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(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Improved Cotton Press', 'Popular Errors in regard to the Patch', 'Nitro-glycerin Explosions', etc., with page numbers.

THE NEW COMMISSIONER OF PATENTS.

The President has appointed GENERAL MORTIMER D. LEGGETT, of Zanesville, Ohio, U. S. Commissioner of Patents. He will enter upon his duties immediately upon being confirmed by the Senate.

THE PROPOSED FAIR OF THE AMERICAN INSTITUTE IN 1876.

The proposition to hold a grand International Exhibition in New York city, under the auspices of the American Institute, in 1876, on the occasion of the centennial celebration of the birth of our Republic, has long been entertained by the Board of Management, and now seeks tangible shape in a memorial to Congress and a circular addressed to whom it may concern.

The occasion selected for this grand project is very appropriate, and must at once challenge the support and insure the sympathies of all patriotic citizens. We hope that something worthy of the country, and in keeping with the high reputation of the Institute, will be accomplished.

We had occasion, recently, to speak of the importance of scientific administration and to deplore the lack of this potential energy in the public and private affairs of our country; and we are forcibly reminded of this topic when we contemplate the immense undertaking the Institute has proposed to itself.

In a circular, prepared no doubt for the information and instruction of Members of Congress, entitled, "The American Institute and its Mission," we find an interesting account of what the society has accomplished towards the encouragement of American industry.

These fairs had small beginnings but they have shown a steady growth, and the last one was the best of all. Considering the limited means at their disposal and the want of a suitable building in which to hold their exhibitions, it cannot be denied that the managers have produced results very creditable to their administration and full of encouragement for the future.

The circular speaks of the valuable scientific library of ten thousand volumes, to which the members of the Institute have free access; and of the four clubs now in full operation, the proceedings of which have an enormous circulation throughout all parts of the Union.

whose proceedings are so extensively read, and in this respect it challenges competition.

We understand that the Institute has in real estate and government securities property of the value of three hundred thousand dollars, and this amount is now steadily increasing from the proceeds of the annual fairs and the interest on bonds.

The hundredth anniversary of our independence can be celebrated by the Institute without an appeal to Congress. It is the obvious duty of the citizens of New York to put up a suitable building for annual fairs and permanent libraries and collections.

The Paris Exposition of 1867 was the last and best of its kind. We shall never see anything like it again. The building covered forty acres of land; the park outside embraced eighty acres more, and there was an island of fifty acres in the river Seine set apart for agricultural implements.

"In the hands of the long-tried and experienced management of the Institute, the World's Fair of 1876 will, without doubt, eclipse those of the Old World." The committee who have the matter in charge would do well to follow the example of the English Commissioners, many of whom had served in 1851 and 1862, who, when the question of another World's Fair, in 1872, was proposed, unanimously decided that such a project, in the present age of industrial progress and invention, was impossible, and they have changed the whole plan of decennial fairs into annual exhibitions of specific objects.

The true plan for the exhibition managers of the American Institute, is, therefore, to profit by the teachings of the English Commissioners, and to abandon the idea of an International World's Fair. They will be much more likely to obtain money from our citizens when they ask for a million dollars, than when they come before the public with plans involving an outlay almost as great as the cost of the Pacific Railroad.

MECHANICAL POWER.

We have often been obliged to correct errors in thought arising from the fact that many of the words used in scientific discussion still do double duty, retaining not only the meaning formerly attached to them in the times when knowledge was comparatively imperfect, but being also used to express ideas obtained through more modern research.

The term "power" is such a word, and perhaps no other in the language leads to greater confusion in thought among those who have not made the sciences of physics and mechanics special studies. It is with the intent to give clearer notions of the proper use of this term that the present article has been written.

In its primary philosophical significance the word power means ability to do any act of volition. In this sense the idea of power is connected with that of will, but the original meaning has been extended to the conditions of change in things animate as well as inanimate. When the conditions necessary for a given effect exist in connection with any body or mass of matter, we say that body has the power to produce the effect.

In the mechanical or dynamical sense, however, the word change in the definition of the term power is limited wholly to change of position in masses, or mass-motion, and the heat produced by friction. When we speak of overcoming resistance we are only using an expression which means the production of increased motion in masses of matter, or portions of masses, and the molecular motion of heat caused by friction.

In a static sense the word power is popularly used to express the "tendency to produce motion;" or, in other words, it is used as synonymous with force in ordinary language.

In mechanics, even by some eminent writers, the term is used not only in a general sense as ability to produce motion, or to perform work, but, in a specific sense, as ability to do some particular work under particular circumstances. In this sense it is used in the old saying, that "what is lost in speed is gained in power, and what is gained in speed is lost

in power." This is only true when the word power is used in a special sense. In this sense an engine that would pump a ton of water to the height of fifty feet in one hour, by a succession of impulses, might be entirely insufficient to raise it as a mass, unless a train of wheels or other device be employed to "change speed into power."

We think it is much to be regretted that the use of the word "power" is not restricted in mechanics to its dynamical meaning. Its use as a synonym for force is liable to mislead the mind and cause confusion on points of mechanical science requiring the utmost clearness of conception.

The term "mechanical powers," as applied to the elements of machines—the wheel and axle, inclined plane, lever, etc.—is singularly inappropriate, and has been discarded by some of the best writers on mechanics. No one of these elements is a mechanical power, in any just sense of the term. It is only by the addition of other circumstances that they even become instruments for the transmission of power.

The want of clear conceptions of the distinction between the meaning of the term power, when used in its dynamical sense, and the term static force, or pressure, has led to more absurdities than any other error in mechanical science. Some of these absurdities are apparent in the series of articles on "Perpetual Motion," now appearing in this journal.

OBJECT TEACHING AND SCIENCE.

The public are beginning to be awakened to the fact that technical education is the education they require, being in accordance with the conditions of modern civilization; and it is admitted that such technical education must be based upon a foundation of natural knowledge. The principles of the natural sciences must then, for the future, form an essential part of popular education; the only questions are, how far and in what manner are these sciences to be introduced?

Whatever is to be the amount taught, educators are agreed that the first steps in natural science, or, in other words, in systematizing natural knowledge, are to be taken as early as possible. Early impressions are the deepest, and every child before its school days is already an untrained student of nature. The foundations of technical education should, therefore, be laid in the primary school; but whether commenced thus early or not, the method will always be the same. The child must be encouraged and guided in its natural habits of observing, and it must be led to systematize its observations, connecting them together by a chain of reasoning into groups of related ideas. This method is simply that known as "object teaching;" and you may as well try to fly without wings, or to teach geography without maps or globes, as to teach natural science without objects and diagrams.

It has been recently advocated that every public school should be supplied with a collection of objects to illustrate the fundamental facts of natural science. By all means let it be so; but let the first use to which these are put be to instruct the teachers themselves in what they will have to teach. Let them learn what there is in each object of educational value, and what are its worthless characters; let them recognize that no object is complete in itself, but is merely a part of a vast whole, and that their office is to lead the child to recognize its most important relations to other objects. In building up the edifice of knowledge, they must not use every rough stone indiscriminately, but they must teach the little builders to chip off the useless angles of selected pieces, and so shape them that every stone shall, at its proper time, fit into its proper place.

We fear that no better end is attained by, or can be hoped for from, object teaching in our public schools, until, as we have said, the teachers themselves are thoroughly educated in the principles of natural science. To accomplish this, however, the ear of those who rule the teachers must be gained; and we raise the question whether the representatives of science should not have a voice in the management of our public school system? As object teaching is a mere handmaid of science, is of use only to give scientific habits of thought, and to convey a knowledge of scientific facts, and is worthless without science, the public should see that