Advantages of a Mechanical Education.

In this age of iron and steam, the young man who thoroughly understands the nature and manipulation of the former, and the scientific and practical management and application of the latter, need not long be without lucrative employment; provided, of course, he has the moral and physical qualifications for a position of responsibility and trust. While it is true that a large number of the prosperous manufacturers and contractors of this country have never had the advantages of a so-called technical education, such as is afforded by a mechanical college, yet the day is fast approaching, when, as now in Europe, our large industrial establishments, and our boards of public works, will demand a scientific and technical education of the men who direct these undertakings.

As our country grows older men will pay more and more attention to an education which fits them for some definite pursuit in life, and their entire educational course will be framed with this particular object in view. A bent for mechanical pursuits usually manifests itself at a very early period in life; the inclination of the six-year old boy to hammer and pound, to tear open toys and clocks to "see what makes 'em go," all so annoying to the careful parent, may be taken as indications of latent constructive genius, although now manifested in a very destructive form.

In the youth the mechanical bias becomes still more apparent, manifesting itself in attempts to construct wagons, boats, gig saws, small engines, etc. With such a boy a mechanical education is no doubtful experiment; talk to him about it, and he wants to go to a mechanical college at once, where he may learn to be indeed and in truth a competent mechanical engineer.

Just at this point, well-meaning parents, in order to fulfill some preconceived plan, or to do what seems to them prospective of most good for the son, endeavor to force him into some other line or profession, and thus make a third rate lawyer, doctor, or merchant, out of a boy who would have certainly made a first rate mechanic. Of course there is a vast difference between a merely whimsical tinkerer and a youth with undoubted mechanical proclivities; and an observing parent or experienced teacher would have no difficulty in making the distinction. A few queries put by a judicious technical educator would soon reveal the young man's inherent prejudices, and enable him to judge whether the candidate possessed a promising foundation for a mechanical education.

Such a foundation consists mainly in an aptitude for mathematics, a good idea of form and construction, a ready insight into mechanical movements, a positive love for machine manipulation, and a tendency to improve every possible opportunity to witness machinery in motion, coupled with a desire to see into and learn its office and applications.

The above is from *Leffel's News*, to which the editor adds:

There are numerous excellent institutions in this country in which a youth of the character we have described can get the education requisite to develop his natural powers and to fit him to fill a useful and profitable position in the field of practical mechanics; to enter the list as an inventor, or, in time to superintend important public works.

Among these institutions might be named Columbia College, New York City; Stevens Institute of Technology, Hoboken, New Jersey; Cornell University, Ithaca, New York; Rensselaer Polytechnic Institute, Troy, New York; Ohio State University, Columbus, Ohio; and Illinois Industrial University, Champaign, Ill. All of these institutions publish catalogues giving schedule of studies, terms of tuition, cost of living, etc.

Of the students recently graduated from one of the above named institutions—the Stevens Institute of Technology—one is now engaged in a steam-heating and ventilating establishment; another has a position on the Michigan Southern Railway; another is employed as instructor in the Institute; another as a consulting engineer; another in the Midvale Steel Works; another as assistant editor of a technical publication; another in the Franklin Paper Mills; another in the engineer corps of the United States navy; another in the car-shops of the Pennsylvania Railway; another in the manufactory of brick machinery; another as professor of engineering at Yeddo, Japan; another at ship-building works in St. Petersburg, Russia, and another on a survey and exploration of the Western Territories.

The course in the institution just named is somewhat exacting, as indeed it must be to turn out men capable of filling such positions as we have named, but the earnest student has the advantage of association with those who are as enthusiastic as himself, and, as he gets into the higher classes, the *dilettanti* drop out, and those who have in them the stuff out of which competent and successful mechanical engineers are made, move forward to graduation and go out to assume the duties of their vocation thoroughly prepared for their life work.

Magnesium Steel.

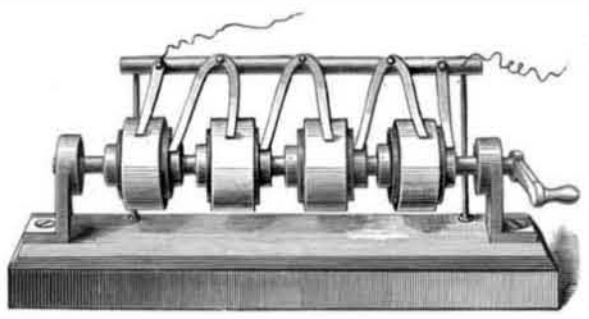
Magnesium also causes a remarkable change of structure in other metals. A coarse-grained steel becomes fine-grained on the addition of one-fifth per cent. of magnesium. In performing the experiments referred to, the magnesium must be introduced through a hole in the cover of the crucible after the oxygen has been first removed by the addition of a few pieces of charcoal. Without this precaution violent explosions are apt to occur.—*Ber. d. Chem. Gesell.*

PROGRESS AT MENLO PARK.

Mr. Edison has wisely kept his own counsels of late, so that very little is known outside of his laboratory as to what goes on within. Occasionally the public gets an idea through the publication of one or two of the scores of patents pending and complete; but these do not indicate the real nature of the improvements that are maturing and soon to be made known.

The electric light and the various matters pertaining to it engross the attention of Mr. Edison and the majority of his assistants; but just at present the electro-chemical or loud-speaking telephone is being made ready for the market. It is a wonderful advance in telephony. It talks as loudly as the natural voice, and repeats the words louder than they were originally uttered at the distant station. As the construction of this curious instrument was described in these columns in detail some time since,* it will be unnecessary

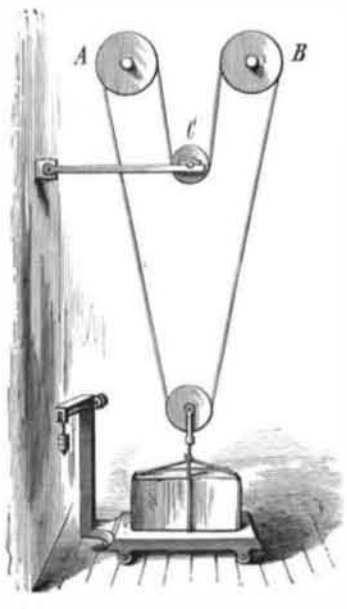
Fig. 1.



to repeat the description here. The telephone depends for its results on the varying friction upon a rotating chalk cylinder, of a platinum faced arm attached to the mica diaphragm of the instrument; the variation in friction being due to electro-capillary or electro-chemical action upon the surface of the chalk effected by an undulatory electrical current proceeding from the secondary wire of an induction coil whose primary is in circuit with a carbon transmitter.

Mr. Edison discovered some peculiar freaks in the receiving instrument which at first puzzled him; but on connecting the binding posts of the telephone with a galvanometer, he found to his surprise that the chalk and platinum rubber of the telephone formed a generator of electricity of no mean order, as it equaled in electromotive force a half of a Daniell cell. He therefore arranged four of the chalk cylinders upon a non-conducting shaft, and connected the platinum rubber of one chalk cylinder with the metallic boss of the next, the terminals being a rubber on one end, and a spring tonching the metallic boss of the chalk cylinder at the other end. A series of four chalk cylinders thus mounted and connected (as shown in Fig. 1) is equivalent to two Daniell cells, but the power varies somewhat with the speed at which it is rotated. Mr. Edison is investigating the action of this peculiar battery. He finds that its resistance is 1,200 ohms when at rest, and only 50 ohms

Fig. 2.



when in motion: this is for ⅛ inch metallic surface on the rubber. When this surface is increased to 1½ inch the resistance will be reduced to 1 ohm. Whether the current is due to the decomposition of the solution with which the chalk is moistened, or whether it is due to capillarity or some other cause, has not been definitely determined.

Mr. Edison, in speaking of the electric light, says with a great deal of emphasis, that the system of lighting by incandescence is correct theoretically and practically. It is being perfected in detail, and will before long be exhibited to the public. It would seem from what is at present being done in the Menlo Park laboratory that there are hundreds of points in the problem of electric lighting that have not been considered by experimenters; among these are the proper treatment of the metal or mineral to be subjected to the intense heat required to bring it to incandescence; the insulation and protection of the electrical conductors; the meter for the measurement of the current; and the generator of electricity, which is, after all, the most vital point in the system. Much of the detail of the system has been perfected. The machine which is to supply the current has been completed, and is now undergoing a series of tests to determine its efficiency. Ninety-six per cent of the power applied to the machine is realized in the electric current, and 82 per cent of the power is made available outside of the machine. This is about double the effective exterior current realized by other machines. We hope to give our readers a description of the generator as soon as the tests are completed.

In endeavoring to measure the power required to drive the generator Mr. Edison has tried every dynamometer within reach, and condemned them all. At last, after considerable experiment, he hit upon the simple contrivance shown in Fig. 2. He claims that with this apparatus he can measure the $\frac{1}{100}$ of a horse power. The weighted box rests on the platform scale, and is provided with a pulley for receiving the driving belt, which passes over the driving pulley, A, under the tightener, C, and over the driven pulley, B. The number of foot pounds of power used will be indicated by the lifting of the box and the consequent lightening of the load on the scale. Five per cent is deducted for the angle of the belt and for friction.

Mr. Edison's dynamometer is certainly very simple and effective, but it is in principle something like other dynamometers, employing a weight as a measure of power.

As an evidence of the faith of Mr. Edison and his colleagues in the system of lighting by incandescence, we mention the fact that they have prospectors searching for platinum in all the mining regions of the country.

Mr. Edison is confident that the metal exists in large quantities in this country, and he has sent out circulars which read as follows:

FROM THE LABORATORY OF T. A. EDISON,
MENLO PARK, N. J., U. S. A.

DEAR SIR: Would you be so kind as to inform me if the metal platinum occurs in your neighborhood? This metal, as a rule, is found in scales associated with free gold, generally in placers.

If there is any in your vicinity, or if you can gain information from experienced miners as to the localities where it can be found, and will forward such information to my address, I will consider it a special favor, as I shall require large quantities in my new system of electric lighting.

An early reply to this circular will be greatly appreciated.

Very truly, THOMAS A. EDISON.

MENLO PARK, N. J.

Specimens of platinum and iridosmine sprinkled upon a card were sent with these circulars. The difference in the metals is easily detected with a microscope or magnifying glass.

Many replies, inclosing samples of platinum, have already been received at Menlo Park, and the metal has been found *in situ* in two places. Mr. Edison has a stamp mill and all the apparatus required for reducing ores of various kinds. His facilities for reducing refractory ores and metals are particularly good.

* Vol. xl., page 260, SCIENTIFIC AMERICAN.

American Produce Exported into Scotland.

The landings of cattle, fresh and cured meats, and dairy produce at Glasgow, from New York and Canada, during the month of May, show, according to the London *Grocer*, a considerable falling off as contrasted with the imports in the corresponding period of last year. There were 435 live cattle and 843 live sheep brought over, being 215 cattle and 659 sheep fewer than in May, 1878. Of fresh meat there were 3,250 quarters of beef, and 650 carcasses of mutton, against 7,200 and 475 quarters and carcasses respectively in the same month last year. There were also 3,550 cases of preserved meats, 4,446 packages of bacon, 300 barrels of pork, and 1,900 tierces of beef and hams. Excepting in pork, the import of which was about one-half greater, all the other commodities aggregated not much over one-half the imports during the same month of 1878. The same may be said with regard to the imports of butter and cheese, of which there were 7,561 tubs of the former and 11,200 boxes of the latter, as compared with 10,000 tubs and 20,000 boxes in May of last year. The landings of lard and tallow aggregated 3,000 tierces last month, being a falling off to the extent of fully one-half.

The Cental System.

The Committee on Trade, in a report to the Board of Managers of the New York Produce Exchange, suggest October 1, 1879, as a suitable day for the introduction of the cental system in all transactions in produce bought and sold by weight. The committee recommend that the different trades represented in the Exchange be requested to so arrange their business that all their dealings in grain, flour, meal, provisions, lard, tallow, butter, cheese, petroleum, naval stores, oils, hay, salt, seed, dried fruit, live and dressed stock, freight, storage, and all other articles of produce that are or may be dealt in on the Exchange, and insurance thereon, shall, on and after the date named, be exclusively on the basis of weight, the unit of transactions to be the pound avoirdupois, and the multiple thereof to be the cental or 100 pounds avoirdupois.