Test of American Iron and Steel.

The Sundry Civil Appropriation bill, passed among the last acts of the late Congress, contained an appropriation of $75,000 for tests of iron and steel, to be made by a Board of Engineers, who are to serve without pay, with the exception of the Secretary. The members of the Board have recently been appointed by the Secretary of War, as follows: Colonel T. T. S. Laidley, Ordnance Department, U. S. A., resident; Professor R. H. Thurston, Secretary; Commander L. A. Beardslee, U. S. N.; General Q. A. Gilmore, Engineer Department, U. S. A.; Chief Engineer David Smith, U. S. N.; W. Lovy Smith, C. E.; A. L. Holley, C. E. A testing machine is to be built, and set up at the Watertown arsenal, where the experiments are to be conducted. The Board will receive instructions from, and report to the Chief of the Ordnance Department of the Army.

The members of this Board are all well known engineers, several of whom have already distinguished themselves by their investigations of the properties of materials used in construction. It would be difficult to overestimate the value of their future experiments, if carefully conducted. To mention a single instance, it may be stated that the English formula deduced from Gordon's experiments is almost the only authority available to our engineers for computing the resistance of materials to compressive strains. Very few of our engineers could afford to make such experiments as they desired; and when such investigations were conducted by companies, the results were not usually available for general use. It seems probable, therefore, that the appropriation, made by Congress for these experiments, will be productive of more good than many other items for which ten times the amount was allotted.

NEW MODE OF TREATING BELTS.—A correspondent of the *Scientific American* writes as follows: I have for the last 25 years, on every Saturday evening, turned the inner side of my engine belt outside, let the engine run slow, and washed the belt well with warm water and soda, applied with cotton waste. Next, I take a piece of sheet metal and scrape well the belt, next wash with clean warm water, and dry off. I collect the waste oil from the shafting and apply to the belt as much of it as possible. The washing must be done as quickly as possible so as not to dissolve the glued parts. I let the belt stand on the pulleys till Monday, then give another scraping and turn the belt as before. I keep the pulleys very clean. I have long been surprised at the economy I have effected with very little trouble. I have not bought a new belt for the last ten years. There is an engine next me, 14x36 inches (mine is 12x36). I have nearly double the shafting and belts, and my neighbor cannot run with less than 38 lbs. of steam when all the belts are on the loose pulleys. Mine will run at full speed with 5 lbs.

These suggestions, adds our cotemporary, will be appreciated by our readers. One must begin with a first class belt, made in the best manner, and use considerable judgment, in following the practice of our correspondent.

A NEW HEATING FURNACE.—A new invention has recently been made by Messrs. C. Reese, master mason, and Thomas Johns, superintendent of the mill of the iron and steel company, at Ironton, Ohio. The improvement is practically a double furnace, having a grate at both ends, with the flue in the center, passing down between the two doors under the body of the furnace into the chimney on the other side. The inventors claim that this furnace will do one-half more work, for the reason that the heater can be charging at one door whilst drawing at the other; and that it will save largely in iron from the fact that the cold air passes directly to the flue before reaching the iron; that it will save greatly in coal, there not being so large a surface to be heated as in the ordinary furnaces; and further, that it costs less to build and less labor to work it, doing away with the labor of pulling the flue piles to the bridge for sufficient heat, the last pile charged being the first ready to draw out. The furnace is said to be well suited to rail, bar, plate, guide and hoop mills. It is believed by practical iron workers that this furnace will prove to be an important addition to the productive capacity of rolling mills. There will be one of them put in the mill of the above mentioned company as soon as possible.

ABSENCE OF OXYGEN FROM ARTESIAN WATER.—M. Gerardin, in a paper read to the Paris Academy of Sciences descriptive of the artesian wells of Grenelle, finds there is no oxygen present in the water from the lower sandstone of this locality, nor from the Rilly gravel beneath the clay and at contact with the chalk (the water was obtained out of contact with air from various depths by means of a syphon invented by the author), nor from the Soissonais gravel. Neither was this gas discovered in the water from the artesian well at Gonesse. M. Gerardin concludes that water obtained from subterranean depths does not contain oxygen if kept from contact with the atmosphere. This precaution is essential, for in contact with the air it dissolves several cubic centimetres of oxygen. The author has often found in the interior of the ascension tubes long white opaline filamentary algæ. These algæ present the curious property that they remain white in solar light as long as the water is deprived of oxygen, but they become green the instant the water is the least aerated. Their sensibility to the action of oxygen is most delicate. The action of the algæ serves to confirm the chemical test with hyposulphite of soda.

ORIGIN AND PHILOSOPHY OF LIMESTONE CAVES.—Caves in limestone have usually had their origin in fissures, through which water flows, or at one time flowed, at first slowly percolating through them, and then, as they gradually became larger and larger the volume of water likewise increased, until the fissure became converted into a true underground river or water course; even in cases where no water flows through them at the present day it can plainly be seen that such was the case once.

They are eaten out of the limestone by the solvent power which water charged with carbonic acid possesses. Ordinary water free from carbonic acid would be quite incapable of dissolving out the limestone, but all natural waters contain more or less of that gas, derived by the rain from the atmosphere and from the decaying vegetable matter which it meets with in its passage through the soil. All limestone caves usually retain more or less completely their original form of fissures, expanded, perhaps, in parts, into vast caves and chambers of immense proportions, but again contracting a little further on into a mere crack or tunnel. Comparatively large rivers are received by such caves, which then continue their course underground, in some cases suddenly appearing to the light of day again, but in others making their way beneath the surface right out to sea. Certain of the South Australian creeks are thus discharged.

THE ANDES GRADUALLY SINKING.—The highest points of the Andes are thought to be sinking. In 1745, when measured by La Condamine, Quito was found to be 9596 feet above the sea. In 1803 Humboldt made it 9570 feet, in 1831 Boussingault 9567 feet, in 1867 Orton 9520, and in 1870 Reiss and Stubel 9356 feet. If the earliest and latest measurements were exact Quito has sunk 240 feet in 125 years.