51° 44′ 34″484
Diff. of Par. in Long. ☉ & ☾. } Damoiseau,	8′ 28″6801	8′ 39″2797	24′ 12″9051	24′ 22″7627	37′ 18″8097	37′ 26″8978
Burckhardt,	8′ 28″3842	8′ 38″6657	24′ 12″0348	24′ 21″8859	27′ 17″4985	37′ 25″5834
App. diff. Long. ☉ & ☾. } Damoiseau,	32′ 6″7880	31′ 45″9934	6″0346	27″3027	31′ 54″3009	32′ 17″3789
Burckhardt,	32′ 8″1922	31′ 47″3988	5″6112	26″8927	31′ 54″6473	32′ 17″7334
App. diff. Latitude ☉ & ☾. } Damoiseau,	3′ 3″9077	3′ 3″8777	2′ 11″2864	2′ 10″2695	25″5240	24″3218
Burckhardt,	2′ 59″9081	2′ 59″8752	2′ 7″2010	2′ 6″1854	21″4049	20″2076
Apparent motion of ☾ from ☉	during 60″					
Damoiseau,	20″7946		21″2681		23″0780	
Burckhardt,	20″7934		21″2815		23″0861	
Moon's apparent semi-diameter, } Damoiseau,	15′ 48″ 578	15′ 48″5944	15′ 49″189	15′ 49″186	15′ 48″1902	15′ 48″2218
Burckhardt,	15′ 48″0555	15′ 48″0700	15′ 48″628	15′ 48″624	15′ 47″637	15′ 47″ 649

Errors from instants assumed.

Beg.	Damoiseau,	+49″.435	—10″.565
	Burckhardt,	+53″.887	—. 6″.113
App. ☌.	Damoiseau,	—17″.024	
	Burckhardt,	—15″.819	
G. Obs.	Damoiseau,	+ 0″.670	—59″.320
	Burckhardt,	+ 1″.355	—58″.645
End.	Damoiseau,	+ 9″.348	—50″.652
	Burckhardt,	+ 8″.269	—51″.731

Times obtained—Civil Reckoning.

	Apparent Time.		Mean Time.	
	Damoiseau.	Burckhardt.	Damoiseau.	Buckhardt.
Beginning,	11h 17′ 59″ . 92 A. M.	11h 18′ 4″ . 38 A. M.	11h 32′ 33″ . 91 A. M.	11h 32′ 38″ . 36 A. M.
Apparent ☌	0 49 23 . 51 P. M.	0 49 24 . 71 P. M.	1 3 57 . 45	1 3 58 . 65 P. M.
Greatest Obscuration,	0 49 41 . 20	0 49 41 . 89	1 4 15 . 14	1 4 15 . 83
End,	2 16 19 . 92	2 16 18 . 84	2 30 53 . 82	2 30 52 . 74
Duration,	2 58 20 .	2 58 14 . 46	2 58 19 . 91	2 58 14 . 38
Digits Eclipsed,	11dig.3′ 32 . 26	11dig.4′ 51 . 09 from the ☉'s S. W. limb.		

Eclipse commences on the ☉'s South-western Limb, 74½° to the right of the Vertical.

In computing the foregoing results, the Sun's semi-diameter has been diminished 3″.5 for irradiation, and the Moon's augmented semi-diameter 2″ for inflection. The value of these, still somewhat doubtful, corrections, can be best ascertained at those places where the Eclipse will be annular, by observing the time of the Moon's passage across the Sun's disc. The annexed Plate, when held perpendicularly, will represent the appearance of the Sun at Albany, at the instant of its greatest obscuration. The Longitude of Albany, employed in this computation, is that determined by Jose Joaquin de Ferrer; according to whose statement it is 58″ in time East of New-York. See Transactions of the American Philosophical Society, vol. vi. page 269. The Longitude of New-York (City-Hall) is stated by Prof. Hassler, to be 74° 03′ 05″. 2.

ERATUM.—Sun's Latitude at 7h. 24m. for 0″.0111, read 0″.0131.

PART II. APPENDIX.

CONTENTS.

APPENDIX.

Charter of the Society for the promotion of Useful Arts.

An Act to incorporate a Society for the promotion of Useful Arts, passed April 2, 1804.

WHEREAS the institution of a society, calculated to promote, collect and preserve the knowledge of useful arts, is intimately connected with the public welfare and prosperity: Therefore,

Be it enacted by the people of the state of New-York, represented in senate and assembly, That all such persons who shall, at the time of the passing of this act, be members of the society for the promotion of agriculture, arts and manufactures, and such other persons who shall from time to time become members of the society hereby intended to be incorporated, and shall within ten months after the passing of this act, signify their intention in writing, subscribed by them respectively, to Samuel L. Mitchill or Benjamin De Witt, the present secretaries of the said society, to become members of the society hereby intended to be incorporated, and shall pay to either of them two dollars for the use of the said society, shall be, and hereby are, constituted a body corporate and politic by the name of "the Society for the promotion of Useful Arts;" that by that name the said society shall have perpetual succession; and that the said society and their successors shall be capable in law to sue and be sued, plead and be impleaded, answer and be answered, defend and be defended, in all courts and in all actions, suits, matters and causes whatsoever, and to purchase, take, receive, hold and enjoy, any real or personal estate, in fee simple or otherwise, and the same to lease, sell, dispose of and convey, for the purpose of the better enabling them to carry into effect such measures as to the said society shall seem best calculated to promote agriculture, arts and manufactures within this state: *Provided*, That the clear annual value of such real and personal estate shall not exceed the sum of two thousand five hundred dollars: That the said society shall have a common seal, which may from time to time be changed or altered at its pleasure.

And be it further enacted, That the said society shall, from time to time, forever hereafter, have power to make, constitute, ordain and establish such by-laws and regulations as they shall judge proper for the election of their officers, for prescribing their respective functions, and the mode of discharging the same; for the admission of new members into the said society; for the government of the officers and members thereof; for ascertaining an equal annual rate of contributions towards the funds thereof; for regulating the times and places of meeting for managing the affairs of the said society, and for suspending or expelling such members of the said society, as shall neglect or refuse to comply with the by-laws and regulations thereof, so as such by-laws and regulations shall not be repugnant to the laws of the United States or of this state.

And be it further enacted, That a president and one or more vice-presidents, nine counsellors, two or more secretaries, a treasurer, and such other officers as the said society shall, by any by-law, from time to time appoint, shall be elected by a plurality of votes of the members of the said society present at any election: That such election shall be annually held in the senate chamber, or at such other place as the said society shall from time to time by by-law direct and appoint, on the Tuesday next succeeding the day on which both houses of the legislature shall have been formed, ready to proceed to business, after the first day of January in every year: That the said officers shall respectively hold their offices until the next annual election day, or until others shall be elected in their stead: That if the annual election shall not be held at any of the days for that purpose appointed, it shall be lawful to make such election at any other day; and that the president, or one of the vice-presidents, with any twelve or more of the said society, meeting at the place designated for that purpose by any by-law, shall constitute a legal meeting of the said society.

And be it further enacted, That the books, papers, monies and effects of the society for the promotion of agriculture, arts and manufactures, shall be and the same are hereby with the approbation, and at the instance of the last mentioned corporation, vested in the said society for the promotion of useful arts, from and after the fourth day of May next, on which day the corporation aforesaid expires by its own limitation.

And be it further enacted, That the members of the legislature shall in that capacity be honorary members of the said society; but shall not vote at elections, or have any voice in the disposition of the funds of the said society.

And be it further enacted, That Robert R. Livingston shall be the president, and Ezra L'Hommedieu the vice-president of the said society, until the second annual election day.

Charter of the Albany Lyceum of Natural History.

An Act to incorporate the Albany Lyceum of Natural History. Passed April 23, 1823.

WHEREAS the members of the Albany Lyceum of Natural History have associated for the purpose of encouraging the study, and of disseminating a knowledge of natural history and other useful sciences, and have petitioned for an act of incorporation: Therefore,

Be it enacted by the people of the state of New-York, represented in senate and assembly, That Stephen Van Rensselaer, Theodric Romeyn Beck, Simeon De Witt Bloodgood, Lewis C. Beck, Matthew Henry Webster, Frederick Mathews, Richard Varick De Witt and James Eights, and such other persons as now are and may from time to time become members, shall be and hereby are constituted a body corporate and politic, by the name of the "Albany Lyceum of Natural History," and by that name they shall have perpetual succession, and shall be persons capable of suing and being sued, pleading and being impleaded, answering and being answered unto, defending and being defended, in all courts and places whatsoever, and may have a common seal, with power to change and alter the same from time to time, and shall be capable of purchasing, taking possession of, holding and enjoying, to them and their successors, any real estate in fee simple or otherwise, and any goods, chattels, and personal estate, and of selling, leasing, or otherwise disposing of said real and personal, or any part thereof, at their will and pleasure: *Provided however,* That the funds of the said corporation shall be used and appropriated to the objects contemplated in the preamble to this act: *And provided also,* That the clear annual income of such real and personal estate shall not exceed the sum of one thousand dollars.

And be it further enacted, That the said society shall forever hereafter have power to make, constitute, ordain, and establish such by-laws and regulations, as they shall judge proper for the election of their officers, for prescribing their respective functions, and the mode of discharging the same, for the admission of new members, for the government of the officers and members thereof, for collecting the fines, impositions and annual contributions from the members, for regulating the places and times of meeting of the said society, for suspending or expelling such members as shall neglect or refuse to comply with the by-laws or regulations, and for managing and directing the affairs and concerns of the said society: *Provided*, such by-laws and regulations be not repugnant to the constitution and laws of this state or of the United States.

And be it further enacted, That the officers of the said society shall consist of a president, two vice-presidents, a corresponding secretary, a recording secretary, a treasurer, three curators, and a draftsman, and such other officers as the said society may deem necessary, who shall be annually chosen, and who shall continue in office for one year, or until others shall be elected in their stead; that if the annual election shall not be held on any of the days for that purpose appointed, it shall be lawful to make such election on any other day, and that five members of the said society assembled at the place and time designated for that purpose by the constitution, by-laws, or resolutions of said society, shall constitute a legal meeting thereof; and that in case a vacancy shall take place between the annual meetings, then it shall be lawful to fill such vacancy at any regular meeting, and the person or persons so chosen shall continue in office until the next annual meeting, or until others shall be elected in their stead.

And be it further enacted, That Stephen Van Rensselaer shall be the president, Theodric Romeyn Beck the first vice-president, Simeon De Witt Bloodgood the second vice-president, Lewis C. Beck, corresponding secretary, Matthew Henry Webster, recording secretary, Frederick Mathews, treasurer, Richard Varick De Witt, James Eights and Matthew Henry Webster, curators, and James Eights, draftsman, severally to be the first officers of the said corporation, who shall hold their respective offices until the fourth Monday of January next, and until others shall be chosen in their places.

And be it further enacted, That the present constitution of the said society shall, after the passing of this act, continue to be the constitution thereof, and that no alteration shall be made therein unless it be proposed in writing at some stated meeting, one month before it is acted upon, and shall be decided by a majority of three-fourths of the members present.

And be it further enacted, That the legislature may at any time modify or repeal this act.

Charter of the Albany Institute.

An Act to incorporate the Albany Institute. Passed February 27, 1829.

WHEREAS the Society for the Promotion of Useful Arts and the Albany Lyceum of Natural History have agreed to articles of association, for the purpose of forming an institution for the promotion of science and literature, to be called "The Albany Institute." Therefore,

The people of the state of New-York, represented in senate and assembly, do enact as follows:

All such persons as shall at the time of the passage of this act be members of the said "Society for the Promotion of Useful Arts," or of the "Albany Lyceum of Natural History," and such other persons as shall from time to time become members of the same, or of the third department herein after mentioned, shall be and are hereby constituted a body corporate and politic, by the name of "The Albany Institute;" and the annual income of the real and personal estate which the said corporation is authorised to hold, shall not exceed ten thousand dollars.

The said corporation shall consist of three departments, to wit: First, the department of physical sciences and the arts: Second, the department of natural history, and, Third, the department of history and general literature. "The society for the promotion of useful arts," as at present constituted, shall be the first department—"The Albany lyceum of natural history," as at present constituted, the second department; and a society for the promotion of history and general literature shall be formed as soon as may be, which shall be the third department: but until such society shall be formed and duly organized, the said corporation shall consist and be formed of the aforesaid first and second departments.

The officers of the said corporation shall be a president, three vice-presidents, three corresponding and three recording secretaries; a treasurer, a librarian, and as many curators as the second department may direct. The president and treasurer shall be annually elected; and the presidents of the departments shall be the vice-presidents; and the corresponding and recording secretaries of the departments shall be the corresponding and recording secretaries of the institute; the librarian of the first department shall be the librarian, and the curators of the second department shall be the curators, of the institute : Stephen Van Rensselaer shall be the president, and Simeon De Witt, at present president of the society for the promotion of useful arts, and Theodric Romeyn Beck, at present president of the Albany lyceum of natural history, shall be the vice-presidents, and William Mayell, the treasurer, of the institute ; who shall severally hold their respective offices until others shall be chosen in their places.

The elective officers shall be chosen by a plurality of the votes of the members of the institute present, at a regular meeting for that purpose, convened according to the by-laws of the institute, of which previous notice shall be given in at least one of the newspapers published in the city of Albany.

If at any regular meeting of the institute for the election of officers, any or either of the departments constituting the institute shall not continue organized, or be in any way dissolved, such officers of the institute as are hereby declared to be ex officio from the said departments, may be elected by the institute in the same manner as the other elective officers are directed to be chosen.

Nine members of the institute, regularly convened, shall constitute a quorum for the transaction of business, and five members of either of the departments, regularly convened, shall constitute a quorum for the transaction of business in such department.

The books now belonging to or hereafter coming into possession of the aforesaid departments, shall be deposited in the library of the said corporation ; and all specimens of natural history or the arts, now or hereafter belonging to or coming into the possession of either of the said departments, shall be deposited in the museum of the said corporation.

The corporation shall have power to make, constitute, ordain and establish such by-laws and regulations as they shall judge proper for the election of their officers, for prescribing their respective functions and the mode of discharging the same, for the admission of new members, for the government of the officers and members thereof, for collecting the fines, impositions and annual contributions from the members, for regulating the times and places of meeting and for managing and directing the affairs and concerns of the said corporation.

The legislature may at any time hereafter amend, modify or repeal this act.

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2 †*Academy*, of Natural Sciences of Philadelphia, Journal of, 8vo. vols. 1, 2, 3. Philadelphia, 1817—23.

3 ‡*Adrain*. The Mathematical Diary, containing new researches and improvements in Mathematics, with collections of questions proposed and resolved by ingenious correspondents, &c.—Conducted by R. Adrain, L. L. D. F. A. P. S. Professor of Mathematics and Natural Philosophy in Columbia College, New-York, vol. 1, 12mo. New-York, 1825.

4 †*Agriculture, Arts and Manufactures*, Transactions of the Society for the promotion of, 8vo. 2 vol. Albany, 1801.

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6 †‡*Aikin*. A Dictionary of Chemistry and Mineralogy, with an account of the processes employed in many of the most important Chemical Manufactories, &c. &c. &c. By A. & C. R. Aikin, 2 vols. 4to. London, 1807. With an Appendix of recent discoveries and improvements. London, 1814. (2 copies.)

7 **Aikin*, A Manual of Mineralogy, by Arthur Aikin, Secretary to the Geological Society, 12mo. Philadelphia, 1815.

8 ‡*Albany*, Laws and Ordinances of the City of, 1791.

9 ‡*Aldrovandus*, De Piscibus, (title page wanting,) folio.

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11 **Allan's* Mineralogical Nomenclature, alphabetically arranged, with Synoptic Tables of the Chemical Analysis of Minerals. By Thomas Allan, 8vo. Edinburgh, 1814.

12 ‡*Almanacks*, Twelve London, of the year 1637, bound in one volume.

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24 ‡*Bacon* (Lord Verulam, Viscount St. Albans) Sylva Sylvarum, or a Natural History, in ten Centuries, &c. Published after the author's death, by William Rawley, D. D. one of his Majesties Chaplains. The tenth edition, folio. London, 1676.

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40 ‡*Board of Agriculture* of the State of New-York, Memoirs of, published by authority, 8vo. 3 vols. Albany, 1821—26.

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42 ‡*Botany*, Elements of, as established by Linneus; with examples to illustrate the classes and orders of his system, with plates, 3 vols. 12mo. London, 1812.

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55 ‡*Canal* Commissioners of Ohio, Report of, to the General Assembly. Columbus, 1825. (Pamphlets, 8vo. vol. 6.)

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64 †*Census* of Albany County, taken in 1801, fol. MS.

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257 ‡*Regents* of the University of the State of New-York, Annual Report of, to the Legislature for 1827, do. for 1828. (Pamphlets, 8vo. vol. 5.)

258 ‡*Rensselaer School*, Triennial Catalogue of the Officers and Members of, Troy, 1828. (Pamphlets, 8vo. vol. 5.)

259 †*Repertory* of Arts and Manufactures the, Consisting of Original Communications, Specifications of Patent Inventions, and useful practical papers from the Transactions of the Philosophical Societies of all Nations, &c. &c. 16 vols. 8vo. London, 1794 to 1802.

260 †*Repertory* of Arts. Analytical Index to the first series, 1 vol. 8vo. London (2 copies.)

261 †*Repertory* of Arts, Manufactures and Agriculture, &c. &c. Second series, 46 vols. 8vo. London, 1802 to 1825.

262 ‡*Repertory* of Patent Inventions, &c. being a continuation of the Repertory of Arts, 7 vols. 8vo. London, 1825—28.

263 ‡*Richardson's* (Dr. John) Appendix to Captain Parry's Second Voyage, containing the Natural History, with plates, 4to. London.

264 ‡*Robinson* (Samuel) M. D. Catalogue of American Minerals, with

their Localities, including all which are known to exist in the United States and British Provinces, 8vo. Boston, 1825.

265 ‡*Rochefoucald-Liancourt* (La) Voyage Dans les Etats unis D'Amerique, fait in 1795, 1796, and 1797, 8 vols. 8vo. Paris, (L'An vii. de la Republique.)

266 ‡*Roemer and Schultes*. C. A. Linne Systema Vegetabilium secundum Classes, Ordines, Genera et Species, editio nova—curantibus J. J. Roemer, M. D. et J. A. Schultes, M. D. volumen Tertium et quartum. Stultgardias, 1819.

267 †*Rotheram* (John) M. D. Observations on an Universal Standard for Weights and Measures. Edinburgh, 1791. (Pamphlets, 8vo. vol. 1.)

268 ‡*Rumford*. Essays, Political, Economical and Philosophical, by Benjamin Count of Rumford, F. R. S. &c. &c. 2 vols. 8vo. Boston, 1798.

269 ‡*Rutty's* (John) M. D. Essay towards a Natural, Experimental and Medicinal History of the Mineral Waters of Ireland, 8vo. Dublin, 1757.

270 †*Samoulle's* (George) Entomologist's useful compendium, or an introduction to the knowledge of British Insects, &c.—with plates. 8vo. London, 1819.

271 ‡*Say* (Thomas) Explanation of Terms used in Entomology. 8vo. Philadelphia, 1825.

272 ‡*Say*. American Entomology, by Thomas Say. Vol. 1. Philadelphia, 1817.

273 †*Schoolcraft's* (Henry R.) View of the Lead Mines of Missouri, including some Observations on the Mineralogy, Geology, &c. of Missouri and Arkansaw. 8vo. New-York, 1819. (2 copies.)

274 †*Schoolcraft* (Henry R.) Narrative Journey of Travels from Detroit northwest through the great chain of American Lakes to the sources of the Mississippi River, in the year 1820. 8vo. Albany, 1821.

275 **Schoolcraft* (Henry R.) Memoir on the Geological position of a Fossil Tree, discovered in the secondary Rocks of the River Des Plaines. Albany, 1822. (Pamphlets, 8vo. vol. 3.)

276 ‡*Seguin*. Instruction sur l'usage du vin de Gilbert Seguin, &c. Paris, 1824. (Pamphlets, 12mo. vol 1.)

277 ‡*Shaw*. General Zoology or Systematic Natural History, by George Shaw, M. D. F. R. S. With plates. Vol. 3, Part 1 & 2, amphibia, Vol. 4 & 5, each in 2 parts, pisces, 6 vols. London, 1802-4.

278 ‡*Silk*. Letters from the Secretary of the Treasury, transmitting information on the growth and manufacture of. Feb. 7, 1828. Washington, 1828. (Pamphlets, 8vo. vol. 5.) 2 Copies.

279 **Silliman*. The American Journal of Science and Arts, conducted by Benjamin Silliman, M. D. L. L. D. Professor of Chemistry, Mineralogy, &c. in Yale College, &c. &c. 15 vols. 8vo. New-York and New-Haven, 1818 to 1829.

280 †*Sinclair*. An Account of the System of Husbandry, adopted in the more approved districts of Scotland, &c. by the Right Hon. Sir John Sinclair, Bart. Founder of the Board of Agriculture. The third Edition, 2 vols. 8vo. Edinburgh, 1814.

281 †*Sinclair*. The Code of Agriculture, including Observations on Gardens, Orchards, Woods and Plantations, by the Right Hon. Sir John Sinclair, Bart. &c. First American Edition with Notes. 8vo. Hartford, 1818.

282 ‡*Societe De Geographie*. Questions proposes aut Voyageurs, &c. Premiere Serie, Paris, 1824. (Pamphlets, 8vo. vol. 4.)

283 ‡*Societe De Flore*. Proces-Verbal de la seance d'exposition du 19 Fevrier, 1825. (Pamphlets, 8vo. vol. 4.)

284 ‡*Societe Asiatique.* Discours et Rapport leus dans la seance generale annuelle du 28 April, 1825, &c. Paris, 1825. (Pamphlets, 8vo. vol. 4.)

285 ‡*Societe* Linneene de Paris. Memoires de la, precedes de son histoire depuis 1788 epoque de sa fondation jusque et compris l' annee 1822, Tome Premier. Pendant les annee 1823 et 1824. 2 vols. 8vo. Paris, 1822 and 1825.

286 ‡*Societe Geographie de Paris.* Officers and lists of prizes of. 1825. (Pamphlets, 4to. vol. 2.)

287 ‡*Societe* De la Morale Chretienne. Assemblee generale annuelle dela, April 15, 1825. (Pamphlets, 8vo. vol. 4.)

288 **Soils and Manures.* A Treatise on, founded on actual experience, &c. by a practical Agriculturalist. 8vo. London, 1818.

289 ‡*Solano* (Pietro Soane.) The History of the Council of Trent, by. Written in Italian, and translated by Nathaniel Brent. Folio. Lon. 1620. (Printed by Robert Barker.)

290 †*Somerville's* (John. Lord) Facts and Observations relating to Sheep, Wool, Ploughs and Oxen, &c. &c. 3d Edit. enlarged. London, 1809

291 †*Spafford,* (Horatio Gates, A. M. F. A. A.) American Magazine. Albany, 1816. (Pamphlets, 2d vol. 8vo.

292 †*Spafford* (Horatio Gates) Gazetteer of the State of New-York, carefully written from original and authentic materials. 8vo. Albany, 1813.

293 ‡*St. Hilaire* (Chev. Geoffroy) Philosophie Anatomique. Des Organes Respiratoires sous le rapport de la determination et de l'identite de leurs pieces osseuses. Avec Figures de 116 nouvelles preparations D'Anatomie. 8vo. Paris, 1818.

294 ‡*Stewart's* (Charles) Elements of the Natural History of the Animal Kingdom, &c. The second Edition. 2 vols. 8vo. Edinburgh, 1817.

295 **Summer* (George) M. D. A Compendium of Physiological and Systematic Botany, with Plates, by. 12mo. Hartford, 1820.

296 ‡*Sutcliffe.* A Treatise on Canals and Reservoirs and the best mode of designing and executing them—also, on Cotton Spinning, Corn Mills, and Public Drains, by John Sutcliffe, Civil Engineer. Rochdale. 8vo. 1816.

297 **Sutherland* (James) Hortus Medicus Edinburg ensis, or a Catalogue of the Plants in the Physical Garden at Edinburgh, by J. Sutherland. Intendant of the said Garden. 8vo. Edinburgh, 1683.

298 ‡*Swainson* (William,) F. R. S. & L. S. The Naturalist's Guide, for collecting and preserving all subjects of Natural History and Botany, with two plates. 8vo. London, 1822.

299 ‡*Tarascon* (Lewis A.) Exposition of some of the reasons, why measures should be taken for the construction of a Canal, round the falls of the River Ohio, &c. Louisville, 1824. (Pamphlets, 8vo. vol. 6.)

300 †*Tatham* (William) View of the proposed Grand Junction Canal, designed to bring the commerce of North Carolina to Norfolk by an inland Navigation. Norfolk, 1808. (Pamphleis, 8vo. vol. 1.)

301 †*Tatham* (William) Comparative View of the four projected Coastwise Canals, which are supposed by some to be in competition for the trade between Norfolk and North Carolina. Norfolk, 1808. (Pamphlets, 8vo. vol. 1.)

302 †*Taylor's* (James N.) Sketch of the Geography, Political Economy and Statistics of France, from the Original Work, in seven volumes, 8vo. Digested, abridged and translated. 8vo. Washington, 1815.

303 ‡*Taylor's* (Joseph) Complete Weather Guide, a collection of Practical Observations for prognosticating the weather, &c. 12mo. London, 1812.

304 **Thomas'* (David) Travels through the Western Country in the summer of 1816. 12mo. Auburn, 1819.

305 †*Thomson*. A System of Chemistry, in four volumes. By Thomas Thomson, M. D. F. R. S. L. & E. F. L. S. &c. The fifth edition. 4 vols. 8vo. London, 1817.

306 †*Thomson*. History of the Royal Society, from its institution to the end of the eighteenth century, by Thomas Thomson, M. D. F. R. S. L. & E. M. G. S. M. W. S. &c. 4to. London, 1812.

307 ‡*Thornton*. The British Flora or Genera and Species of British Plants, arranged after the reformed Sexual System, and illustrated by numerous tables and dissections. By Robert John Thornton, M. D. Professor of Botany at Guy's Hospital, &c. 2 vols. 8vo. London, 1812.

308 **Tilford* (William J.) Hortus Botanicus Americanus, with coloured plates, 4to. New-York, 1810. (Pamphlets, 4to. vol. 2.)

309 **Torrey*. A Flora of the Northern and Middle Sections of the United States, or a Systematic arrangement and description of all the Plants hitherto discovered in the United States north of Virginia. By John Torrey, M. D. President of the Lyceum of Natural History of New-York, &c. Vol. 1. 8vo. New-York, 1824.

310 ‡*Tousard*. American Artillerist's Companion, by Louis de Tousard. Mem. of the Soc. Cincinnati, &c. &c. &c. 8vo. 2 vols. and 4to. vol. plates. Philadelphia, 1809.

311 ‡*Tuckey*. Narrative of an Expedition to explore the River Zaire, usually called the Congo, in South Africa, in 1816, under the direction of Capt. J. K. Tuckey, R. N. &c. 8vo. New-York, 1818.

312 †*Tuke*, jun. (Mr.) General view of the Agriculture of the North Riding of Yorkshire. 4to. London, 1794. (Pamphlets, Quarto, vol. 1.)

313 ‡*Turnpike* Road Company, Memorial of the first Great South Western, 1823. (Pamphlets, 8vo. vol. 6.)

314 ‡*Turton*. A Conchological Dictionary of the British Islands, by Wm. Turton, M. D. assisted by his Daughter. 12mo. London, 1819.

315 †*United States* Military Philosophical Society, Account of the Proceedings of. 1806. (Pamphlets, Quarto, vol. 1.)

316 †*Useful Arts*. Transactions of the Society for the promotion of, in the State of New-York (a continuation of the Transactions of the Society for the promotion of Agriculture.) 3 vols. 8vo. Albany, 1807, 1814, 1816 and 1819.

317 ‡*Webster* (M. H.) A catalogue of the Minerals which have been discovered in the State of New-York, arranged under the heads of the respective Counties and Towns in which they are found, 12mo. Albany, 1824. (Pamphlets, 12mo. vol. 1.)

318 ‡*Werner*. A Treatise on the External Characters of Fossils, translated from the German of Abraham Gottlob Werner, Professor of Mineralogy. Public Teacher of the Art of Mining in the Mine Academy of Freyberg. By Thomas Weaver, 8vo. Dublin, 1805.

319 †*Wernerian* Natural History Society. Memoirs of, vol. 1, for the year 1808—9—10. vol. 2, 1811—16. vol. 3, 1817—20, with engravings, 8vo. Edinburgh, 1811—21.

320 ‡*Woodarch's* Introduction to the study of Conchology, describing the Orders, Genera and Species of Shells, &c. 2d edit. revised and enlarged, by J. Mawe, 8vo. London, 1822.

321 ‡*Worcester* (Marquis of) Century of inventions from the Original MS. with Historical and Biographical Notes and a Biographical Memoir, by Charles F. Partington, Lecturer at the London, Russel, &c. Institutions, 12mo. London, 1825.

322 ‡*Ellicott*. The Journal of Andrew Ellicott, late Commissioner on behalf of the United States, in 1796—1800, for determining the boun-

dary between the United States and the possessions of his Catholic Majesty in America, &c. 4to. Philadelphia, 1805.

323 ‡*Northcote's* (James) Memoirs of Sir Joshua Reynolds, Knt. LL. D. F. R. S. Late President of the Royal Academy, &c. 8vo. Philadelphia, 1817.

324 ‡*Stevens'* (W. S.) Homographia, an Essay on the Proportions of the Human Body, hitherto unknown or undescribed, 8vo. London, 1811.

List of Donors to the Library

OF THE

ALBANY INSTITUTE,

With reference to the numbers affixed in the foregoing Catalogue to the Books presented by them respectively.

The Board of Agriculture, London—No. 41, 119, 158, 312.
The American Philosophical Society, Philadelphia—16, 17, 18.
The Academy of Natural Sciences, Philadelphia—1, 2.
The Lyceum of Natural History, New-York—20, 110, 115, 278.
The Board of Agriculture, New-York—40.
Connecticut Academy of Arts and Sciences—96.
Literary and Philosophical Society, New-York—192.
Massachusetts Society for promoting Agriculture—203, 204, 205.
New-York Historical Society—226.
Dutchess County Agricultural Society—121.
Philadelphia Society for promoting Agriculture—241.
Stephen Van Rensselaer, Oliver Kane, Isaiah Townsend, John Townsend, Charles R. Webster, Richard V. De Witt, Samuel M. Hopkins, John S. Walsh, Charles E. Dudley, Israel Smith, Joseph Henry and T. Romeyn Beck—6, 9, 10, 14, 23, 24, 27, 39, 42, 43, 47, 50, 51, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 67, 97, 98, 99, 100, 105, 120, 138, 139, 147, 154, 162, 165, 169, 173, 175, 182, 186, 190, 197, 199, 200, 207, 213, 217, 218, 221, 231, 233, 234, 235, 240, 242, 247, 248, 249, 253, 263, 264, 270, 271, 272, 285, 296, 298, 299, 303, 307, 313, 314, 318, 321.
Edward C. Delavan and John T. Norton—73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 137, 176, 223.
Ebenezer Baldwin—251, 252.
Daniel H. Barnes, New-York -30.
John B. Beck, New-York—12, 153.
Lewis C. Beck—32, 33, 124, 258.
N. F. Beck—114, 151.
T. Romeyn Beck—3, 8, 34, 35, 36, 37, 124, 135, 136, 177, 209, 220, 256, 257, 293, 294, 297, 311, 320.
Richmond Brownell—156.
William Caldwell—68.
Walter Clarke—289.
Charles A. Clinton—70, 71, 72, 134.
James E. De Kay, New-York—276, 282, 283, 284, 286, 287.
Richard V. De Witt—7, 116, 295.
Simeon De Witt—117, 194, (the first 14 vols.)
M. Durand, Paris—210.
James Eights—208, 275, 304.
Jonathan Eights—65, 129.
Ebenezer Emmons, Massachusetts—131.
George W. Featherstonhaugh—146.

History of the Institute,

WITH AN ABSTRACT OF ITS PROCEEDINGS.

As the Albany Institute is composed in part of two incorporated Societies, it may be proper to preface its history with a brief account of them.

The "Society for the Promotion of Agriculture, Arts and Manufactures," was formed in February, 1791, at the city of New-York, the (then) seat of government of this state, and incorporated in 1793. Of this body, Robert R. Livingston was the first President, and continued so until the year 1804, when its act of incorporation expired by its own limitation. It was then re-incorporated under the title of the "Society for the Promotion of Useful Arts," by the act of the Legislature of the state of New-York, which forms the first article in this Appendix. Of the labors of this Society, it would be improper to say more than that four octavo volumes, composed of communications read at its different sessions, have been published; that it is acknowledged to have exerted a most beneficial influence upon the agriculture of the state—and that it was for five years the organ of the state, in distributing premiums for improvements in domestic manufactures.

The "Albany Lyceum of Natural History," was formed and incorporated in 1823, for the promotion of the objects mentioned in its title, under the presidency of Stephen Van Rensselaer. Confining its labours to the advancement and extension of the knowledge of the natural sciences, and more particularly of the natural productions of our own state, it succeeded in forming a Museum, embracing respectable collections in the various branches, especially mineralogy, geology and oryctology.

Circumstances, on which it is not necessary to dwell, induced a majority of the members of both Societies to believe that the objects for which they had been incorporated, would be more certainly attained by a union: and accordingly in May, 1824, this was effected by articles of union mutually agreed to, the details of which will be found in the act of incorporation, subsequently passed, and which forms the third article of this Appendix.

On the 5th of May, 1824, the Institute was organized by the election of the following persons as officers:

Stephen Van Rensselaer, *President.*

Simeon De Witt, *President of the First Department,* and Elisha Jenkins, *President of the Second Department,* ex officiis, *Vice Presidents.*

William Mayell, *Treasurer.*

Peter Gansevoort and Lewis C. Beck, } *Corresponding Secretaries.*

Henry W. Snyder and Matthew Henry Webster, } *Recording Secretaries.*

Richard Varick De Witt, Matthew Henry Webster and James Eights, } *Curators.*

A joint committee, previously appointed to examine the libraries and collections of the two Societies, and to make catalogues thereof, reported that the library of the First Department (or Society of Arts,) consisted of 277 volumes, and that of the Second Department (or Albany Lyceum,) of 52 volumes, including pamphlets.*

The committee further reported, that the collections in Natural History and the Arts, belonging to the First Department, consisted of 394 specimens, obtained either by purchase, or presented by the following persons, viz.—De Witt Clinton, Jonathan Eights, Henry W. Snyder, Edmund C. Genet, John Lansing, Jr. Jacob Green, Matthew Henry Webster, Theodric Romeyn Beck, Vinal Luce, Sylvanus Fansher.

That the collections in Natural History and the Arts, belonging to the Second Department, consisted of 1473 specimens, (excluding the botanical collection) presented by the following persons, viz.—Stephen Van Rensselaer,† Stephen Van Rensselaer, Jr.‡ James Hadley, David Thomas, Theodric Romeyn Beck, S. De Witt Bloodgood, Jacob Green, Lewis C. Beck, Matthew Henry Webster, Winslow C. Watson, George W. Bush, James Eights, Isaac Doolittle, William Cooper, Mordecai Morgan, Samuel K. Kip, John C. Whiting, Ten Eyck Gansevoort, J. Smyth Rogers, Ebenezer Baldwin, Joseph Henry, John I. Godfrey, John Griscom, William U. Titus, Elkanah Watson, Thomas Mather,

* The names of the donors of these, when presented, are stated in the catalogue contained in this Appendix.

† The donation of Mr. Van Rensselaer, consisted of a valuable collection of European specimens and a goniometer.

‡ This donation consisted of a select collection of European minerals, (many of them rare) procured in Europe by Mr. V. R. and a suite of minerals, rocks and earths, illustrative of the Geological and Agricultural Surveys of Albany and Rensselaer counties.

Gerrit Wendell, Richard Varick De Witt, Samuel L. Mitchill, William M. Hopkins, Timothy D. Wilson, Peter Seton Henry, Henry Inman, James P. Boyd, Stephen V. R. Bogart, John C. Morrison, Ashbel S. Webster, James G. Tracy, Perez Packer and Charles R. Webster.

June 2d, 1824. The following donations were received: From Henry W. Snyder, 14 silver and 67 copper coins; from Simeon De Witt, Chinese coins, balanus tintinnabulum, haliotis tuberculata, a dried specimen of the pulmonaria virginica and a betel nut; from Samuel M. Lockwood, alabaster from Sandusky, Ohio; from the President, Van Rensselaer's canal rocks, part 1, 8vo.; from the American Philos. Society, catalogue of its library, 8vo.

July 14. The following donations were received: From Benjamin Knower, native sulphur, produced by the decomposition of pyrites, red ochre, and sulphate of magnesia, Guilderland; from Volkert P. Douw, brown ochre, from Glenville, Schenectady county; from William Mayell, coins and continental money; from T. R. Beck, a suite of American copper coins; from James Eights, 61 species of insects. Lewis C. Beck deposited the right valve of the unio crassus, *Say*, var. giganteus, *Barnes*.

T. Romeyn Beck read a notice of the family of fossil remains, called trilobites, in which after stating the divisions proposed by Brongniart, he enumerated and named the specimens in the Museum of the Institute, belonging to the three genera of asaphus, calymene and paradoxide. He also mentioned, that he was unable to refer some of the specimens in the Museum to either of the genera of Brongniart. The collection embraces the following localities—Vicinity of Cincinnati, Ohio; southern shore of Lake Ontario; Canajoharie, Montgomery co.; Hudson; Crown Point, Essex co.; Helderbergh mountains; Coeymans, Albany co.; Rochester, Monroe co.; Seneca, Ontario co. This communication was accompanied by drawings.

John R. Bleecker, deposited the specimen of calymene macrophthalma of *Brongniart,* from which the plaster cast, sent to that naturalist, by Dr. Hosack, and used by him in describing the species, was taken. The locality of this specimen is Ulster county, New-York, and not as stated by Brongniart, the vicinity of Albany.

Dr. John James deposited a specimen of asaphus, in limestone, from Crown Point, Essex county. This beautiful relic is thus characterised by Dr. Bigsby, (Silliman's Journal, vol. 8, p. 83.) "Many asaphi from Montreal, lakes Seneca and Ontario, have a smooth coat of limestone, granular or sparry, which conceals the abdominal joints and lobes, and exhibits only the relieved outline of the cast; but in a few, their structure is still discernible, as is well exemplified in a superb specimen, in the possession of Dr. James, of Albany, in which, in fact, the greater part of this covering has disappeared. The largest American asaph which I have seen, is that of Dr. James."

William Mayell read a paper on the processes used in hat making.

In this communication, the author, who is a practical artisan, stated that the processes used by the hatter are mechanical and chemical. The former are similar in all countries, while the latter frequently vary.

The operations included under the head of mechanical ones, viz. *bowing*, *basoning* and *planking*, were next described. It was remarked, that wool and the fur of different animals, possess in various degrees, the property of combining by means of the hatters' processes, and in order to improve this, several chemical operations are employed. The most common of these, was the addition of wood ashes to the water used in boiling. The alkali in this or similar substances aids in promoting the contraction or shrinking of the hat, and upon the success of this, its fineness and firmness depend.

It is however, a very uncertain process, and workmen frequently fail in it. Mr. Mayell is inclined to ascribe the variety in this case to a want of attention to the proportions that have been found most effective. The quantities of substances containing either the vegetable or volatile alkali, which are used in successful experiments, should be noted.

Another difficulty attending the mechanical operations is the danger of *shrinking* too much. "If the hats be not well boiled, their texture will be loose, and it will be impossible, perhaps to *shrink* them to the required size. On the other hand, the boiling, aided by the wetting and rolling, may cause too rapid a contraction, and yet, if the latter processes be discontinued, the texture of the hats will be coarse and harsh."

To retard the *shrinking*, brewers' dregs are frequently employed by some manufacturers, while others use them directly for it. The reason of this diversity of result is thus explained: These dregs when fresh, contain a quantity of mucilage and saccharine matter and little or no acid. Their application will thus effect the first object. But if they have stood a considerable time, fermentation has gone on, and acetous acid in a greater or less degree, is produced.

This acts like the sulphurous acid, and if mixed with the water, will accelerate the *shrinking*.

"Beer and vinegar dregs, are generally used by the London hatters, in the manufacture of fur hats, for the purpose of *mellowing* their hats and of removing the harshness that results from the use of the sulphurous acid."

Mr. M. remarks, that the Indian method of dressing beaver skins, is to steep them in the ley of wood ashes, containing of course a notable portion of potash.

September 1. The following donations were received: From the Academy of Natural Sciences of Philadelphia, vols. 2d and 3d of its Journal; from Peter S. Townsend, a collection of marine shells and corals from the Bahama Islands, crystals of salt from the salt ponds of Crooked Island; from Lewis C. Beck, a black lead coin, trilobite, and cast, Rochester, Monroe county; from James Eights, specimens of organic remains, from the falls of Genesee river and the Helderbergh, salamandra punctata, Montgomery co. and s. erythronata, from Albany; from Stephen V. R. Bleecker, rattles of the crotalus horridus; from Henry W. Snyder, a collection of engravings and drawings, two specimens of agate, from the falls of St. Anthony, on the Mississippi; from Richard Varick De Witt, a living specimen of the testudo ferox, *Pennant*, (trionyx ferox, *Say*,) from Cayuga lake, silver penny of Charles I.; from T. Romeyn Beck, calymene blumenbachii, Ohio, 27 foreign copper coins, polished slab of marble, containing encrinites, from Cherry Valley, petrifactions from do. suite of minerals from Phillipstown and Coldspring, Putnam county; from Thomas Mather, asphaltum, Island of Trinidad; from James Macauley, a collection of mineralogical and geological specimens, from the interior of the state of New-York; from Elisha Putnam, specimen of vegetable matter, approaching peat, Delaware and Chesapeake canal; from a lady, Hamburgh skilling, 1759, (silver) Gibraltar quarto; from M. H. Webster, a catalogue of the minerals discovered in the state of New-York, 28 copper coins and julus tridentatus, from Guilderland; from R. Webster, limulus polyphemus, from Long Island; from De Witt Clinton, a preserved specimen of the hirundo fulva, *Viellot*; from the President, a collection of geological specimens from the route of the Erie Canal; from Joseph Henry, one silver and one copper coin; from John S. Phillips of Philadelphia, 29 species of marine shells.

The Hon. De Witt Clinton communicated a description of the testudo ferox, identifying the living specimen in the possession of the Institute, with that species.

October 13. The following donations were received: From M. H. Webster, four silver coins, vegetable impressions in slate, from Harrisburgh, Penn. two species of testudo and nine petrifactions; from T. R. Beck, stalactite (polished) from Mitchill's cave, Montgomery county, nitrate of soda from South America, sundry specimens of salt made by various processes, at Salina; from R. Webster, a Russian coin, (silver); from H. W. Snyder, eleven silver coins, one copper do. and an egg shell of the ostrich; from Barent S. Boyd, coral from W. Indies; from John Finch, fossil echinus in chalk, from England; from Ebenezer Baldwin, four shells of mother of pearl, Panama, S. A.; from Peter Seton Henry, organic remains in limestone, Amsterdam, Montgomery county; from Joseph Henry, specimens of lithographic printing on satin; from James Eights, trilobites and other organic remains in limestone, Canajoharie, Montgomery county; from Beck, Eights and Webster, sixteen specimens of organic remains from the Helderbergh; from Peter Gansevoort, dried plants, from Franklin county; from Lewis C. Beck, organic remains, from St. Louis, Missouri, Rome, Oneida county, and Rochester, Monroe county.

James E. De Kay, of New-York, communicated a notice of the testudo ferox, *Pennant.*

T. R. Beck read a notice of the nitrate of soda, recently discovered in South America.

October 30. Joseph Henry read a communication on the chemical and mechanical effects of steam, with experiments designed to illustrate the great reduction of temperature in steam of high elasticity when suddenly expanded.

R. V. De Witt read a communication on the history of the steam engine, and exhibited drawings of its various modifications, which he presented to the Institute.

The working model of a Watt and Bolton's steam engine, loaned by Mr. George Birkbeck of New-York, was exhibited, and its different parts explained by Joseph Henry.

November 10. The following donations were received: From Professor Horace Webster, of West Point, suite of minerals, from that place and its vicinity; from James E. De Kay, M. D. of New-York, sixteen copper and three silver coins; copper coins from John Meads, Hezekiah Skinner and M. H. Webster; from James Eights, Pecten opercularis, from England; from Orlando Meads, copper coins and fluate of lime, England.

December 15. The following donations were received: from John James, one silver and fifty-two copper coins;

from C. N. Bement, four species of testudo; from A. S. Webster, galena, banks of the Fever river, N. W. Territory, and carnelian from St. Peters, Mississippi; from Henry I. Linn, memoirs of the Philadelphia Society for Promoting Agriculture, vol. 1st; from Samuel Webster, a sheet of paper, 21 feet long, manufactured at the Brandywine mills, Delaware; from L. C. Beck, dried plants from the vicinity of Albany, and kelp manufactured at Salina; from Simeon De Witt, sulphuric acid from a spring on Grand Island, Niagara river; from Major Delafield, New-York, specimen of the root of a fern, from St. Michaels, Azores, (used in filling matrasses.)

December 29. The following donations were received: From H. W. Snyder, Haytian silver coin; from James Eights, a species of testudo; from M. H. Webster, beryl, (fragment of a large crystal,) Chester, Penn. and other minerals; from Duncan M'Kercher, organic remains, from Livingston county.

M. H. Webster read an account of the processes employed in the manufacture of paper.

L. C. Beck read the first part of a communication on lead and lead mines, including a minute account of the lead mines of the Western States.

January 12, 1825. L. C. Beck read the second part of his communication on the lead mines of the Western States.

A paper (selected) by the late John Shaw of London, on preventing the evaporation of spirits from preparations, was also read. As the author's anatomical pursuits enabled him to test the value of various applications, and as the subject is often a perplexing one to those engaged in the study of natural history, we republish his directions.

"A piece of whalebone, such as is used by the umbrella makers, is to be cut to the diameter of the jar, the two ends are then to be nicely filed down to the shape of the convex surface of the inside of the rim, so that they may rest upon the rim of the bottle, but not project over the edge—to *nicks* in this walebone, the different threads, or still better, horse hairs, supporting the preparation, are to be attached. The jar being now filled to the top, the rim is to be dried, and then smeared with a weak glue. A portion of an ox's bladder, which has been soaked in water for two days, is to be immediately put over the mouth of the jar and is to be bound firmly with twine, which is to be applied in a quantity sufficient to press the bladder tightly upon the lower part of the rim. The jar is then to be exposed to a current of air, that the bladder may dry quickly; the following day, a piece of the sheet lead, which is used to line liquor chests, is to be cut to the size of the top of the bottle, so as to lap over the margin of the rim. It is to be fixed on with glue, and on the succeeding day, the twine by which the first bladder was fixed, is to be taken off; all the surface of the lead and the portion of the first bladder surrounding the neck, are to be rubbed with a thin glue, and then a second piece of bladder is to be applied and secured in the same manner as the first. The preparation may then be set aside, and in a few days the twine is to be taken off and the two portions of bladder are to be neatly cut, about a quarter of an inch from the rim; the twine is then to be waxed and again applied over the bladder. The top and neck of the jar may be covered with a coating of black varnish, which is made by mixing a little lamp black, with the *black japan* used by coach painters."

Annual Meeting, *February* 2, 1825. The Institute met for the election of its officers.

A report was made, stating that the Third Department (that of History and General Literature) had been organized during the present season.

The following officers were elected in the respective Departments.

1st Department.

Simeon De Witt, *President.*
Jonathan Eights, *1st Vice President.*
Joel A. Wing, *2d Vice President.*
William Mayell, *Treasurer.*
Peter Gansevoort, *Corresponding Secretary.*
Henry W. Snyder, *Recording Secretary.*
T. Romeyn Beck,
John Meads,
Charles R. Webster,
James Stevenson,
John Taylor,
Elisha Jenkins,
William A. Tweed Dale,
Philip Hooker,
} *Counsellors.*

2d Department.

Elisha Jenkins, *President.*
T. Romeyn Beck, *1st Vice President.*
Stephen Van Rensselaer, Jr. *2d Vice President.*
Matthew H. Webster, *Corresponding Secretary.*
Joseph P. Mott, *Recording Secretary.*
Duncan M'Kercher, *Treasurer.*
Lewis C. Beck,
Matthew H. Webster,
Richard V. De Witt,
William Cooper,
Joseph Henry,
} *Curators.*

3d Department.
John Chester, *President.*
John W. Yates, 1*st Vice President.*
Alfred Conkling, 2*d Vice President.*
Frederick Matthews, *Corresponding Secretary.*
Richard V. De Witt, *Recording Secretary.*
James Edwards, *Treasurer.*

The Institute then proceeded to the election of officers, when STEPHEN VAN RENSSELAER, was chosen President, and WILLIAM MAYELL, Treasurer.

M. H. Webster read a translation of the 2d chapter of Brongniart on trilobites, being an essay on the relation existing between those fossils and animals known at the present day.

T. Romeyn Beck read a communication on the nature and properties of potassium, accompanied with experiments on that substance.

February 16. The following donations were received: From Dr. William Basset, of Syracuse, (Onondaga county,) a collection of plants from that place; from Dr. James M'-Naughton, copper coins of the present kingdom of the Netherlands; from Professor Hadley, trilobites from Norway, (Herkimer county,) and Williamsville, (Niagara county,) also petrifactions (univalve) from Adams, (Jefferson county); from William Cooper, fourteen copper coins and two silver coins. Among the former was one with the inscription of "Washington, President, 1791," probably among the first struck at the United States mint, and the die of which was ordered to be broken by Gen. Washington; from M. H. Webster, fossil alcyonium, from Wiltshire, (England,) and quills of the Hystrix dorsata; from T. Romeyn Beck, bituminous coal from Tioga, (Pennsylvania.)

Cyrus M. Stebbins, corresponding member, communicated a catalogue of plants, growing in the vicinity of the city of Hudson.

Among the most interesting are the following: Acnida cannabina, Arabis hispida, Arum dracontium, Arum virginicum, Asplenium ruta-muraria, Asplenium montanum, Bromus ciliatus, Cactus opuntia, Campanula acuminata, Cimicifuga serpentaria, Convallaria angustifolia, Convallaria stellata, Corydalis fungosa, Cymbidium hyemale, Dracocephalum virginianum, Gerardia pedicularia, Glycine comosa, Gnaphalium decurrens, Gratiola officinalis, Gratiola pubescens, Helonias dioica, Hydrastis canadensis, Hyoseris amplexicaulis, Kalmia latifolia, Lemna trisulca, Ligusticum levisticum, Ligustrum vulgare, Liriodendron tulipifera, Ludwigia alternifolia, Mimulus alatus, Monotropa procera, Orchis cristata, Orchis lacera, Orobanche uniflora, Orontium aquaticum, Polygala viridescens, Polygala sanguinea, Quercus falcata, Ranunculus reptans, Sarothra gentianoides, Sparganium simplex, Sparganium natans, Stellaria palustris, Heteranthera reniformis, Helianthus strumosus.

T. R. Beck read a communication on the bituminous coal of Tioga, (Pennsylvania.)

A quantity of this mineral was received in January, 1825, from Mr. William De Zeng, of Geneva, with the following account of its topographical situation.

"It is found at and near the south branch of the Tioga river, in the town of Covington, Wayne county, Pennsylvania, and about thirty miles south from Painted Post, and fifty miles south west from Elmira, (both in Tioga county,) in the state of New-York, following the course of the river. It was first discovered about the year 1796, by a Mr. Benjamin Patterson, while crossing the country with a party of German emigrants. In the course of a hunting excursion, he found the coal on the top of a hill, where the wind had blown over trees by the roots."

Though the existence of this coal was thus known for years in the vicinity, yet the abundance of wood throughout the surrounding country, and the want of a good navigable conveyance to distant markets, had hitherto prevented much attention to it. Blacksmiths near the spot have however used it with success for some time.

The colour of the Tioga coal is velvet black, and its lustre shining. It is soft and easily frangible, soiling the fingers. Indeed, in external appearance, it is difficult to distinguish it from what is generally styled Liverpool coal.*

The experiments on its specific gravity and constituents, which were merely approximations, showed a striking similarity between it and the best kinds of British coal.

An ounce in powder was put into an iron retort, and the heat of a portable furnace applied. Gas soon appeared which had the peculiar smell of carburetted hydrogen, when obtained from bituminous coal, although there was less of petroleum floating on the surface than is usually observed. When two gallons were obtained, the process was stopped. Having been passed through water only, it was of course not pure, but it burnt with a yellow flame, occasionally mixed with blue. When washed with lime water, the flame could not be distinguished from that of carburetted hydrogen, made in the common way.

* This name is given to most of the bituminous coal brought to New-York from England.

M. H. Webster read a description of the Hystrix Dorsata, or North American porcupine, with observations on its habits, illustrative of a specimen in the Museum of the Institute.

L. C. Beck continued the reading of his communication on the lead mines of the Western States.

March 2. The following donations were received: From Solomon Van Rensselaer, iron pyrites and bituminous shale from the vicinity of Albany; from M. H. Webster, fossil pectinites from the eastern shore of Chesapeake Bay; fossil turitella from Fort Washington, on the Potomac; specimens of the tertiary formation of Maryland; English silver coin of 1786; from William Cooper, Maryland paper money, 1774.

Simeon De Witt read a communication on the functions of the moon, as deduced from the total eclipse of the sun on the 17th of June, 1806.

Mr. De Witt also presented a drawing illustrative of the appearance of the moon, during the above eclipse.

D. M'Kercher read a paper on the natural history of the black oxide of manganese, and its application in the arts.

M. H. Webster read a description of a specimen of the Unio Crassus of Say, var. Giganteus of Barnes, deposited in the Museum by Dr. L. C. Beck. This specimen is a right valve, and was obtained by the depositor on the banks of the Illinois, where it is found in abundance. When compared with the specimens described by Mr. Barnes, in 6 Silliman's Journal, 118, it appears to be of much more magnificent dimensions. Of these the largest weighed fifteen ounces and measured

2.9 inches in diameter,
4.8 " " length,
7.2 " " breadth;

diameter of posterior cicatrix, one inch, and depth, ¼ of an inch. Dr. Beck's shell measures

3.4 inches in diameter,
4.7 " " length,
7.7 " " breadth;

its posterior cicatrix, 1 inch in diameter, and .3 of an inch in depth—weighs 19 ounces. It was described as being, shell oval, ponderous, rounded behind, angulated before, epidermis blackish brown, interior surface considerably waved, cardinal teeth deeply sulcated, anterior cicatrix wrinkled and striated, naked, pearly white, iridescent.

Mr. Webster also mentioned, that during the present season, Mr. James Eights had found three shells which were believed to be undescribed. One of these has subsequently been described by Mr. Barnes, as U. alasmodontina, and by Mr. Lea, in III Trans. Am. Philos. Soc. as symphynota compressa.

Joseph Henry read a communication on the production of cold by the rarefaction of air, accompanied with experiments.

One of these experiments most strikingly illustrated the great reduction of temperature which takes place on the sudden rarefaction of condensed air. Half a pint of water was poured into a strong copper vessel, of a globular form, and having a capacity of five gallons—a tube of one-fourth of an inch in caliber, with a number of holes near the lower end, and a stop-cock attached to the other extremity, was firmly screwed into the neck of the vessel: the lower end of the tube dipped into the water, but a number of the holes were above the surface of the liquid, so that a jet of air mingled with water might be thrown from the fountain. The apparatus was then charged with condensed air, by means of a powerful condensing pump, until the pressure was estimated at nine atmospheres: during the condensation, the vessel became sensibly warm. After suffering the apparatus to cool down to the temperature of the room, the stop-cock was opened; the air rushed out with great violence, carrying with it a quantity of water, which was instantly converted into snow; after a few seconds, the tube became filled with ice, which almost entirely stopped the current of air. The neck of the vessel was then partially unscrewed, so as to allow the condensed air to rush out around the sides of the screw; in this state, the temperature of the whole atmosphere was so much reduced, as to freeze the remaining water in the vessel; the stop-cock and tube at the same time became so cold, that the fingers adhered to them in the same manner that they are sometimes found to stick to the latch of a door, on an intensely cold morning. This experiment was exhibited to the Institute within six feet of a large stove, and in a room, the temperature of which was not less than eighty degrees of Fahrenheit's thermometer.

March 16. Frederick Matthews read the first part of an historical account of the Literary Institutions of the United States.

L. C. Beck concluded the reading of his paper on lead mines.

In this paper the author commenced with a notice of the various ores of lead, among which the sulphuret (*galena*) was particularly alluded to, as being the richest of all the ores, and in fact the only one that is extensively worked. The subspecies and varieties of galena were briefly described; and the peculiarity observed by Williams in his Natural History of the mineral kingdom, as occurring in the lead mines of Scotland—viz. the absence of fluor spar as a matrix, was stated to be applicable in a good degree to our own country. "Fluor spar, it is true, is found associated with the sulphuret of lead at the Southampton mines; but it is in very small quantities, and by no means constitutes the matrix. It also occurs with galena at Shawneetown in Illinois; but in the extensive lead mines of Missouri and the Upper Missouri, it has not been discovered.

The author next proceeded to a notice of some of the most celebrated lead mines in Europe, viz. those of England, France, Spain and Germany. In the former country, those of Derbyshire are believed to have been worked for centuries. As several blocks of lead have been found in this vicinity with Roman inscriptions,it is supposed that they were wrought by the Romans.

In the United States, the different ores of lead occur in various places in the Atlantic States, from Maine to Georgia. Generally, however, galena predominates, and is the ore which is most profitably and extensively worked. In the states of Maine and Vermont, galena occurs in small quantities in granite and limestone, but no mines have as yet been opened. In Massachusetts a mine was opened at Southampton, eight miles southwest from Northampton, and about the same distance from the Connecticut river, some time previous to the revolutionary war, but it was neglected for upwards of forty years. It was again opened in 1809. Professor Silliman visited this mine in 1810, and published an account of it in Bruce's Minerological Journal. A more recent account of it has been given by Prof. Hitchcock in the 6th volume of the American Journal of Science. In Connecticut, galena occurs at Middletown and at Southington, associated with pyritous copper, in a gangue of quartz and sulphate of barytes. The mines which were formerly opened at both these places, have since been abandoned. At Huntington, in the same state, this ore of lead also occurs in a similar gangue, and is worked principally for the silver which it contains, and which it is said amounts to 3½ per cent. In New-York, the ores of lead are not very widely disseminated. Galena, however, occurs in many places, and a mine has been opened in Columbia county. In Pennsylvania, at Perkiomen, is a mine upon the old red sandstone formation, in which the galena is accompanied by the carbonate, phosphate, molybdate, and sulphate of lead, yellow blende, several ores of copper, and the scaly red oxide of iron. In Virginia, mines of lead are found on the Great Kenhawa, about 25 miles from the southern boundary of the state, in which, according to Mr. Jefferson, the ore is accompanied with a small proportion of silver, and yields from 50 to 80 per cent of pure lead.

In passing westward, several localities of the sulphuret of lead might be enumerated in the state of Ohio, Indiana, Kentucky and Tennessee; but in neither of these is it found in sufficient quantities to warrant mining operations. In Illinois, a short distance below Shawneetown, a lead vein occurs in a gangue of fluor spar of great variety and beauty—a circumstance, as has already been remarked, somewhat uncommon in our country. The ore is the common galena, of singular richness, and entirely destitute of silver.

The chief object of the present communication being a notice of the valuable lead mines of the Upper Mississippi, a particular description of them was prefaced by a rapid sketch of their history, which in fact forms an epitome of that of the whole country bordering on the "Father of Rivers."

"After the discovery of the Mississippi river by the enterprising La Salle, settlements were soon formed on its eastern banks, to which indeed they were for many years confined. Here, engaged in the quiet pursuit of agriculture, the inhabitants soon established amicable relations with the savages. But this state of things was destined to be of short duration. The infatuation which in the beginning of the 18th century spread all over Europe, found its way also into the peaceful and secluded settlements of the Mississippi. The dazzling prospect of discovering the precious metals, was fatal to every other pursuit, and created in the minds of men a rage for adventure—a thirst for speculation."

"Such was the situation of the colony of Louisiana, and such the desires by which the French nation in particular were actuated at the period just mentioned. A report having been raised by a few straggling adventurers, that the precious metals existed west of the Mississippi, an expedition was prepared by the governor of the colony, with a view to ascertain upon what it was founded. This expedition visited the mines on the Upper Mississippi, erected a fort, and commenced a settlement; but the prejudices of the savages were soon excited, and the French found it prudent to abandon that part of the country. They next turned their attention to the Missouri, where, though we are not accurately informed what mineral riches they discovered, it is probable they did not answer the sanguine expectations of the explorers."

"The wars in Europe engaging now the whole attention and resources of France, the colony of Louisiana was reduced to the most embarrassed situation; and the king determining to keep it out of the hands of his enemies, in 1712 granted it by letters patent to Anthony Crozat. In this grant were included the propriety of the mines and minerals he should discover; the king, however, reserving to himself the fifth part of all the bullion of gold and silver, and one tenth of the produce of all other mines."

"The first effective mining operations were conducted by Philip Renault, who located himself about the year 1720, near Fort Chartres; from which he sent miners into various parts of the surrounding country. The result of these frequent explorations was the discovery of those extensive mines at Potosi and on the St. Francois river; and being now satisfied that no silver would be discovered, Renault turned his whole attention to the smelting of lead—which, for some time, appears to have been vigorously prosecuted."

"The complete failure of the Mississippi scheme, and the return to France of Renault and most of his workmen in 1772, put a stop for a long time to the mining operations. At the close of the last century, they excited the attention of the Americans; and from that time until within a few years since, they were extensively and profitably worked. But these have now been abandoned for the richer and more extensive veins on St. Peter's and Fevre rivers."

At Potosi the ore of lead is found imbedded in a stratum of stiff marly clay, varying in colour from a light brown to a deep red. It is also found in the limestone upon which this bed of marl reposes. The accompanying minerals are sulphate of barytes, calcareous spar, radiated quartz, (called by the miners "mineral blossom,") iron pyrites, sulphuret of zinc, and carbonate of lead.

This vein of galena probably extends, without much interruption, from the locality just mentioned, nearly 600 miles in a northerly direction, being about 20 miles in breadth from east to west. The most northern point at which the ore is worked is at Dubuque's mines, 456 miles above St. Louis, on the west bank of the Mississippi. This mine, which was probably long known to the Indians, was visited by Julian Dubuque, a Spaniard, in 1787, who purchased from the Foxes a tract in which the mine was included. Very little however was known concerning it until 1820, when it was visited by Mr. Schoolcraft, who represented the ore to be very rich, and to possess nearly the same geological relations as that of Potosi.

The author next adverted to the dispute concerning the geological character of this ore. Professor Keating, in his Narrative of the Expedition of Major Long, maintains, with some appearance of truth, that it is not in its original site, but that throughout this whole extent, the galena is out of place. Setting aside the evidence of Mr. Schoolcraft, and that derived from personal observation, that the ore is often found in the transition limestone; the fact that this immense body of lead, unparalleled in the world, should be found as an accidental deposit, would be quite too startling to the geologist. The clay above mentioned always reposes upon the transition limestone, and there is no doubt that it has been formed by the disintegration of the rock which formerly constituted the bed of the ore. The abundance of the mineral so near the surface, has prevented the sinking of shafts, except in a few instances; and hence it has been generally supposed not to exist at all in the rock stratum—a mistake into which Mr. Keating, in common with others, has fallen, from not having personally examined these mines: Hearsay evidence, books, or even specimens, can seldom be depended on in matters of this sort.

The most extensive mining operations at present conducted on the Mississippi, are those of Fevre river, a short distance below Dubuque's mines. These operations commenced in 1822; previous to which, however, the mines had been quite extensively worked by the Indians.

Between the northern and southern points heretofore described, galena has been found in various places. But in consequence of the vast quantity of the mineral found at the upper mines, and the ease with which it can be obtained and brought to market, few researches have been made at the intermediate places.

In general, the galena of this region yields from 60 to 75 per cent of pure lead, the smelting of which is conducted in the simplest manner. Indeed, when compared with similar operations in other countries, they may be said to be altogether crude and unscientific. Yet such are the abundance and richness of the ore, that many millions of pounds of the purest lead are annually sent down the Mississippi to New-Orleans, and from thence to the various other markets of the U. States.

A number of specimens of agricultural products presented to the Agricultural Society of the county of Albany, for its premiums, in February 1825, were exhibited by Mr. Henry W. Snyder.

April 13. The following donations were received: From E. C. Genet, a copy of his address, delivered before the Rensselaer County Agricultural Society, and also of his address before the Society for the promotion of Useful Arts, delivered February 5, 1824.

Mr. Genet also read a communication on the application of steam to the aerial navigation of balloons. (This communication, in an enlarged form, has been published by the author, under the title of "*Memorial on the upward forces of Fluids, &c.* 8vo. 1825.")

Mr. S. De Witt read a paper on the application of soap alumina, to the manufacture of a water proof blacking.

In this communication the author stated that in looking over Gregory's Dictionary of the Arts and Sciences, he had noticed the following paragraph, under the article Soap. "*Soap Alumina* may be formed by mixing together solutions of alum and common soap. It is a flexible, soft substance, which retains its suppleness and tenacity when dry. It is insoluble in alcohol, water and oil. Heat easily melts it and reduces it to a beautiful, transparent, yellowish mass."

Having for some time suffered injury from shoes, made either too tight or of rigid leather, Mr. De Witt had recourse to the use of buckskin shoes. They answered his wishes, but they were found to be pervious to water, and their appearance was very soon injured by stains. Various expedients to obviate this were unsuccessful, until the use of the soap alumina occurred to him. The suppleness of the leather and its proper appearance were found to be preserved, and it was also made water proof.

The compound was prepared, by taking water, saturated with alum, and slicing into it from a common bar of soap, two or three inches of its length. This was then put on the fire to boil, but the soap, though it melted, did not incorporate with the mass. It was found necessary to beat the mixture together, as is done by cooks, in beating eggs. The boiling was then continued until the evaporation of the water left the composition of a proper consistence. A quantity of ivory black was then thoroughly mixed with it.

After treating the buckskin shoes for some time with it, they could not be distinguished from the finest leather, and they were rendered impervious to water, by placing a layer of the soap between the under and upper soals.

A committee was appointed to prepare a detailed report of the proceedings of the Institute since its formation, with a statement of the donations to the Library and Museum.

April 27. The following donations were received: From Rev. John Chester, Charles R. Webster and Joseph Henry, silver and copper coins; from T. Romeyn Beck, the Commission of Henry Glen, Esq. as Town Clerk of the town of Schenectady, dated Feb. 27, 1767, and signed by Sir Henry

Moore, then Governor of the colony; from M. H. Webster, fibrolite from Pennsylvania, a snake preserved from Tonnewanta creek, Unio, and a specimen of stained glass from the Old Dutch Church, Albany; from James Ferguson, corresponding member, asbestus from Isle St. Joseph, River St. Mary, and sulphate of strontian, from Moss Island, Lake Erie; from James Eights, eleven specimens of minerals from Massachusetts and Rhode Island; 12 specimens of fresh water shells from the vicinity of Albany, of the genera Unio, Helix, Planorbis, Paludina and Cyclas; from L. C. Beck, fourteen specimens of shells found in the marl of Salina, Onondaga county, of the genera Unio, Anadonta, Helix, Planorbis, Melania, Lymnæa, Physa, and Cyclas; Geological specimens from Onondaga county; various specimens of salt, made by solar evaporation, by evaporation with artificial heat, and by boiling, at Montezuma, Salina and Syracuse, with specimens of residua, left after making salt; fossil shells from Genessee river and the vicinity of Rome, Oneida county.

A box, containing 38 specimens of wool from France, was exhibited, illustrative of the utility of crossing breeds, in improving the quality of that staple.

Mr. Simeon De Witt presented a table of variations of the magnetic needle, at Boston, Falmouth and Penobscot, from 1672 to 1800, which he had obtained from the late General Schuyler. (See Transactions, vol. 1, Art. 1.)

Lewis C. Beck read "An account of the Salt Springs at Salina, Onondaga county, with a chemical examination of the water, and of several varieties of salt manufactured at Salina and Syracuse." This paper has been published in the New-York Medical and Physical Journal, vol. 5.

Lewis C. Beck also exhibited experiments, illustrative of the nature and properties of pure alcohol, when deprived of all the water that usually accompanies it.

The Rev. John Chester was appointed to deliver the annual address.

June 8. The following donations were received: From John S. Phillips, Philadelphia, fossils from the tertiary formation in France, including Dentalium, Oliva, Rostellaria, Echinus, and Chama; specimen of the tertiary formation and helix algira (recent) from France; Belemnites from Pennsylvania; from Joseph Henry and M. H. Webster, Gorgonias; from the Academy of Natural Sciences, Philadelphia; two copies of its annual report, presented January, 1825; from Joseph P. Mott, copper coins; from John Finch, 25 specimens of fossil shells, from the tertiary formation of Maryland, with specimens of the formation. Most of the shells are described and figured by Mr. Say, in the Journal of the Academy of Natural Sciences, vol. 4; from Dr. Wendell, plates in Natural History from Rees' Cyclopedia; from Lieut. Birdsall, U. S. army, Columba Migratoria, (stuffed) and a large sponge from the Pacific.

The committee appointed at a previous meeting, reported the condition of the Museum and Library.

From this it appears that since the formation of the Institute, 89 mineralogical specimens, 45 geological, 103 of organic remains, and 338 zoological, had been added.—Total, 930. Also, several collections of dried plants, with specimens in the arts, and 325 silver and copper coins, with 5 specimens of continental paper money. To the Library, only 16 volumes and 6 pamphlets had been added.

July 1. The following donations were received: From Harman V. Hart, an ornamented Sioux pipe; from W. H. Bogart, a Canadian copper coin; from J. Trumbull Backus, cloth made from the bark of a tree in the Sandwich Islands, worn by the natives; from J. Ogden Dey, an engraved Map of the northern part of the state of New-York; from E. Van Alen, a map of the city of Albany; from Lewis C. Beck, several Indian ornaments, used by the Pottawatamies; from R. V. De Witt, an Indian tomahawk; from C. R. Webster, an engraved map of the city of New-York, made in 1767; from G. Seely, a specimen of Cistuda, Albany.

The Rev. Dr. Chester, according to appointment, delivered the Annual Address, before a large and respectable audience, in the hall of the Academy. The subject was, the intimate union that exists between the promotion of religion and of science and literature, and the duty of all, as christians and patriots, to promote those important objects. The author declined the request of the Society for its publication.

Annual Meeting, *February* 1, 1826. The following officers were elected in the respective departments.

1*st Department.*

Simeon De Witt, *President.*
Jonathan Eights, 1*st Vice President.*
Joel A. Wing, 2*d Vice President.*
Henry W. Snyder, *Recording Secretary.*
Peter Gansevoort, *Corresponding Secretary.*
William Mayell, *Treasurer.*

T. Romeyn Beck, James Stevenson, Matthew Gregory, John Tayler, Charles R. Webster, John S. Walsh, Peter Wendell, Edmund C. Genet, Hugh Robison, *Counsellors.*

2d Department.

Elisha Jenkins, *President.*
T. Romeyn Beck, *1st Vice President.*
Stephen Van Rensselaer, *2d Vice President.*
Matthew H. Webster, *Corresponding Secretary.*
Richard V. De Witt, *Recording Secretary.*
Duncan M'Kercher, *Treasurer.*
M. H. Webster, R. V. De Witt, William Cooper, D. M'Kercher, Ebenezer Emmons, *Curators.*

No election was held in the Third Department, and the officers of last year consequently continued in office.

Stephen Van Rensselaer was elected President, and William Mayell, Treasurer.

The Curators reported, that during the recess of the Institute, the following donations had been received: From Peter S. Henry, Gorgonia from Georgia; from Gideon Hawley, an engraved map of the Albany pier and basin; from Joseph P. Mott, a collection of West India shells, and the annual reports of the New York Hospital, and Bloomingdale Lunatic Asylum for 1824; from the author, Memoire sur la fabrique du Magasin central des inventions nouvelles, par Q. Durand, Paris; from L. C. Beck, Boletus ignarius, from Pittsfield, Mass.; Tremolite from Windsor, Vermont; Encrinites and Septaria, from Rochester; from James E. Jones, an English silver coin, (George I.); from David Hosack, M. D. his Medical Essays, 2 vol. 8vo. New-York, 1824; from William M'Culloch, copper coins and continental money; from George W. Jewett, Hezekiah Skinner, William Stewart, James M'-Glashan, Rensselaer Westerlo and Dr. Ebenezer Emmons, forty-two copper coins; from Rev. Mr. Leonard, E. W. Skinner and Silas Bulkley, continental and colonial paper money; from Charles Baldwin of New-York, Scolopendra Morsitans, from Carthagena, (South America,) and mother of pearl shell from the East Indies; from William G. Ver Planck, two specimens of Lacerta, from Mount Pleasant, Westchester county; from Stephen Van Rensselaer, jun., crystallized chromate of iron, from Baltimore; from Dr. Jacob Sherwood, of Newport, N. Y. orthoceratite in limestone, from the same place; from Warner Daniels, calcareous concretion, from a cave in Clarendon, Vermont, and a specimen of coral; from Dr. W. Willoughby, of Newport, N. Y. Talpa Europea preserved, recent shells from the Niagara river, and madreporite from the same; from Rev. John Ludlow, peat from New-Jersey; from T. R. Beek, orthoceratite in limestone, from Trenton Falls; two quartz crystals, containing water from Newport, N. Y.; quartz rock, containing drusy cavities, with some of the crystals coloured by anthracite; trilobite and other petrifactions from do.; also, Stewart's Elements of Natural History, 2 vols. 8vo. From William E. Greene, graphite from Worcester, Mass.; from Professor Douglass, of West Point, a large collection of minerals and fossils from the vicinity of Lake Huron and Lake Superior, also, several minerals from West Point; from James Gough, a Haytien silver coin (Petion); from James Geddes of Geddesburgh, iron ore from St. Lawrence county; asbestus with tremolite, from De Kalb, N. Y.; from Philip S. Parker, dogtooth spar with strontian and echinite, from Lockport; from James M'Glashan, and Dr. Ebenezer Emmons, five silver coins; from Edward Livingston, galena in quartz, from Wolfhill Mass.; from James M. Gould, cloth made from the bark of a tree, worn by the Indians on the river Sinu, (S. America,) also the saw of a saw fish, from Carthagena; from James Eights, 86 species of insects; from Charles A. Clinton, a case for the above insects, also, a mountain hawk preserved, with a case; from Charles D. Gillepsie, madreporite from Wiltshire, (Eng.); from Joseph W. Lee, of Butternutts, favosite from Fenner, (Madison county); from George W. Clinton, 25 specimens of minerals from this state, principally those found at Ticonderoga and Rogers' Rock; from Albert Sinclair, of Jamaica, (West Indies) dogtooth spar, from Lockport; from Henry W. Snyder, trilobites, (asaphus and calymene,) ammonites and productus, from Trenton Falls, also, petrifactions from Paris, (Oneida county;) from Paul Hochstrasser, petrified wood, with tufa and shells, from Chitteningo; from the New-York Lyceum of Natural History, Annals of the Lyceum, vol. 1, No. 10; from Samuel L. Mitchill, M. D. New-York, memorandum of articles contained in his Museum; from Charles S. Parker of Liverpool, (England) a collection of foreign plants from Europe and the West Indies; also, a proof engraving of the Parkeria pterioides of Hooker, discovered by Mr. Parker, in British Guiana;

from James Elkington, the proprietor, feathers of the condor, lately exhibited in this city; from Dr. E. Emmons, eight ancient Roman coins, obtained at Syracuse, in the Island of Sicily; 8 specimens of crania of animals, and 22 insects; from Benjamin Atkins, crystallized garnets and geodiferous quartz, from Saratoga Springs; snowy gypsum from Niagara, and pearl spar and gypsum in their matrix, from Lockport; from William Martin, a species of moss, growing on a maple, from Amsterdam, N. Y.; from James Geddes, amber found 34 feet below the surface of the ground, in the deep cutting of the Delaware and Chesapeake canal; from Simeon De Witt, a fossil gryphite and hæmatitic iron ore, from the same locality as the last; from Harvey Meech, a pigeon hawk, preserved. The above being an addition to the cabinet of 339 specimens, exclusive of the collection of plants.

The Curators also reported, that they had purchased a living specimen of the Proteus (*menobranchus lateralis* of Harlan) of Lake Erie, but that it survived only a few days, and is now preserved in spirits.

February 15. The following donations were received: from Samuel B. Barlow, spodumene? from Granville, Mass. and several copper coins; from James Eights, an ancient Roman, and a Nova Scotia coin; from George W. Clinton, alum ore and iron pyrites, from Mount Independence; from T. Romeyn Beck, a meteorological table for the year 1825, kept at Albany; from the New-York Lyceum, Annals of do. No. 11; from James E. De Kay, M. D. of New-York, the following pamphlets—Discours et Rapports lus dans la seance generale annuelle de Societè Asiatique de Paris, 1825–Sixieme Exposition publique de Societé de Flore, Bruxelles, 1825—Societè de Geographie. Questions proposées aux voyageurs, &c. Paris, 1824—Assembleé generale annuelle de la Societé de la Morale Chretienne, Paris, 1825—Instruction sur l'usage du vin de Kinkina de G. Seguin, Paris, 1824—Rapport fait a' l' Academie des Sciences de Paris, 1829, par Cuvier sur l' ouvrage de M. J. V. Audoin sur le thorax des animals articulees, Paris, 1823; from the Literary and Philosophical Society, of New-York, volume 2 Part 1 of its Transactions.

A communication was read from James Geddes, corresponding member, on the geological features of the south side of the Ontario Valley, (see Transactions, vol. 1, Art. VIII.)

A communication, from George W. Featherstonhaugh, on the principles of the natural draught of horses, was read.

The practical importance of this paper to the commercial part of the community, induced the Institute to direct its publication in one of the newspapers of this city. Its value will warrant its republication at this time.

"When the Canal was first going into operation, it was frequently observed, that travelling by land would be so much diminished, that the consumption of horses would rapidly decrease. The reverse is now said to have taken place; and that horses are worn out in so improvident a manner upon the canal, that the demand for them is greater than it has ever been. The great waste of these animals and their consequent sufferings, has fallen under the observation of many intelligent and humane persons. It is not the interest of the owners of the animals to hurry them on to premature destruction, and in most cases where this is done, it is owing to an ignorance of the principles, which should govern the adjustment of load and speed. There is a maximum of useful effect, which a horse can produce without wasting himself prematurely. Where this is exceeded it must be at the expense of his constitution. These animals, so very serviceable to us, are certainly entitled to kindness at our hands, at least; and although it is sometimes important that property should be transported with something beyond natural speed, yet in most cases, the property which is conducted upon the canal, cannot require the destruction of the agents which perform that service.

This paper aims at explaining the principles upon which their traction depends. The authorities which have been consulted for results of experiments, are the most approved practical writers on the subject: and the sole aim of the communication is to do some good to the animals, as well as to their owners.

The body of a horse constitutes his natural weight, and it is by his muscular power he is enabled to move it; assuming the average weight of a useful horse to be half a ton, and dividing his muscular power into eight parts, each part would have 140 lbs. to move; of which one is for pressure of the load, the other seven for keeping up his action and weight. In rising an acclivity where his own gravity is equal to the force he exerts for the load, he must overcome that also, and use two parts out of eight of his muscular force; of which he then has only six parts left for his action and weight. The evidence of this is seen in the exertion which he makes upon such occasions. But before the resistance he has to overcome is further spoken of, it will be useful to explain that term. When a body is in motion, its progress is retarded by the pressure of its own weight to the surface it moves upon. The friction or resistance thus occasioned, varies with the nature of the surfaces. Upon iron rail roads, it is estimated at one two hundredth of the weight of the load a horse can draw on wheels, where the load and the speed are adjusted. To overcome this resistance, which varies from a hundred to a hundred and fifty, and keep up the motion unimpaired, a power must be applied equal to that of the resistance. Wherefore it is, that when an additional weight is attached behind him, to be moved by traction on a level, a part of his natural weight is pressed against the collar and traces, sufficient to overcome the resistance of the load. His remaining muscular force is employed to keep up the motion thus produced. The natural power of the animal thus divides itself into pressure to move his load, and muscular action to move himself in this state. The total power or strength of every horse having natural limits, it is evident, if the pressure is increased beyond its just limit, it must be at the expense of the muscular power, which will thus be untimely exhausted, and the utility of the animal destroyed before its natural period has expired. At 20 miles a day, he may drag a certain load every day for many years: if made to exceed that amount of labor he will be sooner worn out. We are therefore so to use a horse as to get as much beneficial effect from him as we can, at a speed which will not injure him. Hence arise the important inquiries; what ought to be every day's duration and extent of a horse's work, and how much load ought he to carry? It is found by calculation, that the maximum of speed of an unloaded horse for 1 hour in every day is 14. 7m. on a level; and that his maximum of speed when loaded, is one half of his unloaded velocity. Thus if an unloaded horse can gallop one hour every day, at the rate of 14 miles and seven tenths, he can draw his load half of that distance in the same time.

The following table, extracted from Wood, gives the law of the decrease of speed of an unloaded horse at his maximum speed.

One hour in every day,			m. 14 7
2	do	do	10 4
3	do	do	8 5
4	do	do	7 3
5	do	do	6 6
6	do	do	6 0
7	do	do	5 5
8	do	do	5 2
10	do	do	4 6

This computation is based upon the natural powers of a useful horse, and shows the performances he can, when unloaded, do every day without injuring himself. Thus, although at his greatest speed for one hour, he can go 14. 7. m. still if his maximum speed is kept up for 6 hours every day, it will be at the rate only of 6 miles an hour; and if 10 hours, only at the rate of 4. 6 m. When loaded, one half of that distance is to be taken; wherefore if a loaded horse is made to go six hours a day, his limit is 3 miles an hour; if 10 hours, his limit is 2 miles and a fraction an hour.

It appears from a range of experiments, that the distance limited by natural exertion, is 20 miles a day for every day, for beneficial effect: this may be performed in ten hours, or any other period not less than two hours. It is stated by that scientific and practical writer, Wood, that heavy horses with a load, fall into the rate of two miles an hour as their natural pace, and that lighter horses, under the same circumstances, increase that rate. This would seem to point to the conclusion that the respective rate of horses is as their own weights. It consists with observation that heavy horses find it convenient to move at a slow pace: on the other hand, some lighter animals of a keen spirit, are with difficulty brought to a moderate pace, when their load is not more than a just one.—Whilst it is admitted that 20 miles a day for every day, may be considered the average distance for beneficial effect; the longest period of continued action, or ten hours at two miles an hour, is thought to have a wearying and stupifying effect on many animals of a keen temper; a speed equal to four miles an hour for five hours every day, is thought to produce premature stiffness of the joints. Tredgold, a writer of much investigation, thinks the average distance of 20 miles for every day, is best divided into six hours; working three hours, and then, after an interval of rest, working three hours more.—This would furnish a rule of three and one third miles an hour.

As the object of this paper is to awaken attention to the abuses of horses in canal labor, in order to demonstrate the consequences which result from it, a brief comparison will be instituted of the nature of the motion on fluid and solid surfaces. And the demonstration will be clearer if we examine the nature of motion on rail roads.

The great velocity of motion which can be given to bodies moving upon a plane of ice, by a power comparatively small to that required to produce similar effects on ordinary roads, is familiar to all men. These principles being constant, their application through the intervention of other materials, such as wood and iron, has been resorted to, with a view to produce the same effects upon artificial roads. The best adaptation of them is found to be upon the smooth surface which iron affords. On an iron road properly constructed, it is found that the moving power, whether animal or mechanical, has little more friction to overcome than that of the axis. The friction therefore remaining always the same, it is evident that an increase of velocity may be obtained, without a violent exertion of the moving power. That is to say, when a horse on a rail road can draw ten tons comfortably at the rate of 3½ miles an hour for six hours every day, if his motion is increased to five miles an hour for four hours every day, his consequent wear and tear will be owing entirely to the change of pace; and will correspond to that natural wear and tear induced by the same change of pace in all situations. It is not so on a canal. The force which the moving power has here to overcome, is not friction, but resistance of the fluid. This resistance increases nearly as the square of the velocity. All writers concur in this fact. Where the speed on the canal is not greater than three miles an hour, the resistance of the fluid does not exceed the friction of the rail road; but as the speed on a canal is increased, and particularly on a narrow one, the resistance is found to increase, nearly as the square of the increase of the speed. Supposing the horse to be drawing his load on the canal, at the rate of two miles an hour, the resistance at that rate assumed, would be 150 lbs., it is evident, since by doubling the speed the resistance is quadrupled, that by increasing his speed to four miles an hour, the resistance is increased four times, and that the horse has, instead of 150 lbs., no less than 600 lbs. to overcome; and if the speed is further increased to six miles, the resistance is increased beyond the sum total of the horse's powers, which are seldom equal to 1350 lbs. Here is one great advantage of rail roads over canals. On the former, if the distance for the day is not increased, the speed may be augmented from two miles an hour upwards, without inconvenience. On the latter, every trifling increase of speed accelerates the destruction of the animal; which at any rate of speed in canal labor is at some disadvantage, the line of friction being oblique to the direction of his motion. It results from the calculations on this subject, that where the rate of motion on a canal does not exceed two miles an hour, for 20 miles every day, a horse will draw three times as great a load as he can on a rail road; but where the speed is required to be at the rate of six miles an hour, for 20 miles every day, one horse on a rail road will do the work of three upon a canal.

It may be perceived therefore that the beneficial effects of a horse's labor, result from the systematic observance of the law of motion, and of his natural powers. It appears that where load and speed are properly adjusted, a horse will do his work comfortably every day for a distance of 20 miles. That this distance with the same load cannot be increased without injuring him. That upon a canal, a horse may drag near 30 tons, for 20 miles every day, at the rate of two miles an hour; but that if his speed with that load is increased to four miles an hour, the resistance is quadrupled, and he is in fact made to do, whilst at that pace, the work of four horses. It is for the owners of those animals which perform canal labor, to see that the work is done systematically, and after some rule, consistent with the consideration they owe to the animals which labor for them, in the which also their own interests are involved."

A communication (printed) from Professor Vanuxem, of South Carolina College, containing a mineralogical and geological examination of the state of South Carolina, was read.

Mr. M. H. Webster read a translation of Baron Cuvier's report made to the Academy of Sciences, concerning M. Audouin's work on the comparative anatomy of Insects.

March 1. The following donations were received:—From the Board of Agriculture of the state of New-York, through Jesse Buel, secretary, memoirs of the board of agriculture, vols. 2 and 3: From the American Philosophical Society, Philadelphia, transactions of said society, vol. 2, new series.

Dr. L. C. Beck read a communication on some new species of the genus Rosa.

A communication was received from the Hon. Stephen Van Rensselaer, president, being a table of meteorological observations kept at Washington, for 1825, by Rev. Robert Little.

Dr. T. Romeyn Beck read a communication on insurance upon lives, as a branch of medical jurisprudence, (published in the New-York Medical and Physical Journal, vol. 5.)

March 15. A communication from George W. Clinton, was read, being a description of the Hawk in the cabinet of the Institute.

The only species to which this bird can be referred, are the Falco Lagopus or F. Sancti-Johannis of Wilson. It differs in some respects from the description of both of these, but it is probable that the great variety of plumage, so common in this genus, may explain the variation.

This bird measures from the tip of one wing to the tip of the other, three feet eight inches; from the head to the extremity of the tail feathers, twenty-two inches; its height is sixteen inches. It is known in the vicinity of this city by the name of the "*Island Hawk*," probably from its searching its prey in the low moist grounds near the river.

April 5. The following donations were received:—Bituminous coal from Nova Scotia, from George W. Featherstonhaugh; favosite from Olean Point, and anadonta marginata, Erie canal, from James Geddes; cast of an encrinite, from the upper part of the Susquehannah, from Joseph Henry; two copies of a "Memorial on the upward forces of the fluids, &c." from Edmond C. Genet, the author.

Dr. T. Romeyn Beck made some remarks on the analysis of the impure limestone (hydraulic lime) used in the construction of the locks of the Erie canal.

This substance is found in large quantities in the western part of the state of New-York. Its properties attracted attention shortly after the commencement of the excavations on the western route of the canal, and at the request of several gentlemen, Professor Hadley undertook a hasty analysis of it. The constituents noticed by him, were as follows:—

Carbonic acid	35.05
Lime	25.
Silex	15.05
Alumine	16.05
Water	5.04
Oxide of iron	2.02
	98.21*

Mr. Henry Seybert published an analysis of this same substance, in the second volume of the Transactions of the American Philosophical Society, new series, p. 229, viz:

Carbonic acid	39.3
Silica	11.7
Alumine	2.7
Peroxide of iron	1.5
Lime	25.0
Magnesia	17.8
Moisture	1.5
	99.5

Mr. Seybert remarks, that it is evident that Dr. Hadley overlooked the *magnesia* which forms an essential constituent of this mineral.

The object of the remarks of Dr. B. was to introduce the following observations of Professor Eaton, contained in his Geological Survey of Albany county, p. 20. "We analyzed a specimen (of water limestone) from the Helderbergh, but by a method which is not deemed the most accurate, and

* Silliman's Journal, vol. 3. p. 231.

found 25 per cent of carbonic acid, 26 lime, 28 silex, 2 water, 18 alumine and magnesia, and 1 iron. We did not determine the proportions between the alumine and magnesia. As there is about four per cent of carbonic acid unaccounted for, is it not probable that it is combined with the magnesia. And may not the same conjecture be hazarded respecting the western water limestone, analyzed by Professor Hadley, in which there was also some carbonic acid unaccounted for?"

Mr. Seybert's paper was read in July 1822. The geological survey was published in 1820.

Several specimens of native carburetted hydrogen gas from Fredonia and Portland, Chautauque county, were presented by Dr. Elial T. Foote and Mr. Joseph Henry. On passing it through the apparatus used in burning the artificial gas, it was found to yield a beautiful clear light, corresponding in colour with the purest forms of manufactured carburetted hydrogen.

April 19. The following donations were received:— From his Excellency Governor Clinton, a bottle of the water used at the grand canal celebration; from James La Grange, (a venerable citizen now deceased, 1830) the speech of George the Third to parliament, delivered November 30, 1774. This was printed at Albany, February 9, 1775, and is curious from its probably being the earliest specimen of printing done in Albany, that is now extant. It purports to be "printed and sold at the printing-office in Barrack-street," (now Chapel-street); from Simeon De Witt, two specimens of hydraulic mortar, composed of equal parts of water limestone and sea-sand, the one hardened under water, and the other hardened in the air, also a specimen of flat coral; from T. Romeyn Beck, a collection of fossils and minerals, from the vicinity of Liverpool, (Eng.) received through Dr. Wetherill, of that place. Among these are the following: Several specimens of ammonites, belemnites, nautilus, pecten, arca and cardium, also jet, and alum shale.

Mr. Richard V. De Witt read a translation of the Baron De Sacy's annual address before the Asiatic Society of Paris.

1827, *January* 22. The curators and librarian reported the receipt of the following donations during the recess of the society; from L. C. Beck, native muriate of soda, from Cheshire, (Eng.); from Messrs. Webster and Eights, shell marl and various petrifactions from Bethlehem, Albany county; from Oran E. Morris, a fossil helix, found in the state of Ohio; from Elkanah Watson, anthracite in quartz, from Poughkeepsie; from the author, a manual of mineralogy and geology, by Ebenezer Emmons, M. D., Albany 1826; from James

Eights, 117 species of insects collected in the vicinity of Albany; from Leverett Cruttenden, the head of the groper fish from the West Indies; from Dr. Peter Wendell, John C. Backus, Warner Daniels, Charles R. Webster and William Caldwell, copper coins; from Dr. Emmons, two Indian axes, found in Connecticut; from N. F. Beck, bituminous coal from Tryon county, (Pennsylvania); from Professor Vanuxem, Zircon in crystals, from Buncombe county, North Carolina; from Daniel Mitchell, a dress of an Indian chief, from the coast of California, made of various parts of the seal; from George W. Clinton, the cranium of an alligator from the south, orthoceratites in sand stone, from the Sault de St. Marie, cornu-madreporites in limestone, from the Erie canal, near Buffalo, siren lacertina (menobranchus lateralis*) from Lake Erie, six species of salamandra from the state of New-York; from Richard M'Michael, a specimen of coral; from the Lyceum of Natural History (New-York) the concluding numbers of the 1st vol. of its Annals, and Nos. 1, 2 and 3 of vol. 2; from the Chevalier Kirckhoff, of Antwerp, a treatise by himself, entitled "Verhandeling over de Dampkringslucht, &c. Hoorn, 1826"; from Chas. S. Parker, Esq. of Liverpool, (Eng.) Chalmers' Algæ Scoticæ, 1st vol. in folio, fruit of the Bignonia corymbifera, from Demarara, fruit of the Barringtonia speciosa, from Prince Edward's Island, fruit of the Manacaria saccifera and Dipterix odorata, from Guiana, asterias from the British seas, Echinus esculentus, trochus zizyphinus, mytilus edulis and anatinus, cardium edule, buccinum reticulatum, solen ensis, Tellina radula, Venus decussata, mactra subtruncata from Scotland, helix ovalis from Trinidad, and also a collection of British plants; from Stephen Sewell, Esq. of Montreal, a map of the city of Montreal, by John Adams, 1825, in three large sheets; from Richard Webster, a specimen (dried) of the bill fish of Lake Erie; from R. V. De Witt, a horn obtained in excavating the cellar of the building corner of Eagle and State-streets, Albany—this horn is about three feet long and appears to be of the antelope; also, a fragment of the sheathing of a ship perforated by worms; from Anson H. Center, two specimens of cancer from the sea shore; from T. Romeyn Beck, a bottle containing water from the St. Lawrence river, cordage made from the wood of the palm tree, (this was made in Canada in 1824,) breccia from the Island of St. Helens, Montreal; marble, black and dove coloured from Missisqui bay, agate from the shores of Lake Huron, agate and opal from Gaspe, (Lower Canada,) quartz crystals from Cape Diamond, Quebec, carbonate of lime, containing

* Necturus maculosus of Rafinesque.

shells, from Montreal, dog-tooth spar and crystals of quartz in drusy cavities, from the Lachine canal; anomites and a trilobite from Mascouchi river, (Lower Canada,) and strombus chiragra; from Andrew F. Holmes, M. D. of Montreal, pseudomorphous quartz from Scotland; from the Rev. Isaac Ferris, a large crystal of quartz from Fish Creek, Saratoga county; from Simeon De Witt, gypsum (alabaster) from Sandusky, (Ohio); from James Eights, three pieces of Continental paper money; from John W. Farewell, of Hartford, (Connecticut,) 36 copper coins; from Edward C. Delavan, copper ore from the Schuyler copper mine, New-Jersey; from George Clarke, marly clay from Springfield, Otsego county; from Richard Webster, a medal of La Fayette, struck during the American revolution; from the author, "Monograph of the doubtful reptils, New-York," by Rev. Daniel H. Barnes; from Teunis Van Vechten, magnetic iron ore, (an octaedral crystal,) from Essex county, New-York; from John S. Walsh, a gallinule, (preserved) shot in the vicinity of this city, and also a halberd head with the stamp on it of the 62d or Royal American regiment; from Joseph Henry, strombus pugilis; from Dr. William A. King, a collection of fluviatile shells, from the river Ohio, comprising the following species, unio crassus, verrucosus, prolongus, cornutus, purpureus, plicatus, ovatus, triangularis, cunieformis, alatus, cylindricus, orbiculatus, radiatus and ochraceus, and a species of anadonta. The thanks of the Institute were directed to be presented to Mr. Chas. S. Parker, of Liverpool, and Dr. William A. King, for their donations.

Dr. Lewis C. Beck, exhibited a lamp without a wick, as recently described by Henry Home Blackadder, Esq. in the Edinburgh New Philosophical Journal, vol. 1. This lamp consisted of a small glass globe and a bent glass tube, supported on a proper stand. The tube is of the size used for thermometers, and it is passed through an elastic piece of cork, which is cemented to the lower part of the glass globe. When the extremity of the tube is above the surface of the fluid, (oil or alcohol) none of the latter can escape through it, but when the lamp is to be used, the tube is inclined or drawn down. The degree of depression is regulated by the size of the flame that is desired to be produced.

A lamp of this description may be applied to many ordinary purposes, as well as in the laboratory. It is as readily lighted as a candle or a lamp with a wick, and the burner may be such as to produce a flame that is a mere luminous speck in a dark apartment, or such as to give a flame similar to that of an argand lamp with a wick.

Dr. L. C. Beck also exhibited models of crystals formed of spheres, illustrative of Dr. Wollaston's theory of the primitive molecules of crystals. The models were presented to the Institute.

January 29. The following donations were received :—From William H. Morell, corresponding member, the cast of an organic remain, (probably vegetable) from Chenango county; from Rev. D. Brown, alum slate from the shores of Lake Erie; from Philip Kelly, compact brown oxide of iron and anthracite, from Belmont, (Pennsylvania); from the New-York Lyceum, Annals of the Lyceum, vol. 2, Nos. 4 and 5; from Stephen Van Rensselaer, jun. a topographical model of the Alps, done in plaster, vicunas and alpacas wool, of their native colour, and also dyed with native Indian dyes, two specimens of gold ore from Arequipa, (Peru,) and three specimens of silver ore from various mines in the same country.

February 14. ANNUAL ELECTION. The officers of the respective departments, remained the same as in the former year, with the exception of the curators of the second. The following were elected:—

Lewis C. Beck, Matthew H. Webster, Richard V. De Witt, William Cooper, George W. Clinton.

The Institute proceeded to the election of its officers, when STEPHEN VAN RENSSELAER was unanimously chosen President, and WILLIAM MAYELL, Treasurer.

The following donations were received :—From Isaac Mott, calcareous tufa, from Paris, Oneida county, and copper coins; from Henry W. Snyder, a specimen of vermiculite.

Dr. Lewis C. Beck delivered a lecture on the phenomena of magnetism, accompanied with appropriate experiments.

Mr. George W. Clinton, read a communication on the graphite of Ticonderoga, (see Transactions, vol. 1, art. xxi.)

Dr. T. R. Beck read some observations on the combustion of lime, by the compound blow pipe, and the application of the light thus obtained, to the making of surveys at distant stations, accompanied with experiments illustrative of the brilliant intensity of light that is produced. The experiments of Lieut. Drummond, of the British engineers, were noticed, and particularly his proposed employment of this mode of illumination in the new survey of Ireland, directed by the British government.

March 7. The following donations were received :—From William J. Coffee, a specimen of kaolin from Kent, (Mass.); from D. M'Kercher, Hillhouse on the culture of the olive; from Richard Jones, one silver and several copper coins; from Charles A. Clinton, the American Encyclopedia, in 7 vols.

4to. New-York 1805. From the following members, a bust of the Hon. Stephen Van Rensselaer, President, executed by Mr. Coffee of this city, viz. Charles R. Webster, R. V. De Witt, Peter Wendell, William Mayell, Henry W. Snyder, Elisha W. Skinner, Robert Boyd, Hugh Denniston, T. Romeyn Beck, N. F. Beck, Peter Bullions, D. M'Kercher, Lewis C. Beck, Joseph Henry, Matthew H. Webster.

Dr. Lewis C. Beck read a notice and chemical examination of the mineral water recently discovered in the city of Albany, on the premises of Messrs. Boyd & McCulloch.—(This communication has been published in the New-York Medical and Physical Journal, vol. 6.)

Mr. Matthew H. Webster read a memoir of the life and writings of the Count La Cepede, translated from the Revue Encyclopedique.

The Hon. Stephen Van Rensselaer communicated by letter, from Washington, sundry meteorological observations for the year 1826, made at that place, by the Rev. Robert Little, as follows:

1826.	Thermometer. greatest height.	Lowest height.	Mean temperature.
January,	64	0	36
February,	68	11	41
March,	79	30	49
April,	81	31	53
May,	93	55	73
June,	95	64	77
July,	96	58	77
August,	96	60	77
September,	92	47	72
October,	83	31	59
November,	71	20	48
December,	66	8	37

Mean temperature of the year 58.03, being one degree more than 1825. Rain fallen during the year 24.70 inches.

Matthew Stevenson, M. D. of Cambridge, Washington county, corresponding member, communicated a meteorological table for 1826, kept at Cambridge, as follows:

METEOROLOGICAL TABLE, FOR THE YEAR 1826.

1826.	THERMOMETER. Morning.	After-noon.	Evening.	Mean of observations.	Highest.	Lowest.	Greatest M. range.	Greatest D. range.	WEATHER. Fair.	Cloudy.	Variable.	Snow no. of days.	Rain no. of days.	Total in. of rain.	WINDS. North.	North E.	East.	South E.	South.	South W.	West.	North W.	Prevailing Wind
January,	24 45	29.19	25.41	25.68	53	—8	61	38	9	19	3	5	6	3.07	2	1½	½	1	9½	3	11	2½	West.
February,	20.82	31 57	26.28	26.22	54	—20	74	26	8	18	2	8	1	2.68	4		½	1	11	4½	4½	2½	South.
March,	31.09	39.74	34 58	35.13	65	10	55	26	12	17	2	4	8	4.07	6½				13½		9	2	South.
April,	33 06	53 20	41 30	42.52	73	17	56	42	10	13	7	5	7	1.71	2			1½	7½	5	8½	5½	West.
May,	50.64	75.10	62 90	62.88	90	34	56	36	17	5	9		6	0.99					8½	4½	14½	3½	West.
June,	60.13	76 93	67.46	68.17	88	44	44	38	8	11	11		11	3.23				2½	15½	5½	4	2½	South.
July,	59.64	79.48	70.93	70.01	91	44	47	32	13	5	13		7	4.09	2½			1½	9½	4	11½	2	West.
August,	59 96	79.12	68.71	69.26	88	42	46	34	16	10	5		6	2.15	4	3½	4	7	5½	4	2½	½	South East.
September,	54 86	69.26	60.53	61.55	82	34	48	28	13	8	9		8	3 42	4½	1	½	7	8½	5	3	½	South.
October,	41.80	56.90	48.38	49 02	73	22	51	30	14	10	7		10	2.68	4½	2½		4½	8½	4	1½	5½	South.
November,	34.06	42.30	37.80	38 05	63	22	41	23	6	19	5		7	1 91	2		½	3½	8½	7	3½	5	South.
December,	23.96	31.12	26 16	27.08	54	—13	67	23	7	17	7	5	2	2 06	1		½	4	4	10½	5	6	South West.

Results.—Mean of the morning observations,	41.03
Mean of the afternoon observations,	55 32
Mean of the evening observations,	47.53
Mean temperature of the year 1826, according to the above observations,	47.96
Highest during the year,	91.
Lowest during the year,	—20.
Greatest daily range,	42.
Greatest monthly range,	74.
Greatest annual range,	111.

Fair days,	133
Cloudy days,	152
Variable days,	80
Snow (No. of days)	27
Rain (No. of days)	79
Rain (No. of inches)	32.06

North,	33
North East,	8 1-2
East,	6 1-2
South East,	33 1-2
South,	110
South West,	57
West,	78 1-2
North West,	38
	——365

Prevailing wind South.

The morning observations were made as nearly as possible at sunrise. The highest temperature observed in the afternoon was recorded—this was generally near 2 o'clock.—The evening observations were made at 9 o'clock.—Thermometer, Fahrenheit's.

Dr. Stevenson also communicated the following memorandum of the state of the weather at Cambridge, during the extreme cold experienced in January of this year.

JANUARY.	THERMOMETER.		
Days.	Morning.	Afternoon.	Evening.
15	—13	16	— 3
16	14	20	4
17	— 5	12	1
18	—22	3	— 3
19	—16	2	—11
20	—14	— 4	—18
21	—32	4	— 1
22	—14	13	9
23	11	22	20

Mr. William Annesley made a verbal exposition of a new system of naval architecture, invented by himself, and illustrated the same by models.

March 21. The following donations were received:—From M. H. Webster, Voyage dans les Etats Unis, par Rochefoucald Liancourt, 8 vols. 8vo.; from Websters & Skinners, Prof. Eaton's Zoological Text-Book; from T. Romeyn Beck, Woodarch's Conchology and Bigelow's Florula Bostoniensis; from the New-York Lyceum, Annals of the New-York Lyceum, vol. 2, No. 6; from Dr. Emmons, a collection of dried plants, principally carices; from George W. Clinton, a medal struck by the city of New-York, in commemoration of the grand canal celebration; from L. C. Beck, sundry minerals and specimens of the ultimate forms of crystals; from George G. Jewett, minerals from Lockport; from M. H. Webster, a specimen of nitrate of lime, being an efflorescence on a wall; from Warner Daniels, iron ore from Moriah, Essex county.

The following articles, the property of the first department, and not previously noticed, were laid on the table. Premium specimens of woollen cloth exhibited in 1809, 1810, 1811, 1813, and 1815, to the society for the promotion of Useful Arts, bound in 5 vols. 8 vo.; model of an inclined plane for canals; a portrait, by Ames, of the Hon. Robert R. Livingston, first president of the society; specimen of raw silk, from Southold, Long-Island, and specimens of paper made from straw and from the conferva plant.

Mr. Peter Smith, manufacturer, of this city, exhibited a bronzed kettle, and on motion, its examination was referred to a committee.

Dr. L. C. Beck continued his lecture on magnetism, accompanied with experiments.

Mr. Joseph Henry delivered a lecture on flame, accompanied with experiments.

Mr. George W. Clinton delivered a lecture on repulsion, as a property of matter.

April 25. The committee, to whom the bronzed article manufactured by Mr. Smith, had been referred, reported favorably as to his skill and success in this experiment. The report contained a detailed account of the mode usually pursued in bronzing brass and iron goods and plaster figures, and also of bronzing in oil colours. The following is the conclusion of the report.

"The method used by Mr. Smith in bronzing on copper, is by means of an oxide of iron, called *purple brown*. This powder is mixed with water to the consistence of cream, and applied to the surface of the article with a brush. It is then heated over a charcoal fire, to a sufficient degree to fix the oxide upon the copper, and when cold, the superfluous powder is brushed off, and the article finished by hammering or rubbing with a brush. The greatest difficulty in the process seems to be in obtaining the proper degree of heat necessary to fix the oxide; if it be too great or too small, the operation will fail, the copper must be recleaned and the process repeated. A little experience will, however, soon enable the workman to determine the proper temperature."

Mr. R. V. De Witt gave an account of an improved boiler for steam-engines, invented by Mr. Gallup, of Ohio. Mr. G's boiler is spherical, and the heat is applied in the centre. The principle made use of by Perkins in his steam-engine, of heating the water so that it is converted into steam on escaping from the boiler, is adopted by Mr. Gallup.

Mr. R. V. De Witt also exhibited an iron rod, the end of which was coated with platina, intended for the extremity of lightning rods on buildings. These rods are manufactured in Philadelphia, and being superior to those at present in use, and particularly in preventing oxidation of the iron, deserve general introduction.

Mr. William J. Coffee, artist of this city, presented to the Institute a bronzed plaster medallion of his Excellency Governor Clinton, for which its thanks were unanimously voted.

Mr. Simeon De Witt read the following communication:

CONICAL RAIN-GAGE.

I shall now submit to the Institute the description of a rain-gage, which is simple in its construction, more convenient in its management, and which will show the amount of small quantities of rain more accurately than the most approved that has been brought into use.

It consists of an inverted hollow cone, with an appendage to its base, opening like a funnel, of such a diameter as that three inches fall of rain into it, shall fill the cone; and a scale so graduated, as that when it is put down to the bottom of the cone, the water mark left on it shall show the quantity of rain fallen.

The first thing to be attended to in the construction of this gage, is the scale. And as the heights of similar cones are as the cube roots of their contents, the contents of the cone being given and divided into any number of equal parts, numbers corresponding to the cube roots of those parts, will give the proportions of the divisions of the scale.

In the example now given, the cone is intended to contain three inches or thirty tenths of an inch fall of rain. In order then to make a scale to measure these thirty tenths of an inch, the cube root of thirty numbers in succession, commencing with unity, must be found as the proportions of the scale in tenths of an inch. These cube roots are found by dividing the logarithm of each number by three and finding the numbers corresponding to the quotients. But the cube root of the highest number 30, being only 3,107, this must be multiplied by such a number as will give the desired length of the scale, or height of the cone.

For the construction of the contemplated gage, I have assumed 6 for the multiplier, which will give $3{,}107 \times 6 = 18{,}642$ inches for the length of the scale or heighth of the cone. All the other cube roots, found as before mentioned, being also multiplied by 6, will give the several divisions of the scale measuring tenths of an inch fall of rain. If the three first tenths of an inch be graduated according to the proportions found for the graduation of three inches, the result will be hundredths of an inch; and this may be easily done, as shown by the diagram, where A B is made equal to 0.3 and parallel to it, and has transferred to it all the divisions of the scale in their exact proportions, and these are then taken for the hundredths of an inch on the three first tenths of the scale. The tenths above the third, may be graduated sufficiently accurate for hundredths, by dividing them into equal parts.

The diameter of the base of the cone is assumed at pleasure; I have taken 6 inches, and its heighth as before stated is 18,642 inches.

With these data the problem is then presented. What will be the diameter of the opening of the funnel, or rather what will be the diameter of a cylinder 3 inches high, the contents of which shall be equal to the contents of a cone 18,642 inches high with a base of 6 inches diameter?

As the capacity of a hollow cone is equal to one third of it circumscribing cylinder, let D equal the diameter of the base of the cone = 6 inches, H its height =18,642, and 3 = the height of the cylinder; required d, the diameter of the cylinder, the contents of which shall be equal to that of the cone.

Cones and cylinders being as the squares of the diameters of their bases multiplied by their heights, the proposition, stated algebraically, will be thus:

$$\frac{D^2 \times H}{3} = d^2 \times 3, \text{ or } \frac{D^2 \times H}{9} = d^2 \text{ or } \sqrt{\frac{D^2 \times H}{9}} = d.$$

That is, the square of the diameter of the base of the cone, multiplied by its height, divided by 9, and the square root extracted, will give the diameter of the cylinder; or in other words, of the rim of the funnel placed on the inverted base of the cone, into which a fall of three inches of rain shall fill the cone.

Here $D=6$; $H=18{,}642$; then, according to the formula, the square of $6=36$ multiplied by 18,642, the product divided by 9, and the square root of the quotient extracted will give the answer, that is $36\times18{,}642=671{,}112$; this divided by 9 gives 74,568, the square root of which 8.63 inches will then be the diameter of the rim of the funnel.

The cube roots of the 30 numbers and their products, multiplied by 6, are as follows:

	Cube roots.	×6		Cube roots.	×6
1	1	6	16	2,529	15,126
2	1,260	7,560	17	2,571	15,426
3	1,442	8,652	18	2,621	15,726
4	1,587	9,522	19	2,668	16,008
5	1,710	10,260	20	2,714	16,284
6	1,817	10,902	21	2,759	16,554
7	1,913	11,478	22	2,802	16,812
8	2	12	23	2,844	17,064
9	2,080	12,480	24	2,885	17,310
10	2,154	12,924	25	2,924	17,544
11	2,224	13,344	26	2,962	17,772
12	2,290	13,740	27	3	18
13	2,352	14,112	28	3,036	18,216
14	2,410	14,460	29	3,072	18,432
15	2,267	14,802	30	3,107	18,642

According to these numbers, the scale is then graduated.

From the construction of this gage, it is evident that the oftener its contents, after being measured and registered, are discharged, the more correct will be the account, and that the facility with which this can be done, is much greater than that which is allowed by rain-gages of the common construction.

☞ As the diagram, on a scale sufficiently large for a model, cannot be conveniently published with the description, it becomes necessary to add a few remarks.

The apex of the inverted cone, in the inside, must be wrought to a point. The lower part of the scale must be so shaped as to reach the bottom of the gage, or apex of the cone. The rim must be the frustum of a cone, having its largest diameter 8.63 inches, and its smallest 6 inches, to be soldered to the base of the cone. If its height be about 2 1-2 or 3 inches, it will give a sufficient slope to its side to cause a downward inflection of the most violent rain falling on it. In putting down the scale, it must be as nearly as may be, in the middle of the gage. Before the scale is used, it may be rubbed with a piece of chalk, to show the water mark more distinctly.

The dimensions of the gage may be varied at pleasure, according to the principles given for its construction. What I have assumed, I consider as best adapted to practical purposes.

July 2. The curators reported the receipt of the following donations since the last meeting:—From John Bulkley, Peter M'Kelvey and Ambrose S. Townsend, copper coins; from John Gott, orthoceratite, from St. Lawrence county; from Robert Yates, three specimens of the sea horse; from Isaac Lea, of Philadelphia, fibrolite, from Wilmington, (Delaware); from John B. Beck, of New-York, 12 London Almanacs of the year 1637, bound in one volume; from George W. Clinton, scapolite and green spinelle, from Franklin, (New-Jersey); from Lewis C. Beck, various minerals from the states of Vermont and New-Hampshire, including marble (polished) from Pittsford, Shoreham and Middlebury, (Vermont,) quartz aggregate from the the notch of the White Mountains, granular graphite from Goshen, (N. H.) macle from Charlestown, (N. H.); from Andrew F. Holmes, M. D. of Montreal, various minerals from Montreal and the Lachine canal, serpentine in carbonate of lime, from the river Ottawas; from Isaac Mott, concreted carbonate of lime, from Canajoharie; from Edmund C. Genet, his vindication of his "Memorial on the upward forces of fluids"; from the New-York Lyceum, their Annals, vol 2, Nos. 7 and 8; from William Mayell, steel grained iron ore, from Vermont; from Dr. Daniel James and Erastus Corning, 12 varieties of gold ore and auriferous soils, (including a specimen of reduced gold) from North Carolina; from L. C. Beck and Joseph Henry, an improved scale of chemical equivalents, published by them; from Henry W. Snyder, a gorgonia.

The curators also reported that Mr. William Caldwell had deposited the following articles: An Indian pappoose counterpane, of dressed beaver, with bells; four Indian pouches or shot bags, from the Red River, worked in stained porcupine; an otter skin pouch; two gourd rattles for pappooses, and an Indian knife sheath with scalping knifes, (these two last from the Columbia river); three Indian war head dresses, the feathers of the golden eagle; a bundle of Patagonian arrows; a bundle of arrows of the Sioux Indians, and also several from the North West; a hatchet ploughed up at fort William Henry, head of Lake George; an Indian knife sheath, porcupine worked; a calumet or pipe, from the Mississippi; a tomahawk taken at York, Upper Canada, in the attack under Gen. Pike; a part of the keel of the ship Endeavour, in which Capt. Cook made his first voyage. This ship came to Newport, (R. I.) in 1792, where it was condemned as unseaworthy. The keel was purchased by a cabinet maker, and from him the present piece was obtained.

Mr. Mayell gave an account of the processes used in hat making, accompanied with an exhibition of the different states of the materials used, at the various stages of the manufacture.

Dr. T. R. Beck read a communication on the disinfecting powers of the chlorides of lime and soda, as recently ascertained in France, by M. Labarraque.

Mr. Deming presented drawings, and made sundry explanations of a mode invented by him of propelling canal boats by steam power.

October 10. The curators reported the receipt of the following donations:—From Stephen Van Rensselaer, jun. sundry articles dug up on the west bank of the Hudson, near the house of Mr. V. R. four feet below the surface, viz. being various articles of iron, a human bone and a French copper coin of Louis 13th, in perfect preservation; two German silver coins of Ferdinand the 2d, and a quantity of human bones being found at the same time. From Miss Carter, a part of a tree struck by lightning. It is about 18 inches in length, and the fibres throughout its whole extent, are minutely separated from each other, longitudinally, so as to resemble a skein of silk before it is cut;* from George W. Carpenter, an asterias; from W. C. Schuyler, T. Romeyn Beck, Peter S. Henry and M. H. Webster, a number of copper coins, principally foreign; from Ebenezer Baldwin, specular iron ore, from Moriah, Essex county; from James Willard, of Schenectady, a silver coin of Queen Elizabeth, 1568; from Dr. Grant, of Georgia, crystals of salt and crystallized pan scale, from Salina, also carbonate of lime from Trenton falls; from George B. Webster, a specimen of bread fruit, brought by himself from the Sandwich Islands; from Jesse Buel, geological specimens, from the Union canal, (Pennsylvania); from Guert Gansevoort, U. S. Navy, Turkish tobacco, from Smyrna, and stalactite from the Grotto of Antiparos; from Rev. Judah Ely, a collection of organic remains, including univalves, bivalves and fossil bones from Hertford county, (North Carolina) from 100 feet below the surface of the ground, and 100 miles west from the sea shore.

The curators reported that Mr. John B. Van Schaick, had deposited a collection of gold and silver coins of the present and late monarchs of Europe, collected by him while abroad.

Mr. George W. Clinton read an essay on the properties of light.

Mr. William Mayell exhibited a perspective view of the engine of the steam-boat Victory, now building in this city, and also a model of the boilers, accompanied with explanations of both.

Mr. Joseph Henry read a communication "on some modifications of the electro magnetic apparatus," accompanied with experiments, (Transactions, vol. 1, art. iv.)

The Institute then adjourned to its annual meeting in 1828.

* In the Revue Encyclopedique for May 1830, p. 498, it is stated that M. Arago presented to the Academy of Sciences, some fragments of a large oak, struck by lightning, which had been sent to him by the Duke of Chartres. One was three feet long and divided into laths of two or three lines in thickness, and about eight or ten lines long. The other, about fifteen lines long, was divided into a vast number of longitudinal fragments, and resembled the end of a broom.

CATALOGUE OF THE MEMBERS OF THE ALBANY INSTITUTE.

Those marked † are Members of the First Department—‡ of the Second, and § of the Third. Those marked * are deceased.

HONORARY MEMBERS.

[By an article in the by-laws of the Institute, the Honorary Members of the respective Departments were recognized as Honorary Members of the Institute, and the power of electing them hereafter is reserved to the Institute.]

The Governor of the State of New-York, *ex-officio.*	
†The Members of the Legislature, *ex-officio.*	
*‡ De Witt Clinton, LL. D.	*Albany.*
‡Simeon De Witt,	*Albany.*
‡Baron Von Goethe,	*Saxe Weimar.*
‡David Hosack, M. D. F. R. S.	*New-York.*
*† David Humphreys, LL. D.	*Connecticut.*
‡Elisha Jenkins,	*Hudson.*
*‡ John Lansing, Jun. LL. D.	*Albany.*
Baron De Lederer,	*New-York.*
‡John George Lenz, M. D.	*Saxe Weimar.*
*† Henry Muhlenbergh, D. D.	*Pennsylvania.*
*†Richard Peters, LL. D.	*Pennsylvania.*
‡William Swainson,	*Great Britain.*
*‡John Tayler,	*Albany.*
‡Samuel Young,	*Ballston.*

NON-RESIDENT AND CORRESPONDING MEMBERS OF THE FIRST DEPARTMENT.

[Formerly the Society for the Promotion of Useful Arts.]

Abraham Adriance,	*Dutchess county.*
Stephen Alexander,	*Madison county.*
Benjamin Allen,	*Dutchess county.*
* Joseph Annin,	*Cayuga county.*
Moses Austin,	*Greene county.*
John Ballard,	*Onondaga county.*
* Samuel Bard, M. D.	*Dutchess county.*
Robert A. Barnard,	*Columbia county.*
William H. Basset.	

Thomas Bicknell,	*Madison county.*
Francis A. Bloodgood,	*Tompkins county.*
Joseph Bloodgood, M. D.	*Queens county.*
* John G. Bogart,	*New-York.*
Herman H. Bogart,	*Seneca county.*
John Brainard.	
Isaac Briggs, Civil Engineer.	
Charles C. Brodhead,	*Oneida county.*
Micah Brooks,	*Ontario county.*
* John Broome,	*New-York.*
William Broome,	*Dutchess county.*
* Jacob Brown,	*Jefferson county.*
Richmond Brownell, M. D.	*Albany county.*
Thomas C. Brownell, D. D.	*Connecticut.*
* Archibald Bruce, M. D.	*New-York.*
Salmon Buel.	
George Bumford,	*Washington.*
Seth Capron.	
* William S. Cardell,	*Vermont.*
Moses Chapin,	*Monroe county.*
Josiah Chapman,	*Rensselaer county.*
James De Le Ray Chaumont,	*Jefferson county.*
Philip Church,	*Allegany county.*
George Clarke,	*Otsego county.*
Aaron Clark,	*New-York.*
Asahel Clark,	*Washington county.*
George Hyde Clarke,	*England.*
Timothy Clowes, LL. D.	*Long-Island.*
Stephen Close,	*Saratoga county.*
Judah Colt,	*Pennsylvania.*
James Cochran,	*Montgomery county.*
Walter L. Cochran,	*Montgomery county.*
Alexander Coventry, M. D.	*Oneida county.*
* Isaac Cooper,	*Otsego county.*
* Hooper Cummings, D. D.	*New-Jersey.*
James Dean,	*Oneida county.*
* Peter De La Bigarre,	*Dutchess county.*
John Delamater, M. D.	*Herkimer county.*
* Benjamin De Witt, M. D.	*New-York.*
John De Witt, D. D.	*New-Jersey.*

* Frederick A. De Zeng,	*Ontario county.*
Dr. Jonathan Dorr,	*Washington county.*
* Caspar W. Eddy, M. D.	*New-York.*
* Andrew Edmeston,	*Otsego county.*
* Andrew Ellicot,	*West Point.*
* Effingham Embree,	*Long Island.*
Adam Empie, D. D.	*North Carolina.*
George W. Featherstonhaugh,	*Duanesburgh.*
Peter Fleming,	*Lower Canada.*
* Benjamin Ford,	*Albany county.*
* Ebenezer Foot,	*Delaware county.*
John W. Francis, M. D.	*New-York.*
Henry I. Frey,	*Montgomery county.*
David Gardner,	*Long Island.*
John Lyon Gardner,	*Long Island.*
James Geddes,	*Onondaga county.*
Edmund C. Genet,	*Rensselaer county.*
George Gibbs,	*New-York.*
* Dr. James G. Graham,	*Orange county.*
Jacob Green, M. D.	*Philadelphia.*
John Griscom, LL. D.	*New-York.*
James Hadley, M. D.	*Herkimer county.*
* Samuel Haight,	*Greene county.*
* Samuel Hawkins,	*Ulster county.*
Cornelius P. Heermance, M. D.	*Tompkins county.*
* Matthias B. Hildreth,	*Montgomery county.*
John C. Hogeboom,	*Columbia county.*
Myron Holley,	*Wayne county.*
Adam Hoops,	*Albany.*
* Ruggles Hubbard,	*New-York.*
Jonas Humbert,	*New-York.*
Paul Hochstrasser.	
Jabish N. M. Hurd,	*Madison county.*
Isaac Hutton,	*Columbia county.*
Isaac G. Hutton,	*Washington county.*
James Hyatt,	*New-York.*
William H. Jephson,	*New-York.*
Benjamin Joslin, M. D.	*Prof. Union College*
James Kent, LL. D.	*New-York.*
Harman Knickerbacker,	*Rensselaer county.*
* Dr. Oliver Lathrop,	*Montgomery county.*

* Dr. Francis Le Barron,	*Washington.*
Morgan Lewis,	*Dutchess county.*
* Ezra L'Hommedieu,	*Suffolk county.*
* John Lincklaen,	*Madison county.*
Edward P. Livingston,	*Columbia county.*
* Robert R. Livingston, LL. D.	*Columbia county.*
Henry W. Livingston,	*Columbia county.*
* William Livingston,	*Columbia county.*
John Low,	*Saratoga county.*
James Lynch,	*New-York.*
* Jared Mansfield,	*West Point.*
Thomas McAuley, LL. D.	*Philadelphia.*
Archibald M'Intyre,	*New-York.*
Rev. John McJimpsey,	*Orange county.*
Dr. Robert McMillan, U. S. Army.	
Levi McKean,	*Dutchess county.*
William J. McNevin, M. D.	*New-York.*
* John Melish,	*Philadelphia.*
Thomas Melville,	*Massachusetts.*
* Morris S. Miller,	*Oneida county.*
Sylvanus Miller,	*New-York.*
Charles Mitchell,	*Maryland.*
Samuel L. Mitchill, M. D.	*New-York.*
William W. Morris.	
* John Nicholson,	*Herkimer county.*
Josiah Noyes, M. D.	*Hamilton College.*
* John Ogilvy,	*Montreal.*
* Beriah Palmer,	*Saratoga county.*
Alden Partridge,	*Vermont.*
Jonas Platt,	*Oneida county.*
William M. Price,	*New-York.*
John Randel, jun.	*Philadelphia.*
Dr. Stephen Reynolds,	*Montgomery county.*
* John Russel,	*Otsego county.*
Samuel Russel,	*Niagara county.*
* David Rust,	*Alabama.*
* Luther Rich,	*Otsego county.*
John R. B. Rogers, M. D.	*New-York.*
* Nicholas Romayne, M. D.	*New-York.*
* John B. Romeyn, D. D.	*New-York.*
Erastus Root,	*Delaware county.*

* William Ross,	*Orange county.*
* Benjamin Sanford,	*Onondaga county.*
Philip I. Schuyler,	*Dutchess county.*
Rensselaer Schuyler,	*Saratoga county.*
* John V. D. Scott,	*Greene county.*
Theodore Sedgwick,	*Massachusetts.*
Alexander Sheldon,	*Montgomery county.*
* Dr. Asa B. Sizer,	*Madison county.*
Nathan Smith,	*Herkimer county.*
Peter Smith,	*Madison county.*
William Souls,	*New-York.*
Horatio G. Spafford, LL. D.	*Rensselaer county.*
John Stearns, M. D.	*New-York.*
John Stevens,	*New-Jersey.*
William L. Stone,	*New-York.*
* Farrand Stranahan,	*Otsego county.*
Prof. Theodore Strong,	*New-Jersey.*
Selah Strong,	*New-York.*
Joseph G. Swift,	*New-York.*
Andrew Thompson,	*Niagara county.*
George Tibbits,	*Rensselaer county.*
Isaac H. Tiffany,	*Schoharie county.*
Robert Tillotson,	*Dutchess county.*
* Daniel D. Tompkins,	*Staten Island.*
Peter S. Townsend, M. D.	*New-York.*
Amasa Trowbridge, M. D.	*New-York.*
Henry Tucker.	
* John Tryon,	*Columbia county.*
Philip Van Cortland,	*Westchester county.*
Pierre Van Cortland,	*Westchester county.*
John C. Vanderveer,	*Kings county.*
* William P. Van Ness,	*Columbia county.*
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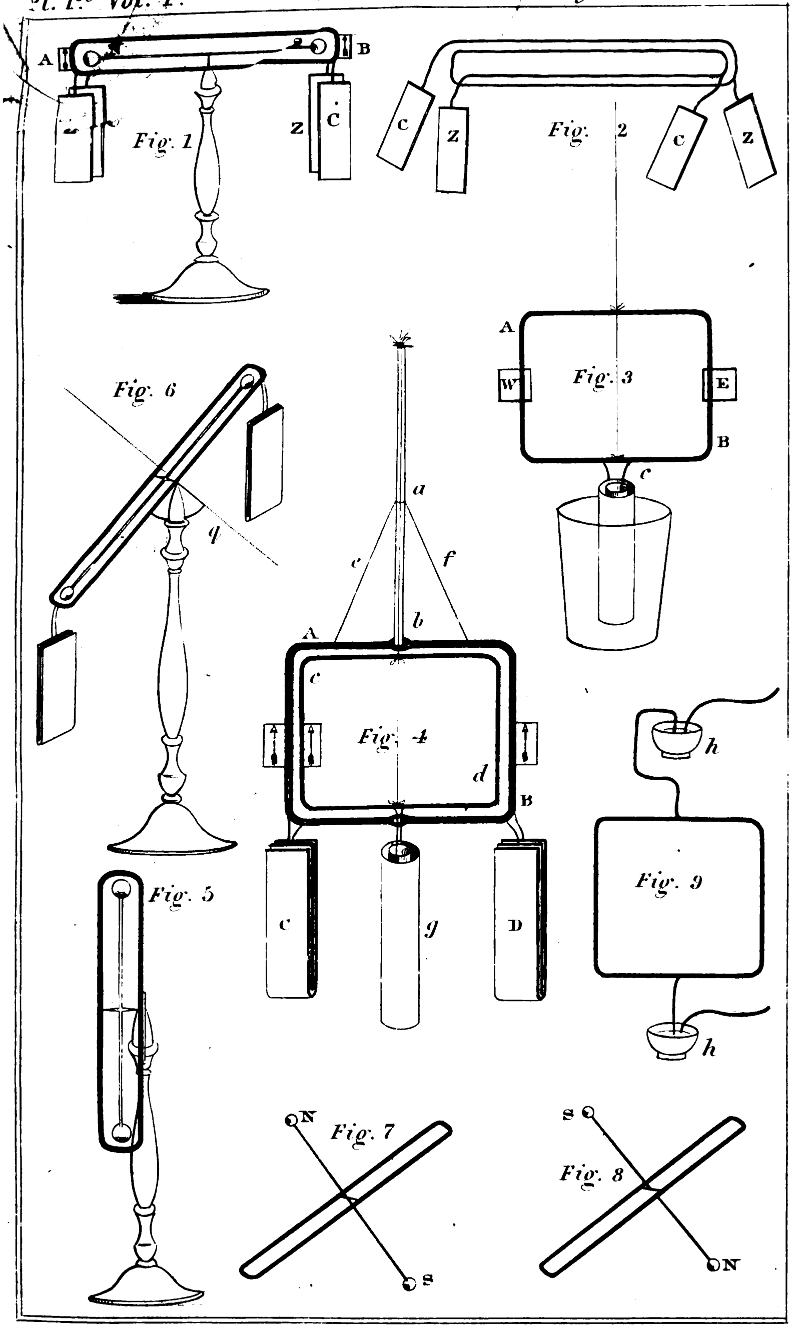
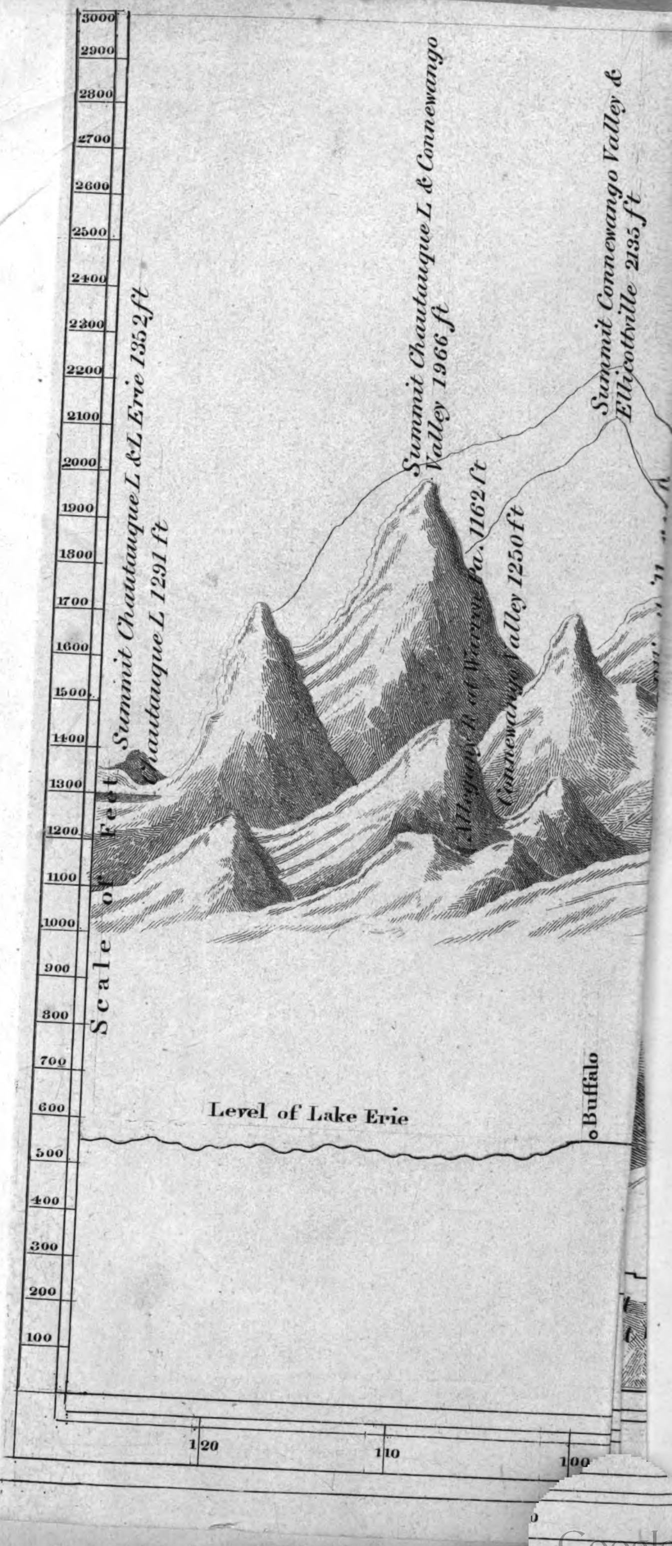
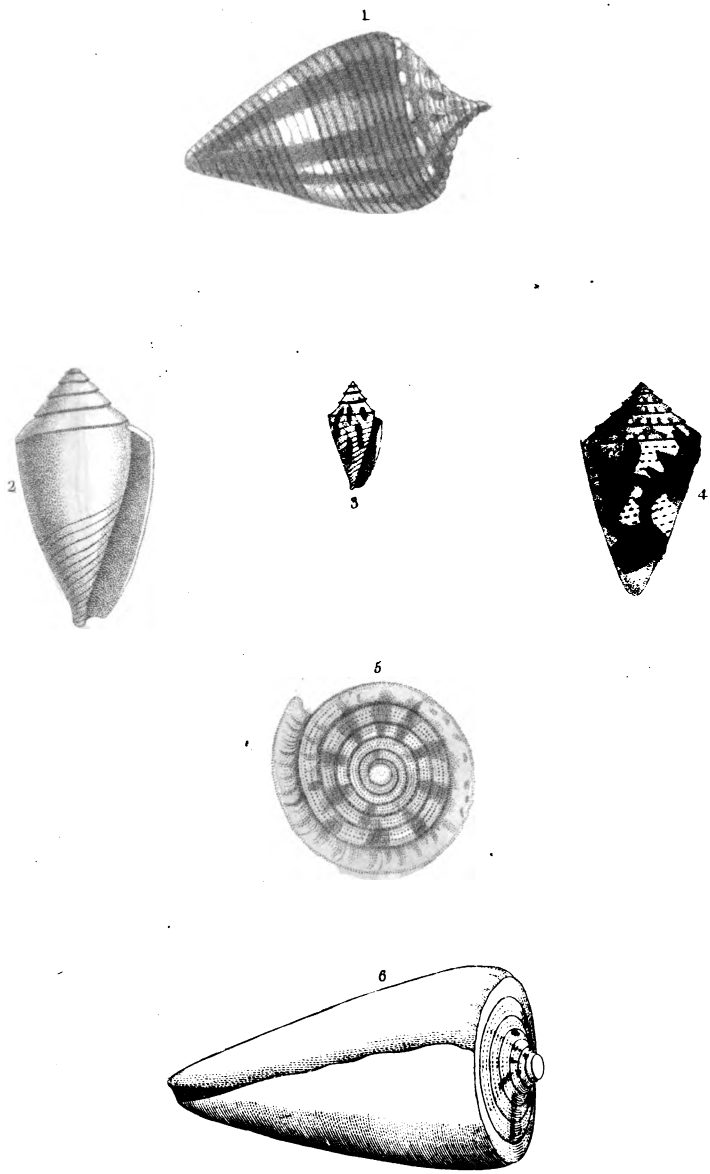
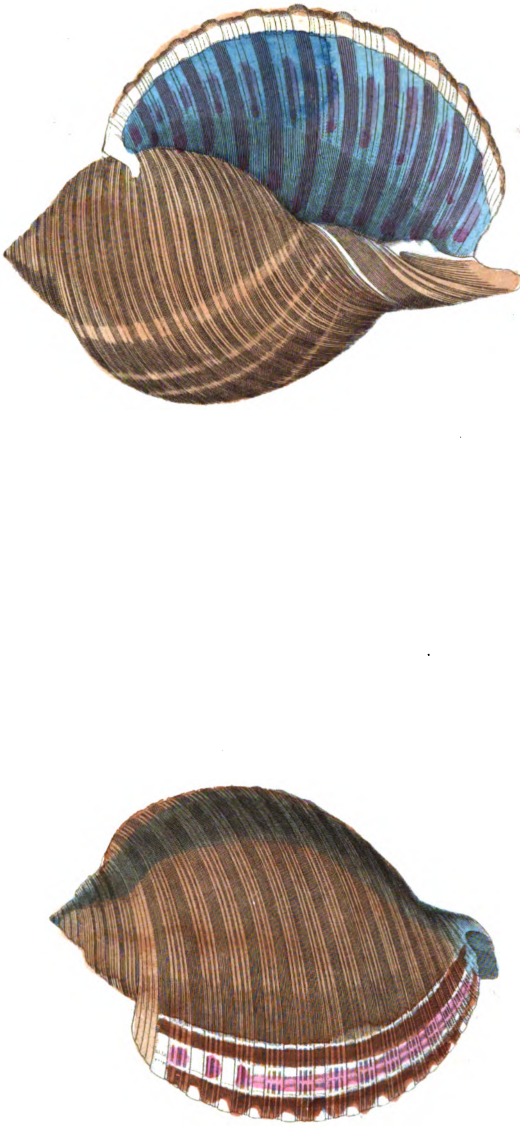

A
B
Fig. 1
Z
C
C
Z
Fig. 2
C
Z
A
W
Fig. 3
E
B
c
Fig. 6
q
a
e
f
b
A
c
Fig. 4
d
B
C
g
D
h
Fig. 9
h
Fig. 5
N
Fig. 7
S
S
Fig. 8
N


Scale of Feet
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
Summit Chautauque L &L Erie 1352 ft
Chautauque L 1291 ft
Summit Chautauque L & Connewango Valley 1966 ft
Allegany R at Warren Pa. 1162 ft
Connewango Valley 1250 ft
Summit Connewango Valley & Ellicottville 2135 ft
Level of Lake Erie
Buffalo
120
110
100



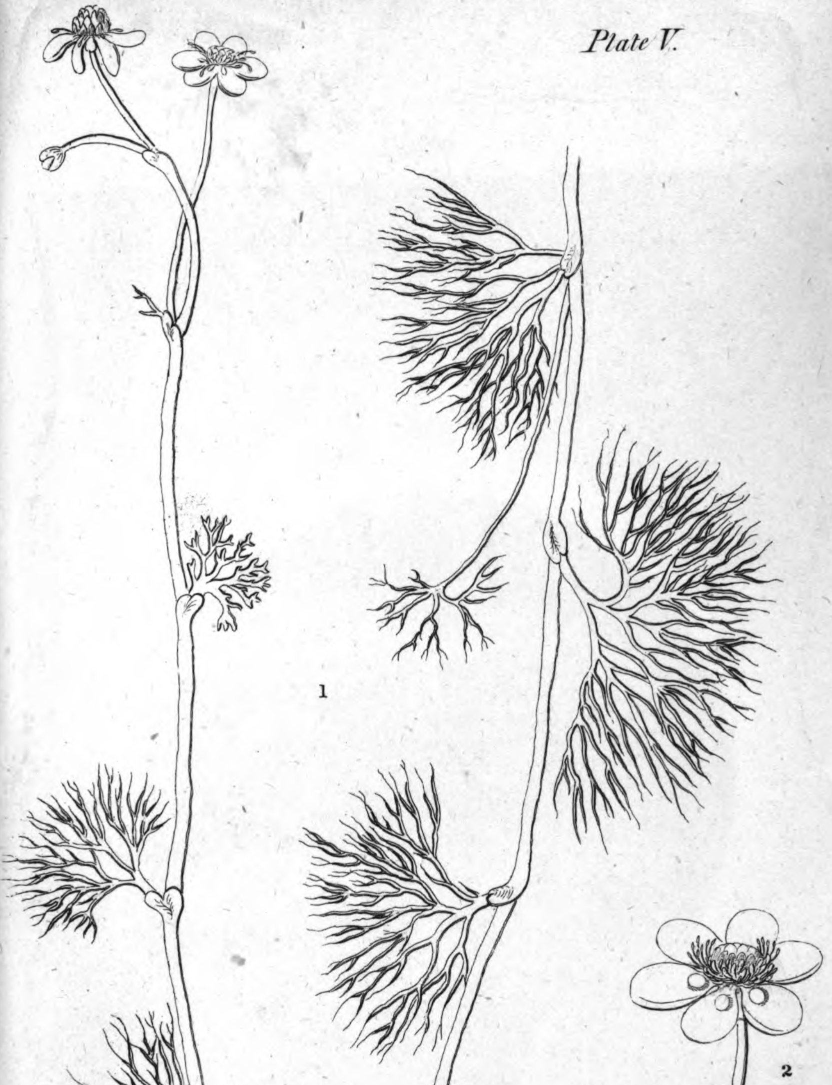
1. C. Mus. 2. C. Marylandicus. 3. C. Pealii.
4. C. Leucosticus. 5 & 6. C. Mamillaris.

PLATE IV.



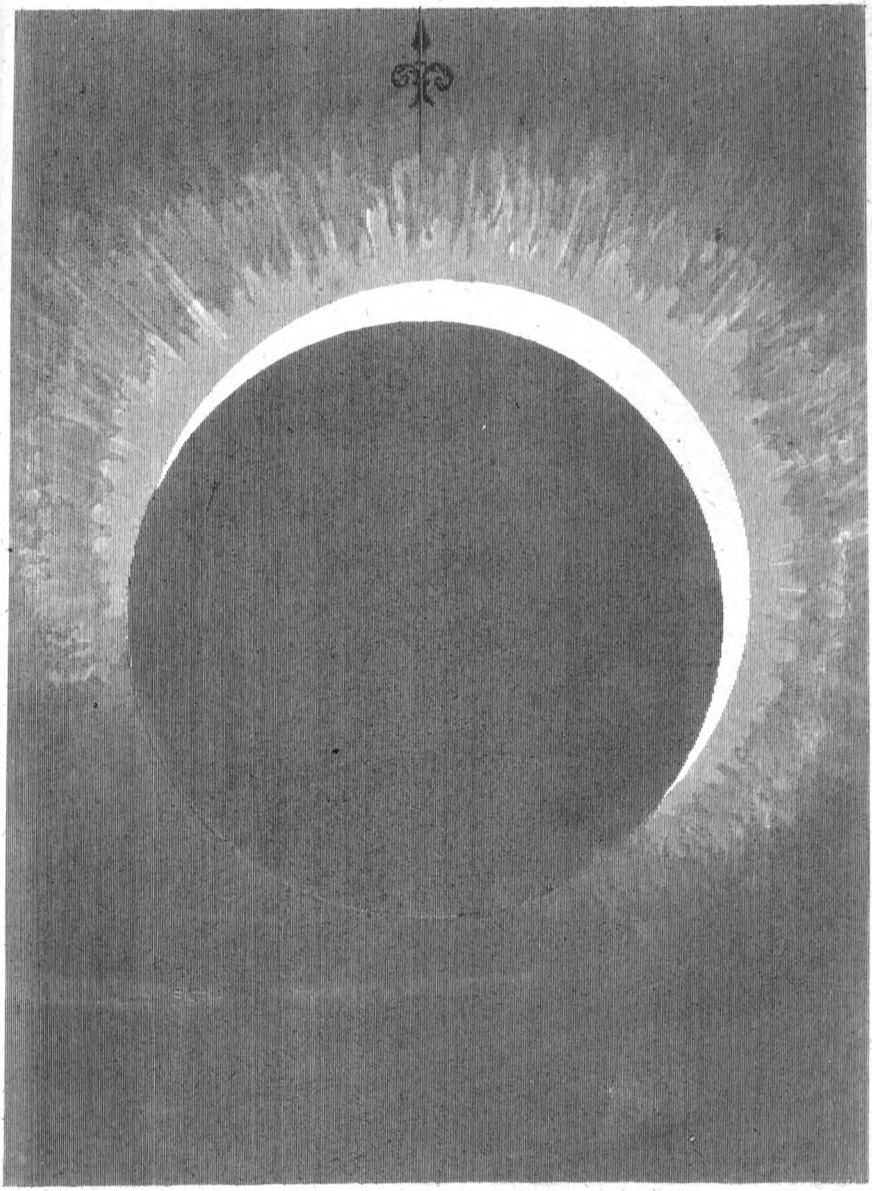
Dolium Zonatum.

Plate V.



Ranunculus lacustris.

Zenith. Plate VI.



Western Side.