### How to Manufacture Saltpeter.

MESSRS. EDITORS—Depending, as we do, upon a foreign country for a supply of one of the "sinews of war," it becomes a matter of duty as well as of inclination, to endeavor to curtail in some measure the extent of our dependence. Your suggestion to "the powers that be," to offer rewards for the discovery of deposits of the substance in question, &c., as is the case with any suggestion laying the most remote claim to merit or value, is likely to fall upon barren ground.

Thus thinking, I should like to propose the following queries to our scientific men: First, is there any difficulty or objection to the manufacture of nitrate of potash in this country as well as in France, Holland, and Germany? Those countries, not being able to purchase from Great Britain, were obliged to look to their own resources, and have manufactured it artificially for years, on quite an extensive scale, from refuse animal and vegetable matter, combined with hydrate of lime and earth—old or second-hand mortar or plaster usually. This compound is disposed in beds, covered in from the rain, but admitting a free supply of atmospheric air, frequently turned over with a spade, and treated with a copious supply of putrid urine. When after a considerable period the salt is judged to have been formed, to the amount of four or five ounces to the cubic foot, it is lixiviated, and the solution treated with wood ashes, which decomposing the earthy nitrates, the earths are precipitated, and the nitrates unite with the potassa of the ashes. The solution is now cooled, and the lixivial salt crystallizes in dirty white crystals, which is the crude nitrate of potash, containing from 75 to 80 per cent. of pure niter.

A very elaborate description of the process is given by (I believe) M. M. Lavoisier and Thenard, of Paris.

Second, are the deposits formerly found in Virginia, Kentucky, Tennessee, Ohio, Maryland, North and South Carolina, and Georgia, exhausted?

At one time, not very remote, they (the deposits,) formed quite an item in the mineral wealth of these States, more especially Tennessee and Kentucky, from which most of the niter used in the last war was obtained.

Third, is it not highly probable that the western slopes of the Andes especially, and the whole equatorial region generally, embracing the Steppes of Brazil, the whole of Ecuador, Peru, Bolivia, Venezuela, and as far south as the Llanas of Buenos Ayres, Paraguay, and Uruguay—those immense plains trodden by countless hordes of animals, and basking in the fervor of a tropical sun—is it not highly probable that we should there find vast deposits of this explosive material?

And fourth, and lastly, Messrs. Editors, to yourselves more particularly:—Has there ever been any attempt made to use the chloride of nitrogen as a destructive agent in war? and has there been any form of fire arm invented for the use of chlorate of potassa as an explosive agent. QUIEN SABE.

Chicago, Ill.

[So far as we can learn, no successful experiment, at least, has ever been made to use the chloride of nitrogen or the chlorate of potassa, as a substitute for common gunpowder in fire arms.

### Iron Steam Battery.

Mr. Stevens' "great iron steam battery, both shot and shell proof," for which Congress has appropriated some $800,000, is in progress. To work in quietness at it, says the *Nautical Magazine*:—

"An excavated dry dock was built on the grounds of Mr. Stevens, Hoboken, extending from the coffer dam at the margin of the river, to nearly the middle, and beneath one of the principal streets; within the enclosure around the adjacent grounds, is a building for necessary machinery adapted to punching, shearing, and drilling the sheets of iron, with lathes and other tools necessary for a machine shop, all driven by a steam engine, besides other necessary buildings of a secondary importance.—The vessel is now covered with her outside shell, and sufficiently developed to enable us to judge of the feasibility of the design. Herdimensions are as follows: 400 feet long, 45 wide, and 21 feet deep; she is to be provided with ten boilers, and two propellers driven by eight engines."

### Flour Mills.

Thirty years ago, the flour mills of France, and most other parts of the continent, were of rude construction, and exhibited few traces of improvement from the constructions of the previous century. The corn mills in England, Scotland, and Ireland, had also been nearly stationary for the same period of time, with the exception, probably, of some changes and improvements effected by Smeaton and the late Mr. Rennie. At the close of the last, or about the commencement of the present century, the Americans, as well as ourselves, introduced the system of creepers and elevators, by which a considerable amount of labor was saved, and the operations of grinding rendered more complete; and from time immemorial it has been the custom to drive the millstones from a large spur wheel, round which they were placed, in the middle of the mill. This arrangement of the grinding process is still in use in many parts of France, and several exhibitions have given examples of some of their best mills on this principle. Like those of this country, they are nearly all of them continuous in the process of cleaning the grain, grinding, and dressing the flour. The millstones are generally driven by straps or belts, whilst those in England are almost entirely driven by gearing.

The contributions to the Corn Mill Department are numerous and interesting; and the contributors have shown no small degree of skill in the numerous forms and devices by which they respectively recommend their machinery to public attention. A flour mill, by Bourdon, of five pairs of stones, and driven by a turbine, on the principle of Poncelet, deserves especial notice, from the novelty of its design, and the facility by which the stones can be stopped and started. The turbine, with its cistern, is placed below, in the center of the stones, five in number, and the main shaft or spindle penetrates the first floor, and from thence ascends to the top of the mill, and in its passage gives motion to the different machines for dressing, cleansing, elevating, &c.

[The above is from Fairbairn's paper on the machinery of the French Exhibition, published in the London *Mechanics' Journal*. He was appointed a special commissioner, we believe, from England to France for this purpose, but although he is an eminent engineer, and by trade a millwright (having learned his trade in Scotland before he took up his residence in England,) this report of his on flour mills is very barren of useful information, and does injustice to himself. We have been informed by millers who had worked as journeymen in England, Germany, and France, that American flour mills are far in advance of those in Europe in the use of improved machinery. Had we a more minute account of the flour mills of Europe, their defects, or wherein they fall short of American mills, might be pointed out. In the last number of Hunt's *Merchant's Magazine*, we find an account of the commercial Industry of the city of Glasgow, by D. O. Kellogg, Esq., late U. S. Consul at that place, in which we find it stated, that in 1852, 16,569 quarters of wheat, and 20,609 barrels of American flour were received at that port, while in the first six months of 1853, 10,469 quarters of wheat, and 25,515 barrels of American flour were received. In the first year named, the amount of flour received was to the wheat as 1 24-100 to 1, while in the succeeding year the amount of flour had increased in the ratio of 2 62-100 to 1, the wheat importation had but slightly, while that of the flour had greatly increased; thus giving evidence of a growing preference for American ground flour. From all that we can learn, American flour mills are the best in the world.

### Pennsylvania Coal.

The whole amount of coal sent from the anthracite regions this year, was about 6,400,000 tuns—an increase over 1854 of 700,000 tuns. It is believed that Pennsylvania has realized about $19,000,000 for these black diamonds. In the course of twenty years from this date, the coal of Pennsylvania will realize yearly more money than ever was obtained in a single year from the golden fields of California.

### The Condensing and Cornish Engine.

MESSRS. EDITORS—I notice in the SCIENTIFIC AMERICAN of Nov. 3d, an answer to an interrogatory of H. H., of Virginia, respecting the relative economy of the Cornish engine, and the double-acting condensing engine, stating that "the double-acting condensing engine being well cased and carefully managed, the difference cannot be much." Allow me to suggest for your consideration, as well as that of "H. H.," and your readers generally, the following statement of facts:

Long experience and a variety of experiments have demonstrated that for each inch in the diameter of cylinder, the condensing steam engine will perform a duty of one million pounds—i. e., lift one million pounds 1 foot with the consumption of 94 lbs. of coal; thus a 10-inch cylinder will lift ten million pounds, a 50-inch cylinder fifty million pounds, an 80-inch cylinder eighty millions, &c., the 80-inch cylinder averaging eight times as much as the 10-inch cylinder, with the same amount of fuel—the steam pressure on the piston being the same in each case. The Cornish engine will fully equal this duty, while the crank engine will not quite come up to this figure. But allowing the two to be on an equality in this respect, we derive the following principle from the foregoing—the economy of the one is to that of the other as the diameter of the one is to that of the other. For example, let us compare the duties of a Cornish engine and a double-acting condensing engine, each of about 100-horse power, and working under an average pressure on the piston of 15 lbs. to the square inch, this being the most economical pressure for the condensing engine, in the one case, viz., of the single-acting or Cornish engine, the cylinder being fifty inches in diameter, the duty will be fifty millions; in the other case, viz., of the double-acting condensing engine, the cylinder being of but half the area or say, thirty-eight three-eighth inches in diameter, the duty will be but thirty-eight and three-eight millions.

Hence it appears that a Cornish engine will perform about 40 per cent. more economically than a double-acting condensing engine of the same power, each clothed in the same manner, expanding its steam equally, and in all particulars cared for alike. But allowing for all contingencies, and holding the advantages of the Cornish engine at as cheap a rate as is possible, I should not hesitate to guarantee for it a saving at the very least of 25 per cent, over any other engine or machine doing the same work now in use, or known by the mechanical world.

There may be, and if I am rightly informed, there are some specimens of a so-called Cornish engine here and there whose duty will scarcely exceed that of a good high-pressure (non-condensing) engine, as there are miserable failures in every class of engine built, scattered broad-cast throughout the land—but of these I do not speak. I compare engines properly constructed from approved models, of such also, I am happy to add, some are in operation in different parts of our country. J. WEST.

Norristown, Pa., Dec. 1855.

[Experience is the best, yea, the only test of the superior economy of one engine above another; and to the above statement of experience relating to the superior economy of the Cornish single-acting, over the common condensing double-acting steam engine, we cannot offer a single contrary statement. But we would like to know the *why* and the *wherefore* of this economy. Should not the common condensing engine, with a cylinder of 38 3-8 inches diameter, having a double stroke, be considered of equal area with the Cornish engine of fifty inches, if the same quantity of steam is used by both—the Cornish using as much during one, as the other during two single strokes. What is the difference?

### Oil on the New York Central Railroad.

From the Report of Edward H. Jones, master mechanic, we learn that the average number of miles run last month (November,) on the Albany and Utica division of the above-named railroad, was 16 83-100 to one pint of oil, and during October 17 miles. The passenger engines oil up every sixteen miles running, and use more oil than the freight engines. Engine No. 56, David Apps, engineer, averaged 29 97-100 miles running to one pint of oil, and Robert F. Freeman, engineer of locomotive No. 40, averaged 28 77-100 miles.

### Reform in the Patent Laws.

MESSRS. EDITORS—You have announced your intention of proposing amendments to the existing Patent Laws. Permit me to suggest a few hints and queries.

1. I perceive no necessity for more than *one* witness to the drawings or specification. It should be sufficient for the Justice who administers the oath to attest to the signatures of the intending patentee. There is no analogy between such documents and deeds, and other sealed instruments where two witnesses are usually required. This amendment would prevent much trouble. One witness can easily be procured, but it is not so easy to get two men together.

2. Does not the English practice allow the applicant to introduce into one patent varieties of application, which in our country would require more than one patent? It seems to me to be important that a certain latitude should be allowed to inventors, which, probably, would not now be favored by our Patent Office.

Without undertaking to be sufficiently exact in these hasty remarks, I would, however, suggest whether some provision like the following would not be advisable:

The applicant should be permitted to include in one patent the various methods occurring to him of effecting the general object proposed.

I think that, in fact, this permission is allowed by the existing law, but not so explicitly as to secure a corresponding practice in the Office, as I understand the practice to be.

3. I do not like the practice of compelling the applicant to disclaim whatever may occur to the examining officer as not within the claim. Let the applicant make his claim, and let the construction of his claim be the office of a judicial court, if need be, and not that of a mere examiner. To all practical purposes the great majority of applicants must submit to have their claims, (which ought to speak for themselves,) whittled away by a class of persons certainly not the best qualified to adjudicate upon such subjects.

4. I think there should be an an *express* provision of law that in all cases of doubt, the doubt should ensue to the benefit of the applicant, and the Patent Office should be required to conform to such rule.

5. Something definite should also be enacted as to what shall be considered a prior use of the patented improvement.

It seems to me that no use or practice which has been private, or merely transient, or which has not been continued in use should bar a patent. Not having time to examine minutely the present state of the law, the writer wishes the above to be viewed as suggestions for the consideration of those who propose to offer a more systematical and comprehensive reform.

A. B.

### When to Wear India Rubbers.

We have noticed that many persons in our city wear india rubber overshoes in cold dry weather, to keep their feet warm. This is an injurious and evil practice. India rubber shoes are very comfortable and valuable for covering the feet during wet, sloppy weather, but they should never be worn on any other occasion; their sole use should be to keep out water. They should therefore be put off whenever the wearer enters a house, and be worn as little as possible, because they are air tight, and both retain and restrain the perspiration of the feet. The air cannot be excluded from them, or from any other portion of the body, for any length of time, without sensibly affecting the health. It is our opinion, that no habit tends more to good health than clean feet and clean dry stockings, so as to allow the free perspiration of the nether extremities.

### Russian Sea Worms.

The British fleet has found a terrible enemy in the Sea of Azof, in the form of large and destructive sea worms peculiar to those waters. These attack the uncoppered parts under the water line of the ships, and bore through them with the rapidity of an old carpenter handling an auger. Vessels navigating these seas have to be sheathed to the water line, or else their days are soon numbered.