

so that it is, in effect, two machines acting alternately, by the weight of one pillar of air, of such a diameter as the diameter of the cylinder is."

The reasons which induced Mr. H. to be of opinion, that his machine could not be employed in the vessel itself which was to be moved against wind and tide, or in a calm, but in a separate tow-boat, were these:—"1. This machine might be thought cumbersome, and to take up too much room in a vessel laden with goods, provisions, &c. 2. If this machine is put in a separate vessel, this vessel may be at any port, &c. to be ready on all occasions. 3. A vessel of a small burthen will be sufficient to carry the machine to take out a large one. 4. A vessel will serve for this purpose for many years, after she is thrown off, and not safe to be taken far abroad."

Mr. H., it will be seen, limited his views of the usefulness of the steam-boat to towing vessels or ships out of, or into any harbour, port, or river, at all times, and in all weathers; but it is needless to say how vastly important its adoption even to that extent would have been. Let one illustration suffice. Had the ease and celerity with which the largest vessels may thus be carried out of, or into the most inland havens, been fully known twenty years ago, the inconvenience attending the Medway, as a station for our North Sea fleet would never have been felt, and those new works at Sheerness, which have cost upwards of a million of money, would probably never have been erected.

Mr. H. was so satisfied of the certainty of the principle of his invention, that he conceived it might be carried to any manageable extent. "*The bigness of the machines,*" says he, "*may be proportioned to the work that is performed by them; but if such a force as is applied in this first essay be not sufficient for any purpose that may be required, there is room to make such addition as will move an immense weight with tolerable swiftness.*"

INSTITUTIONS

FOR

Instruction of *Mechanics.*

Proposals for

A LONDON MECHANICS INSTITUTE:

"_____ still to employ
The mind's brave *seduc* in heroic arms,
Such as may raise us o'er the grow'ng *Eng* head,
And make us shine for ever—that is life."

"KNOWLEDGE," says one of the wisest of men, Lord Bacon, "is Power;" and the first step, probably, towards the mechanics of this great empire obtaining the power to raise themselves to their proper station in society, is to acquire knowledge. Notwithstanding all that has been yet done to diffuse the blessings of education, the great mass of our people are still, comparatively speaking, sunk in a state of great ignorance; and it is only because so many are ignorant, that so many are poor and miserable. Even in the arts which mechanics themselves practise, most of them have much to learn. With the various modes by which the hand exercises its cunning, they are, of course, well acquainted; but of the principles of the operations they know little or nothing, and are proportionally incapable of discovering how they may be simplified and improved.

England, though the first manufacturing country in the world, is singularly deficient in schools for instructing people in the mechanical arts. In Paris there is a celebrated institution called the *Conservatoire des Arts et M^{ét}iers*, where instruction is liberally dispensed by professors appointed and paid by government, on most subjects connected with mechanics. Similar institutions are in existence, we believe, both at Berlin and Vienna. The British government has hitherto been always so much occupied in devising means to secure its power, that it has been able to pay but little attention to the instruction of the people: nor do we wish that it should. The education of a free people, like their property, will always be directed most beneficially

nor them when it is in their own hands. When government interferes, it directs its efforts more to make people obedient and docile, than wise and happy. It desires to control the thoughts, and fashion even the minds of its subjects; and to give into its hands the power of educating the people, is the widest possible extension of that most pernicious practice which has so long desolated society, of allowing one or a few men to direct the actions and control the conduct of millions. Men had better be without education—properly so called, for nature of herself teaches us many valuable truths—than be educated by their rulers; for then education is but the mere breaking in of the steer to the yoke; the mere discipline of a hunting dog, which, by dint of severity, is made to forego the strongest impulse of his nature, and instead of devouring his prey, to hasten with it to the feet of his master. This is the reason, notwithstanding the numerous splendid institutions existing on the continent of Europe for the education of the people, that individual exertion is not there called forth, and that the useful arts, which here are neither patronized nor controlled, have flourished more than there. The people only want to have the means of educating themselves left in their pockets untouched by the tax-gatherer, and there is no doubt but they will employ those means more for their own advantage than they can possibly be employed by men who, for the very reason that they belong to the *upper* classes, can know little or nothing of what the *lower* classes need, nor what is fitting for them. They know, indeed, too well what is proper for them as *subjects*, as *tax-paying machines*, as *slaves*, but not what is suitable to them as labourers and as men.

Our attention has been at present drawn to this subject by the remarkable fact of the mechanics of Glasgow having of their own accord recently formed an institution for their own instruction.

The account which we have read of it in the "Glasgow Free Press,"

a copy of which has been kindly transmitted to us, is one of the most heart-cheering things we have read for a long time. It appears that there had long been in that great and flourishing city an institution, founded by the will of a Professor Anderson, and bearing his name, for instructing in scientific subjects the middle and lower classes of the people. By paying a very small fee, persons were admitted to hear lectures, illustrated when necessary by experiments, on most branches of science. There was a library, several models, a variety of apparatus, and a museum connected with the establishment. No branch of "The Andersonian Institution," however, was exclusively destined for the instruction of mechanics in those branches of knowledge which are of especial use to their professional pursuits till the year 1800, when a Dr. Birkbeck commenced delivering, gratuitously, a series of lectures on mechanical philosophy and chemistry. For several years these lectures were continued; they were also greatly extended, and were very well frequented. At length, however, there was a great falling off in the attendance, owing to the managers of the institution not paying sufficient attention to the interests of the mechanics, and to the lectures being so few and cursory as not to give the pupils complete satisfaction. In 1821-2 the friends of the mechanics, and the mechanics themselves, made a successful effort to revive and improve these lectures, in connection with the other parts of the institution. They formed a library solely for the mechanics, began to make a collection of models, and had a numerous class of students. A disagreement, however, has since occurred between them and the managers of the institution, and the consequence has been, that the mechanics of Glasgow and their friends have seceded from the Andersonian Institution, and have formed a school for their own instruction, called the "Glasgow Mechanics Institution." On the 26th of July, resolutions to this purport were adopted. It was then stated,

that 374 individuals had already subscribed from half-a-guinea to a guinea each per annum; that a place of meeting had been procured; that certain gentlemen had volunteered their services as lecturers; and that a good library had been selected. It was farther proposed and resolved, that the Institution, as it had been begun without the assistance of the more wealthy and influential citizens of Glasgow, should be continued without asking their support; and that such property as it might acquire, should belong to the mechanics of Glasgow for ever.

Although this Institution is the very first in Great Britain established by mechanics themselves, it is not the only one devoted exclusively to the benefit of mechanics. At Edinburgh there is a School of Arts, the students at which are all humble operatives. It was set on foot by Mr. Leonard Horner, brother to the late Mr. Horner, who was so much distinguished as a member of parliament, and several gentlemen in the year 1821. During the winter months, or from October to April, instruction is given in the evening on chemistry, as applied to the arts; on the principles of mechanics, and their application to the arts, and on algebra and the elements of geometry. There is a very good library belonging to this school; and to attend these lectures and have the use of this library, the fee is only 15s. per session. Already it has been so well frequented, that the managers have found it necessary to limit the number of persons who come to get instruction to four hundred.

A "Mechanics and Apprentices Institution" have also been very lately established at Liverpool; but with the particulars of its history and the mode in which it is conducted, we are as yet unacquainted.

What is the reflection which the existence of such institutions as these in Glasgow, Edinburgh, and Liverpool, must excite in the mind of every London mechanic? Does it not instantly inspire the wish for the formation of a similar establishment here? And who does not feel that it will be an everlasting reproach, if

what has been accomplished in these great cities, cannot be accomplished in London, which is larger than the whole three united?

The example of the mechanics of Glasgow is that particularly which we wish to see observed by the mechanics of London. We are desirous of seeing a "London Mechanics Institute" established by the mechanics of the metropolis themselves. We do not conceal from ourselves, that as the people are accustomed, and have long been accustomed only to stir in any combined and general measure, when led on and directed by some members of the aristocracy of wealth and rank, there may be some difficulty in getting them to make any exertions in behalf even of so laudable and meritorious a cause as their own improvement. Still, however, it is so obvious, that it would be very much for the interest of the mechanics, if, instead of assembling in a pot-house of an evening, besotting themselves with the fumes of tobacco and draughts of porter, stupefying their minds and bringing disease on their bodies, rendering themselves more abject than the circumstances of society, which are painful enough, would render them; instead, in short, of seeming to be in a league with the parties of whom they so loudly complain to work their own degradation; we say it would be so much for their interest, if they were to meet in large and well-aired rooms, and endeavour to acquire a knowledge at a cheap rate, of the elements of science, that we do not doubt of their ultimately, and of themselves, establishing THE LONDON MECHANICS INSTITUTE. Our wishes may be disappointed at present; our endeavours may now fail; but we are sure that the very mention of the subject will rouse the attention of the mechanics, and that the time cannot be far distant, when they will disdain to be outdone by their brethren in Scotland and in Liverpool.

We have resolved, indeed, to bring the matter explicitly to the test of experiment, and are now employed in maturing a plan for establishing in this metropolis an institution for instructing mechanics, similar

lar to that of Glasgow. The principal object of it will be, to make them acquainted with those facts of chemistry, mechanical philosophy, and of the science of the creation and distribution of wealth, which, at this period of society, it is essential for them to know; and the means of accomplishing this will be, to bring numbers of them together in large rooms, where they may hear these facts stated, and have them explained to them, by men who have made it the business of their lives to learn and discover them. Of course it will depend on the mechanics, whether they will come or not, and whether they will listen or not. But, we trust, their desire of knowing these facts, will induce them to come; and when there, that the same desire will induce them to be attentive. We do not propose, however, that they shall be indebted to the contributions of benevolent individuals for the sums of money necessary to have rooms and teachers. They must not depend on charity, but on themselves. They must pay for instruction. We believe, however, this may be obtained at a very cheap rate, if the mechanics will take the matter into their own hands. They may be assured, that unless they do that, unless they make such an institution *their own and for them*, they will never feel that zeal for it, that kindness towards it, which men have for things which belong to themselves. We should, indeed, almost despair of seeing any good raise from such an institution, unless it proceeded from the mechanics, was supported, regulated, and controlled by them. We do not think it necessary to enter any further at present into the particulars of our project. Our wish is to see the mechanics of London have the means of instruction, and these procured by their own exertion. We are convinced they can accomplish this if they please, as well as the mechanics of Glasgow. All we profess to do is, to aid them in accomplishing it, to be the means of bringing them together, and enabling them to perform, by a combined operation, what singly is impossible. We do not doubt, that in

this undertaking, the operatives will find much friendly assistance, particularly from the master mechanics but as the Institution is intended for the benefit of the operatives, our present appeal is chiefly directed to them. We cannot proceed one step till we know whether they wish such an institution, and whether they will support it; to know this, therefore, we invite all the mechanics of this metropolis and neighbourhood, as well as all persons who may wish to see THE LONDON MECHANICS INSTITUTE established, to leave their names and addresses with our Publishers. If we should see, as the result of this invitation, a probability of succeeding in our object, we will then call a public meeting for the purpose of submitting our plan for such an Institute, leaving it with the meeting to dispose of it as they may think fit.

GREAT AMERICAN CANAL.

This great work, which was begun in 1817, and will be completed next year, is the longest canal in existence and though upon a small scale as to breadth and depth, is, we believe, in point of pecuniary outlay, the greatest work of the kind ever executed. It is 335 miles in length, 40 feet wide at the surface of the water, 28 at the bottom, and four feet deep, and will cost about five millions of dollars (1,100,000*l.*) or 3,000*l.* per mile on an average. Such a vast undertaking, completed in the short period of seven years, by a state (New York) with 1,368,000 inhabitants, affords a striking proof of the energy and enterprize generated by free institutions. It is a work worth a thousand Escorial and Versailles; because it creates wealth, while these only consume it; and it is a monument of public spirit and national prosperity, while these are only monuments of idle magnificence, vain glory, and despotic oppression.

The canal, which extends from Black Rock, at the east end of Lake Erie, to Albany on the Hudson, will render this river the chief, almost the sole outlet, and New York, the great emporium of a fertile country extending along the lakes, much larger than the British isles, and fast filling with inhabitants. Proceeding eastward from Lake Erie, the canal rises 48 feet, and from the summit's level falls 601 feet to the Hudson