### Molecular Changes in Nervous Structure.

For the future of physic we require to revise our views respecting the molecular changes which occur in nervous matter. The discoveries, in electricity, of Galvani and Volta, and the experiments made by Aldini, the distinguished nephew of Galvani, at the commencement of this century, were sufficient to startle every mind, and to develop a new era of thought. In 1803, one John Forster, a malefactor, twenty-six years old, was hanged at Newgate on the 17th of January, a cold, frosty day. The malefactor swung in the cold air one hour, with the thermometer 2° below freezing point. Then his body was conveyed to a house near, and in pursuance of sentence was delivered to the College of Surgeons. Master Keate, Master of the College (some of us remember Master Keate very well), Carpue (Thomas Hood's own Carpue), Hutchins (one of Carpue's prosectors), Cuthbertson the electrician, Blicke, an anatomist, Dr. Pearson, a physiologist, and young Mr. Brodie, were all at this house, together with Aldini. Aldini had a battery of forty cells in three troughs, and malefactor John Forster, cold, stiff, and stark, was subjected to the influence of the battery. An arc was made from the ear to the lower part of the trunk, and as the electrical stream flowed and penetrated into the life-suspended muscles, those muscles played again. John Forster grinned horribly at his manipulators as if they were hurting him; he opened one eye, and fixed it on something; he moved his limbs. They withdrew the electricity, and John Forster was quiet again; they tried if strong ammonia to his nostrils would influence him, and found it would not; but they re-applied the electricity with the ammonia, and the effect was so extraordinary they thought the wretch was actually alive again; but they stopped, and he stopped. Then they opened his chest and exposed his heart, to find that no electrical current would restore its rhythm; so it was clear that all through the experiment John Forster had not lived by his heart. It is also clear that voluntary muscles may be irritable, while the involuntary heart is quite dead.

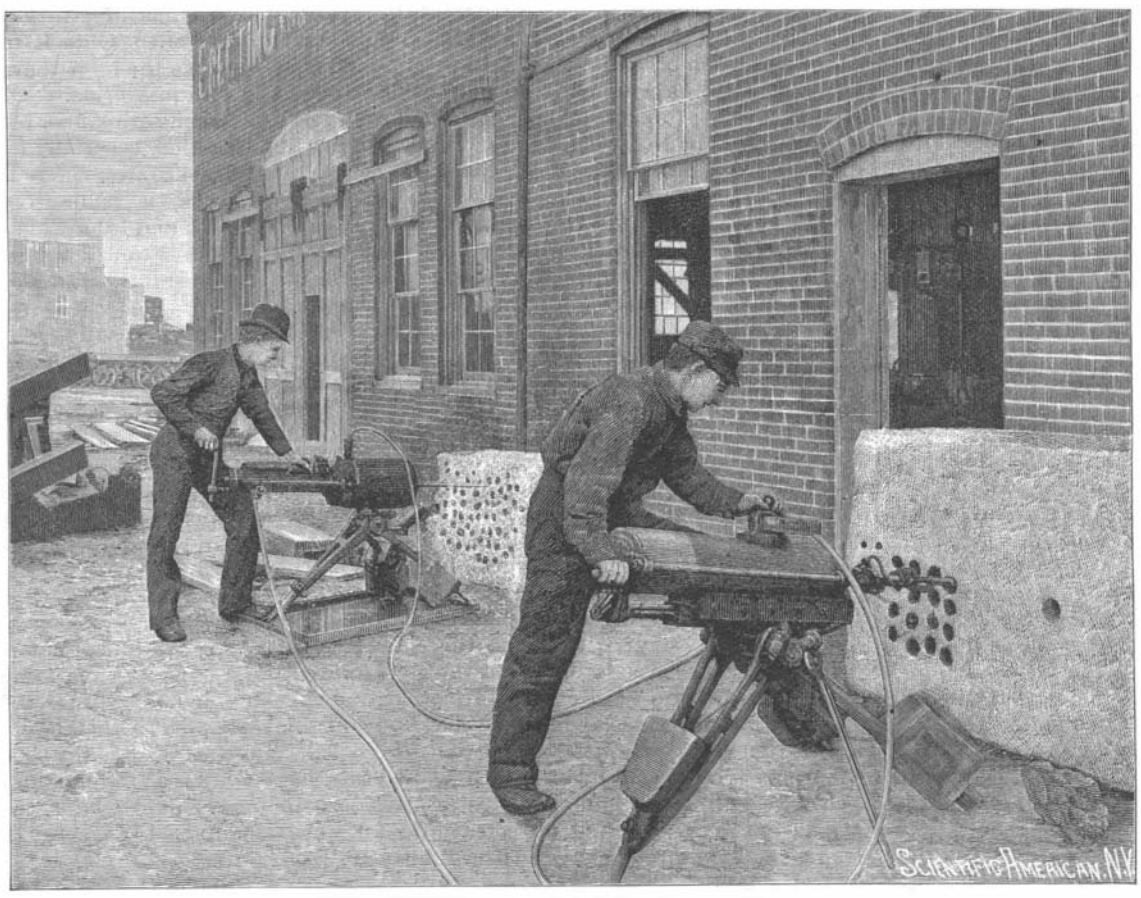
The experiment, as well it might be, was the marvel of the world, and Aldini, who did not, he tells us, mean to bring the malefactor back to life, became the hero of the hour. He was "presented." Master Keate made a good stride toward court eminence, and altogether there was popular fame on the winds traveling briskly over John Forster, malefactor, in 1803. As to the world of science, it was wild with commotion; a volcano bursting through a tranquil lake were not more grandly disturbing. Other experimentalists performed the same experiments on dead malefactors, and with like results; Galvani's theory of animal electricity recovered from the attacks of Volta; and by a vast leap of learned speculation, the human body was declared to be an electrical machine. Of course, for is not the torpedo such a machine, and is not that proof direct? So at once the old researches, from the time of Sylvius, through Haller, Winslow, the Munroes, about the existence of a veritable nervous fluid, went to the wall without question, or were as ignored as if they had never been.

Galvani's and Aldini's experiments were astounding, and rightly read they retain, as do all carefully proved facts, a lasting value; but they led to more error than any of which I know. There is nothing in science of nonsense so gross as the garner of nonsense that has been gathered up to this very time on the so-called animal electricity. Incoherency can go no further that it has gone in this direction, while science has not advanced a minute's march in ninety years toward even a preliminary demonstration of the existence within living bodies of a sign of an electrical mechanism, except in the rare cases of one or two specially constructed electrical animals.

Here then, I think, we have to call back and revise. We want to know, even yet, whether there be a nervous fluid traversing the nervous cords, or circulating between the nerve centers and the blood. And, particularly, we want to ascertain what is the molecular change of matter of the nervous system, when it sleeps or rests, when it wakes or moves. Light, I am glad to say, begins to break on this primary inquiry. We can make nervous substance temporarily solid by cold, *i. e.*, by crystallizing it, and then the nervous structure rests and sleeps. We have to see, then, whether, when our eyes droop with natural sleep, this same change of structure is not progressing naturally in nervous structure; we have to ask whether under sudden shock—shock from a bullet, for instance—the complete destruction of nervous power is not due to change of nervous matter under sudden vibration of its particles, like the change which occurs when water suddenly solidifies under motion, or when fluid fat becomes a concrete mass under brisk agitation.—*Dr. B. W. Richardson, in the Asclepiad.*

### ELECTRICAL ROCK DRILLS.

One of the most prominent exhibits at the Electrical Exhibition held in connection with the Montreal convention, and which attracted as much attention as any part of the whole exhibit, was that of the Edison percussion and rotary mining drills. The accompanying illustration shows these two machines at work. The Edison percussion drill will bore at the rate of three inches per minute in the hardest granite. It requires but little power to operate it, and, of course, can be worked at any reasonable distance from the dynamo, the limit suggested by the company being three miles. The drill is simple in construction, and there is nothing about it that would be affected by moisture. The diamond prospecting core drill, designed for locating mineral deposits, was also shown. This machine will bore 150 feet into the earth, bringing out specimens of mineral for the examination of the prospecting parties. Aside from this, the exhibit at Montreal included coal drills, electric hoists, fans, and pumps for mining use, an indication that the Edison company is turning its attention in a very practical way to this very important application of electricity.—*Electrical World.*




THE EDISON ELECTRIC ROCK DRILL.

### How to Manage a Semi-Dry Brick Press.

Were I to take charge of a semi-dry brick press, before I would start it, I would first examine it all over carefully and see that there are not any loose bolts, broken cogs, or other breaks or obstruction of any kind, such as blocks, cold chisels, ranches, etc., left anywhere in the machine. I would examine the dies or moulds and see that the liners and moulds were well bolted, see that the feed spout and the feed box are clean, and no nails, wood, or any rubbish so natural to brick yards, and brick yard carpentry and neglect, that would wedge under the feed box and break the guides or cams controlling those particular complicated parts when in operation. After I am satisfied that everything is clear and in safe working order, I would see that all the oil wells and oil cups are clean and filled with oil. At all places where I would find open oil holes and no cups for them, I would cover them with wooden plugs to keep dirt and clay out, to keep them from clogging up. From time to time I would examine all the journals, boxes and guides, and see that they were well oiled and not cutting. I would put a heavy coat of oil inside of the moulds. With everything ready for the start I would put on the belt, and holding the clutch lever in the left hand, I would slowly and carefully let the machine turn over (having no clay in the feeder of course). I would particularly notice that the plungers would lead into the moulds without cutting against the side. If the plunger faces would touch the sides, I would loosen the bolts holding the plungers to the cross head and adjust them properly, and equalize the space all around them and again tighten up for keep. After the second and a few more slow revolutions proved satisfactory, I would throw on the clutch and let her run for a minute or so at full speed, go all around it and see that everything is in working order. While the machine be running empty, I would raise the clay adjustment so that the moulds would not be over 4½ inches deep. Then I would stop the machine and fill the clay spout, letting it fall gently into it, as not to unequally pack it. When that had been done I would again let the press start up slowly under a light pressure, having one hand on the clutch lever for instant, if necessary, and then gradually lower the clay adjustment until the proper pressure or amount of clay in the moulds had been reached, which generally can be seen when the bricks begin to burst or split open lengthwise through the flat center. This last mentioned feature is the *tickler* of the scientific brick machine inventors, and there are not a few theories about this little simple thing that makes one astonished over the ignorant ideas that some of these learned men of the ironclad conscience have. One of the most surprising things is that they all claim that all their machines have sufficient pressure to exclude the air, and that it is the elasticity of the enormously compressed clay that rebounds and thus breaks the bricks. It is very true that there is a difference in presses and some produce better results than others, but in all cases it is the unexcluded and compressed air in the brick that breaks them; and when by that stage the pressman wants to guide his work, when the stage of indication of the splitting of the brick has been reached, then the amount of clay in the mould wants to be a trifle lessened as just to keep below that point, and the success will be the greatest. Occasionally the clay wants to be increased to see how near the quantity is right. It is better to throw away a few brick once in a while than to run too far different from the proper hardness.

Every machine should have a steam die-heating attachment using hot dies, say about 200 degrees temperature. In cold weather the clay will stick to the cold metal of the plunger plates or faces and cause much delay in cleaning them if dies are not heated. When hot dies are used, care must be taken that the plunger plates are not too close fitted; heating the dies and moulds, the steel of them will expand about one-sixteenth part of an inch and thereby getting too close fit, bringing the metal surfaces into contact and cut and damage them. At noon and evening, when shutting down work, the mould should always be oiled; in the winter time a little steam should be kept going through the plunger heads at night to keep them from freezing; it will save much delay and loss.

The driving belt on a press should not be kept too tight, as it is about the only safety guard on the present machines that are on the market. In case of an overload or some other accident it would give the machine a chance by letting the belt slip or run off. With a little common sense and care the poorest press can be kept in fair order.—*Clay Journal.*

### A New Thermometric Scale.

F. Salomon proposes a scale which has a relation to absolute zero, so that its readings directly indicate the volumes of gases at various temperatures. The starting point is —273° C.; from this to the freezing point of water the scale is divided into 100 equal parts, so that 0° C. corresponds to 100 of the new scale. From this to 273° C. the scale is again divided into 100 equal parts, 273° C. being 200, the same proportion of division being continued as far as desired. Each degree of the scale is therefore equal to 2·73° C., and 1° C. to 0·3665 of the new scale; the boiling point of water lies at 136·6.

The use of the new scale is seen from the following examples: One cubic meter of a gas at 0° C. or 100° absolute temperature would measure at the boiling point of water (136·6) 1366 liters. At 200° C. or 173·2 absolute temperature, it would have a volume of 1732 liters.

G. Lunge recommends this scale as forming the solution of a little difficulty which is felt in gas analysis.—*Zeitsch. f. angew. Chem.*

HOT water cannot be raised to any considerable height by suction.

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