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Geography and Geology.

The first of our subjects, geography, is the science of describing the surface of the globe, while geology has for its object the description of the interior of the earth, and tracing the history of the rocks of which it is composed. Any one looking at a map will at once perceive the amount of talent, observation and calculation necessary to perfect such a drawing, and the same is equally true of a geological chart or section. We wish, in this article, to show the necessity of a perfect description of our earth, and also indicate the means at command for performing the labor, and, so to speak, for jotting down the items in the great encyclopædia of facts.

It is of the utmost importance to the mariner, and all who trust themselves upon the ocean, that there should be perfect and reliable charts and instructions, deduced from practical observations, of the route they are about to travel. It is equally necessary that every current should be indicated and soundings taken, and the depth of water, at various points, marked on the charts, so that every ocean and sea may become as well known as the Atlantic, from New York to Liverpool. Commerce demands geographers to work in this field, and the saving of human life is their reward. Again, it is necessary that the land should be equally well mapped out, in order that boundaries may be accurately determined, and the divisions of States and countries may be truly known. It may seem surprising to some of our readers, that the destiny of a nation often depends on a geographical question. The late war between Great Britain and Russia was one of boundary, and the Paris Conference was called to settle the question; and there are many parallel cases in history where one geographer would have settled a question which took many battles and victories to determine.

Geology is important, as developing the resources of a country—its explorations are requisite to make out where the coal, iron and mineral veins are concealed—to discover the locality of building stones, and marbles, and of clays for bricks, and also to determine their extent, and the best places to commence their working.

Now, let us inquire the means at command for attaining these objects. The governments of nearly every country having any pretensions to civilization have now an organized body of scientific men to make these geographical and geological charts, sections and maps. We have a Coast Survey, and we are occasionally sending out exploring expeditions whose aim is to do the work we have mentioned. Each State has its geologist and scientific corps for exploring and giving to the world an account of its resources and capabilities. Great Britain has her Ordnance Survey, and her ships of war are always carrying on this work of mapping the globe. Germany has her great band of scientific amateurs, and the learned of each nation are voluntarily doing their utmost for the good of the world.

A vast amount of labor has been done in this field by the means we have specified, but there yet remains much to be done, and we would point this out as a sphere of enterprise in which many can engage, and by first making a chart of their own district they may extend their labors to wider and unexplored fields.

Winter Evenings.

The season when King Frost enchains our country in his icy grasp, and throws his white mantle over the earth, will soon be upon us, and we must begin to think what we shall do with ourselves in those long winter evenings, when there is no comfort but at the fireside, or in sitting close around the stove. Those evenings contain many precious hours that ought not to be, as they too often are, wasted and lost. Reader, we will propose a scheme to you whereby you will find them pass pleasantly and profitably; and when spring again comes, with its gladsome sounds and beauteous vegetation, you will be happier and better for the winter that has passed. Our advice, then, is, learn to do something. No matter what—to draw, to paint, to put together machinery, to read or speak a language that at present you do not know; invent something in your own line of business that is wanted, and determine to make it by the spring. Learn something, read a useful book every evening, if only for an hour; but do whatever you determine regularly and punctually, and you will be surprised how much knowledge you will have acquired in a short time. Do not idle away the precious moments in foolish conversation and story paper nonsense, although they are both very good in their place; but try and master a branch of science—each one of you knows which you like the best, and which is best suited to your habits and capabilities—and should you meet with difficulties in the way, as no doubt many will, write to us, and we will give you the best aid and advice that it is in our power to dispense.

At any rate, set earnestly to work, and learn to do something, and who knows but that there may be among the subscribers to the SCIENTIFIC AMERICAN an embryo Newton, Herschel, Morse or Watt. If such there should be, this advice may tend to develop his genius, and the world will eventually thank us for having advised our readers not to neglect their winter evenings.

Manufacture of Starch.

Starch is an important element of food with animals as with vegetables, and its ready convertibility, without change of composition, into suitable forms, such as dextrine and sugar, fits it exactly for carrying on those changes which occur in the juices of vegetables. It is stored up in the seeds, roots and pith of plants, and by its decomposition affords the materials for the most essential vegetable products. Starch, from whatever source, always presents the same chemical characters; its physical peculiarities may, however, vary slightly. In its pure state, it is a fine, white powder, without taste or smell, and has a peculiar crispness when rubbed between the fingers. It is not soluble in cold water, and on this fact the manufacture, or rather, the extraction, of starch depends. The simplest method of preparing starch, and separating it from the gluten, and other constituents of wheat, is by washing dough in a linen bag, in a gentle stream of water. The usual process, however, whether potatoes, wheat, rice or maize is treated, is as follows:—

The substance is crushed, left to steep in cold water, and occasionally agitated; or a quantity of the grain is conveyed, by appropriate machinery, under small jets of water, until all the starch grains are washed out; the water having the fine starch suspended (not dissolved) in it, they are left to settle, and then dried, when they crack into the little prismatic shapes so well known to all consumers of the article.

The crushing is a very inconvenient operation, especially with indian corn; and Mr. Watt, of Belfast, Ireland, has taken out a patent in this country for the manufacture of starch from indian corn whole. His process is as follows, and in our opinion will be found to answer perfectly:—He first takes the car of corn, and steeps it in water for a week, keeping the water at any temperature between 70° and 140° Fah., and changing the water several times. In this there will be a slight fermentation, and as soon as it has ceased, the corn is taken out and ground to a kind of powdery pulp, as it is quite soft from the steeping. Warm water of the above temperatures must be kept running through the millstones, and this will carry away the starch; the water is passed through the seives, or other arrangement for catching the starch, and the whole is allowed to settle—the clear water being run off, and the starch dried and packed as in older processes. It was patented June 30, 1857.

Human Strength.

When we say that any one is strong, we mean that he is capable of enduring physical exertion and fatigue longer than the average run of men. Many experimenters have endeavored to find an average on which to base observations as to the strength of men; but many allowances have to be made for climate, temperature, food, age, and other accidental interferences. It has, however, been determined that the best method of arriving at a true idea of the strength of men, is to observe the average effect produced by a laborer who continues his exertions several successive days. What is called a "dynamic unit" is then fixed upon as a standard by which to compare results, and this is 1,000 lbs. avoirdupois carried one foot in one minute.

According to M. Coulomb, a man traveling on a level road may walk 30 miles per day, or 264 feet per minute, and continue his exertion for ten hours a day. Taking the man's weight at 150 lbs., he has expended 23,760 dynamic units, or, in other words, has used the amount of strength that would have been required to transport 23,760,000 pounds one foot in one minute.

If instead of walking on a level road he ascends a staircase, the velocity is reduced to 26·4 feet per minute, and he can only work eight hours per day. In this case he has only expended 1,901 dynamic units.

A person carrying a weight of 90 lbs. along a level road, travels at the rate of a mile and a half an hour, or 132 feet per minute, and continues his exertion seven hours per day. The useful effect is, consequently, 4,989 dynamic units.

The force which a man exerts in dragging a load has been variously estimated. Schulze says that a man can exert a pressure of 107 lbs. for a short time, and that a man may walk at the rate of from 4¾ to 6½ miles per hour.

The most advantageous method of employing human strength is in rowing a boat. Of course there are numerous exceptions to these rules of strength we have given, as they can but be an approximation to the average; but in investigations of this kind we must be content with such results.

Another Important Decision by the New Commissioner of Patents.

We have the pleasure to present, in this number of our journal, the report of a late decision by the new Commissioner of Patents, which not only confirms our previous high estimate of his administrative qualifications, but foreshadows the inauguration of a line of future official action that cannot fail to be productive of the most important results.

The decision in question was given in the case of D. D. Badger's appeal, on an application for a patent for an improvement in iron beams, and claimed as a "new article of manufacture." The application was twice rejected, and then carried up on appeal to the Commissioner, who referred it to a Board composed of Chief Examiners Baldwin and Dodge, with instructions to report back to him in the usual manner. Counsel for applicant (Munn & Co.) filed with the appeal a special request that, in rendering its decision, the Office would define its views in regard to the consideration of claims of a character like that presented. The Board was unable to agree, and the members reported their respective opinions to the Commissioner, who thereupon gave the case a personal hearing. We annex his decision. He confirms the report of Examiner Dodge, and sets aside that of Examiner Baldwin. We should be glad to publish both the reports of the Board, but our limits, at present, forbid. The report of Examiner Dodge is very interesting. He takes the most broad and liberal grounds, and fortifies every position by quotations from the highest authorities. His arguments are unanswerable.

We would here remark that much contrariety of opinion has, for a long time, existed among the examining officers at the Patent Office, not only as regards the proper wording of claims and titles, but also in regard to the degree of novelty that an invention must contain in order to render it patentable. Each Examiner has been permitted to follow his own notions in rendering decisions, and to constitute himself judge, jury and prosecuting attorney, in disposing of the petitions of applicants. The result is that the decisions and practice of the Office have often been of a contradictory, and sometimes of a ludicrous character.

We rejoice to believe that this mixed-up method of practice is about to be drawn to a close. In the accompanying decision, Commissioner Holt declares, in effect, that under his administration, the Patent Laws *shall be liberally construed;* that every new and useful improvement shall be entitled to a patent; that *simplicity* shall not be a bar to the patent; that names are not things; that the applicant may patent his improvement as a "New Article of Manufacture," or give it any other term that he chooses; that it is sufficient if the specification describes an invention uniting the indispensible requisites of novelty and utility; that the applicant shall not be embarrassed or impeded by the demands of Examiners in reference to terms and words.

We regard this decision of Commissioner Holt as one of the ablest documents that has ever emanated from the Patent Office. It is strong, dignified, liberal and bold. The constitutional aspect of the whole subject is examined and discussed with judicial clearness. The concluding portion contains an eloquent tribute to inventors, which will be read by them, in all parts of the country, with thrilling interest, and with immense satisfaction. He addresses them as *the benefactors of their race;* and says that it is the duty of the Patent Office, instead of perplexing and discouraging, to take them kindly by the hand, and, if possible, strew their pathway *with sunshine and with flowers!*

Most cordially do we respond to these sentiments. Most heartily do we applaud the Commissioner for the noble stand he has taken in behalf of inventors. In their name, and in the name of the whole country, we thank him for what he has already done, and we urge him to *go on*, fearlessly, with the good work.

COMMISSIONER HOLT'S DECISION.

U. S. PATENT OFFICE,
Oct. 23, 1857.

In the matter of Daniel B. Badger's application for a patent for an iron beam, to be used in the construction of buildings, and which, as made in pursuance of the specification, is claimed to be "a new article of manufacture."

This case having been twice rejected, and brought before me on appeal, was referred to a Board of Examiners, who differ widely in regard to the principal question involved, but conclude their report by deciding that in view of the reference given—the application of Adrian James, rejected on the 28th day of May, 1850,—a patent should not be allowed. Under these circumstances, concurring as I do in the determination arrived at, it is somewhat irregular on my part to discuss the principles commented upon in the Examiners' report. I am urged, however, to do so, both by the Board and by the applicant's counsel, *with the hope of establishing a more uniform rule of action than has heretofore prevailed in the Office in regard to this class of inventions.* I have looked, accordingly, into the authorities bearing upon the subject, and submit briefly the conclusions to which they have led me.

It is objected that this beam could not be patented, because, as is insisted, it is not "a new article of manufacture," It is admitted that it is not an "art," nor a "machine," nor yet "a composition of matter," as that term is universally interpreted. If, then, it is not "a new manufacture," nor a new and useful improvement upon such, it is a nondescript, so far as patent law is concerned, and whatever may be its merits on the score of novelty, utility and invention, it cannot be patented, because it finds no place in the Statutory Catalogue. This renders it necessary