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NEW YORK, SATURDAY, SEPTEMBER 13, 1890.

Contents.

(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 767.

For the Week Ending September 13, 1890.

Price 10 cents. For sale by all newsdealers.

IMPORTANT TESTS TO BE MADE OF HEAVY ARMOR PLATING.

Neither in the new vessels thus far constructed or designed for our navy, nor in any of the plans adopted for the harbor defense of the principal cities, has it been contemplated to put into immediate use such very heavy steel and compound plate defensive armor as may be found already in place on the largest English and Italian ironclads. We can only be said to be taking steps gradually in this line, and with the care and circumspection that should characterize any effort in a direction where the cost will necessarily be very great, and the results by no means certain to be satisfactory in an actual war experience. One such step was taken in the ordering from leading European manufacturers, about a year ago, of some heavy armor plates for a competitive test on the naval proving grounds at Annapolis. These plates, which were expected some months ago, have just arrived. They are all-steel plates and nickel-steel plates made by the famous French firm of Schneider & Co., at their Le Creusot works, and compound plates made by Cammell & Co., of Sheffield, England, both firms of considerable experience in making armor plates for the Italian, French, and English governments. The huge butts required for their trial have been already erected, and it is now expected that these most interesting and important tests will be made during the present month.

To prepare for this trial, a six-inch rifled breech-loader of unusual proportions has been manufactured at the Washington ordnance factory, having been made thirty inches longer than a service gun of the same caliber, to secure increased muzzle velocity, by allowing the charge to act longer against the projectile. Some criticism has been based upon the use of special ordnance instead of the standard gun for these tests, and it might be well founded were the ordnance as well as the armor under trial. Perhaps on some accounts it would be better to obtain the double result of testing not only the plates, but exactly what may be expected from the actual six-inch guns now carried in our new steel cruisers. For the same reason, a shot with an eight-inch service gun would be desirable, and this test the board conducting the trial is empowered, under its instructions, to order after a couple of shots from the smaller caliber. As to this special six-inch gun, which was completed from the forgings within the short space of fifty-two days, it will find its regular work aboard one of the new vessels. In the mean time it will be a powerful weapon of its size to use against the plates.

The plates, which are 8 feet high by 6 feet broad and 10½ inches thick, will be bolted to 3 feet of oak backing, as armor is secured on war ships. They will then be divided into square feet by horizontal and vertical lines painted on them, the parallel lines being 1 foot apart. From the 6-inch gun, 100-pound Holtzer chrome steel, armor-piercing, ogival-headed projectiles are to be fired against the plates, with a striking velocity probably somewhere between 2,075 and 2,115 feet per second. The point of impact for the first shot is to be the intersection of the second vertical with the second horizontal line, counting the vertical lines; from the right and the horizontal from the bottom. The point for the second shot is the intersection of the fourth vertical and the sixth horizontal lines; that for the point for the third is the intersection of the second vertical with the sixth horizontal, and so on for the fourth and fifth shots. But there are provisions by which changes in the point of impact may be ordered or agreed upon, after the first or second shot, since the condition of the plate may warrant such a variation. The board may also substitute an 8-inch gun, with Frith projectiles more than twice as heavy, but having a lower initial velocity, firing one shot with it instead of the last three with the 6-inch gun.

It is a pity that provision has not been made for a trial at the same time of some of our best American steel plates, and that the foreign plates are not also to be subjected to tests with armor-piercing projectiles of American manufacture.

About Lead Pencils.

"What does it cost to make a lead pencil?" said the manufacturer in reply to a New York *Sun* reporter's inquiry. "First, let me tell you how we make a pencil.

"See this fine black powder? That's graphite. It costs twenty-five cents a pound. This white substance is German clay. It comes across the ocean as ballast in sailing vessels, and all it costs us is freight. We mix this clay with this powder together and grind them in a mill, adding moisture during the process, until the two are thoroughly mixed and are reduced to a paste about the consistency of putty.

"This paste we press into these dies, each one of which is the size of a pencil lead except in length. There are four leads in one of these. After they are pressed we cut them into proper lengths and bake them in an oven kept at a very high temperature. Then we have the lead made. Its hardness is regulated by the greater or less amount of clay we mix with the graphite—the more clay we put in, the harder the lead.

"The cedar we use comes principally from Florida, and is obtained entirely from fallen trees that lie there. The wood is delivered to us in blocks sawed to pencil lengths, some of them thick, to receive the lead, and some thin, for the piece that is to be glued over the lead. The blocks are sawed for four pencils each. They are grooved by a saw the entire length, the groove being the place where the lead is to lie. The leads are kept in hot glue, and are placed in the grooves as the blocks are ready. When that is done, the thin piece is glued fast to the thick one. When dry, the blocks are run through a machine that cuts the pencils apart. Another machine shapes them, making them octagonal, or round, or flat, or three-cornered, as the case may be. The pencils are burnished by machinery, and are then ready to be tied in bunches, boxed, and put out.

"The different grades in value of a lead pencil are made by finer manipulation of the graphite and the use of better material. The average pencil in every day use costs about one-quarter of a cent to make. We are content with one hundred per cent profit on it when we sell it to the dealer. What his profit is you may figure out for yourself if you have one of the pencils about you that you paid five cents for. Of this grade of pencil an operator will turn out 2,500 in a day.

"The most valuable lead pencil that I know of is owned by a lawyer in this city.

"It is a cheap-looking affair, but I don't think it could be bought for $100. The wood in this pencil came from a cedar tree that was probably centuries old before any cedar tree now standing began to grow. It was taken from the bottom of a marl bed in Orange County, at a depth of nearly one hundred feet below the surface. Near it was found the remains of a mastodon. The knob of the end of the pencil was made from a piece of the mastodon's tooth. The pencil has never been sharpened, and probably never will be."

Bee Stings for Rheumatism.

Dr. Al. Laboulbene, at the meeting of the French Entomological Society, held on March 13, 1889, gave a short abstract of a paper published in 1888 by an Austrian physician, Dr. Terc, who seems to have made extended experiments for a number of years. Dr. Terc asserts that a person stung by bees acquires thereby a relative immunity from the consequences of subsequent stings; in other words, that the virus of the bee sting acts like a vaccinal inoculation against its own poison. The immunity lasts six months, sometimes less, probably according to the number of stings inflicted on a person. Persons suffering from acute rheumatism require a larger number of bee stings to feel the usual effect of the poison, but as soon as by inoculation of a sufficient amount of virus they have acquired immunity against its effect, they will—as long as this immunity lasts—be free from rheumatic attacks. Dr. Laboulbene suggests that, in the interest of medical science, it would be well to thoroughly test these assertions.—*Insect Life.*

Rolling Cold Steel.

The particles of any metal in cooling are supposed to make a definite crystallized arrangement. Heat, in a certain sense at least, is as to the atoms a distintegrating or repellent power, and, under great force or pressure, crystallizations may be compelled to rearrange themselves on new lines, or submit to a change in form. In drawing wire, for example, the force applied is in the direction assumed by the fiber, as softened by heat, and its strength is supposed to depend upon this arrangement of particles, compacted more or less by the die through which it was drawn. Now, rolled wire is a reversed process, as the compression of molecules both changes their form of arrangement and form of crystallization. Up to a recent period heat was always supposed to be a prime factor in the process, and that without it no alteration in what may be styled granulation was possible. Now a Chicago paper announces a change in manipulation that completely explodes the old theory. Bars of cold steel are as easily rolled into wire as if the metal were hot, and not only that, but the process nearly doubles the tensile strength. That of hot-drawn steel wire is 56,460 pounds to the square inch, while cold-rolled is 105,800 pounds.

What is the nature of the changed arrangement of particles that produces such results? It must be compression that forces the atoms into new forms, or compacts them more closely together, and yet one effect of compression is to evolve heat. The fact of added strength is abundantly vouched for, but the reason of it remains to be explained. Manifestly, if wire can be rolled from cold bars with such results, why may not steel plates for ships or other purposes? yea, why not even railroad bars? If these things are possible, with strength doubled and cost diminished, this manufacturing industry is certainly on the eve of a total revolution. Science, too, has added to its domain the wealth of a new discovery whose value is beyond estimate. Gains on any line of advancement, as all experience proves, are but a prelude to greater gains on other or similar lines. The ending of a beginning in what is new now is beyond the ken of the wisest.—*Iron Trade Review.*

Men of Science at Indianapolis.

BY H. C. HOVEY

In a former article I described the massive and costly State house, and gave an epitome of the opening addresses of the president and sectional vice-presidents of the American Association for the Advancement of Science. Before mentioning some of the scientific papers read from day to day, let me remark that, valuable as these are, they can hardly be of greater practical service than those less formal but equally earnest conversations in corners of the capitol, in parlors of the hotels and on the street cars and railways, and which are seldom noticed by the press. When five or six hundred learned men gather from all parts of America, they have a great many things to talk about. You see that dapper little gentleman cornered with a tall veteran whose snowy beard reaches his waist. One is a chemist from California and the other a Hoosier geologist, and their jovial talk is about the continuity of the natural gas supply and its conditions. Grouped around a table are a scholarly recluse, a pioneer in homespun, a trim business man and a foreign dude, familiarly chatting about the flow and friction of fluids in open channels; and shortly their topic changes to a cheerful discussion of some of the conditions that underlie chemical reactions. A hundred illustrations might be given, proving that these annual conventions answer as a sort of scientific clearing house, and not a mere cluster of sections, where papers are read bristling with technicalities. And these private confabs, as well as the more public systematic discussions, are all "for the advancement of science."

But it is in order to attempt at least a hurried report of the scientific papers, of which more than 250 were offered, and of which only a bird's eye view can be given. The reader wishing more full information can have it in due time in the official publications of the *Salem Press*. All now undertaken is to say what we might find were we to flit from room to room and catch a few ideas as to the work of each section.

Here is a set of anthropologists to whom Prof. Mason is speaking of the Indian origin of maple sugar—not as weighty a subject as some others, but very suggestive. It is said that 36,000,000 pounds of maple sugar were made last year, besides more than 1,000,000 gallons of sirup; and for this sweet art we are indebted to the aborigines. Relics of Indian sugar troughs, and various implements that have hitherto puzzled archæologists, confirm the statement. The Indians tapped the silver maple and ash-leaved maple, as well as the common sugar tree. They were well acquainted with sugar manufacture, it entered largely into their food supply, and many curious customs and religious ceremonies were associated with the annual gathering of sap and production of maple sugar.

Prof. B. G. Wilder, who is always original, exhibited and discussed diagrams prepared with great skill, showing comparatively the brains of man and the chimpanzee, and they looked altogether too much alike. Prof. F. W. Putnam, the faithful and long-time secretary of the association, and whose interest in and purchase of the famous serpent mound of Ohio is well known, described a singular earthwork near Foster's and also an ancient hearth found in the Little Miami Valley. Prof. C. C. Abbott exhibited a bone image from Livingston County, N. Y., and gold beads of Indian manufacture from New Jersey and Florida.

Dr. Jastrow, of Madison, Wis., gave results of his preliminary studies in the line of "Mental Statistics." Among his conclusions was the fact that a marked difference exists between the mind of man and of woman. Dr. Minot, of Boston, spoke of his own psychological investigations, and he, as well as others who followed him, thought that more thorough investigation should be made than had yet been made of the phenomena of mind reading and all that.

An important paper in the biological section was by Prof. Stanley Coulter on "The Forest Trees of Indiana." Of these there are 106 species, embraced in 24 orders. Indiana stands fifth in lumber interests in the United States. The maple is the most uniformly distributed tree, being known to exist in every county in the State. Indiana, once heavily wooded, is now reduced to about two million acres of forest, equal to about one-tenth of its whole area. In this connection attention may be called to a black walnut grove described by Prof. John Collett, and which he planted some forty years ago. Its trunks are now suitable for saw logs, and the owner regards his grove as a most profitable investment, "quite as good as bank stock."

In a paper on the blood corpuscles, Dr. Minot held that there are four stages in corpuscular development; the original nucleated red corpuscle, the granular stage, the embryonic or amphibian form, and the final mature, non-nucleated red corpuscle; the white cells appearing between the second and third stages.

The chemists began by considering a paper on hog cholera germs, read by Dr. Schweinitz, of the agricultural department of Washington, D. C., who had undertaken experiments for the purpose of isolating and identifying the poisonous ptomaines produced by these germs by splitting up certain substances in the body. Prof. W. E. Stone, of Purdue University, read three papers representing the result of a year's work of original research among the pentaglucosides. These are allied to the sugars, but are of a different composition. Two were specially discussed, namely, xylose and arabinose, which have been extracted from bran, gum arabic, sawdust, jute, etc. They do not ferment, but give rise to furfurol when distilled with strong acids. They give the same reaction as ordinary glucose with the copper test, and form an important constituent of food substances.

Other papers in this section showed the composition of Osage orange leaves, which it has been discovered may be used as substitute for mulberry leaves in raising silk worms; the food value of Lycoperdon (the common puff ball) as proved by analysis, it containing a large amount of nitrogenous substances, and its ash being mainly phosphate of potassium; and the governmental experiments for simplifying the methods for extracting sugar from sorghum, and thus promoting its culture. The committee on pronunciation and spelling of chemical terms reported progress, and were asked to condense results, agree on a standard and report next year. The committee on founding a national chemical society (carried over from a former year) reported favorably, and the indications are that such an organization will be formed during the coming year; although, in the opinion of many, the time is not yet ripe for the movement.

Here it may be announced that the ornithologists have been taking a step in advance. Their field is so wide and unique, and on a plane so different from that occupied by any other department of zoology, as to justify their organizing a permanent society of their own. About 941 species are now recognized as belonging to the avi-fauna of North America, of which only 82 are stragglers from other countries. In other words, we have about 859 kinds of birds that make this continent their home. There are 225 varieties in the vicinity of Indianapolis, of which perhaps no more than 25 or 30 are permanent residents of the county, while all the rest are more or less migratory. One of the rising ornithologists is Prof. W. S. Blatchley, of Terre Haute, whose numerous writings on bird life have tended in a marked degree to popularize science. Others in this department of natural history are Professors Steere, Widmann, Jenkins, Jones, Evermann and Butler. Prof. Butler is also the efficient secretary of the Indiana Academy of Science, whose indefatigable efforts have so largely contributed to the success of this meeting of A. A. A. S.

Many practical matters were discussed in the section of mechanical science and engineering, *e. g.*, as to experiments in the resistance of metals to cutting; torsional stiffness and methods of testing it; a standard formula for the efficiency of steam engines; element of waste in machine shops; value of the solid emery wheel; results of tests of 75 ton ammonia compression refrigerating machines; vortex automatic lubricators for high speed shafts.

A strikingly interesting communication was by Prof. T. C. Mendenhall, on standard metric weights and measures. They came sealed from France, and were not opened until in the presence of the President of the United States. They are incased in such a way as not to be injured by moisture or changes of temperature. There are three sets of them kept in different places, so that if one set should be destroyed, it could be restored from the others. Models of the meter and kilogramme were exhibited. Two of the latter had been shown at Washington, and it was observed that when placed side by side they weighed a little more than when placed one on top of the other. This difference amounted to one sixty-millionth of a kilogramme, and was accounted for by the fact that in the latter position, the upper one was removed further from the center of the earth than when it stood beside its fellow! He also told of the materials of which the standards were made, and explained the method of manufacture.

If I have said nothing about the geological section, it is simply because there is so much to be said that I hope to make it the subject of a separate article. The same is true of the Botanical Club and of the Agricultural Society, each of which holds a separate meeting in connection with the A. A. A. S.

Delightful excursions were made to the Rose Polytechnic School, at Terre Haute; a romantic locality near Waveland, known by the gloomy title of the "Shades of Death;" the knobs of New Albany, Mammoth Cave, Ky., and Wyandot and Marengo caves in Indiana, and the famous natural gas region. The latter interested me to such a degree that I shall revisit it for further exploration.

At the closing meeting on Tuesday evening, August 26, Prof. Putnam reported that 89 fellows and 219 members had been elected, of whom 84 were from Indiana. Of the 364 members present besides, 64 were from Indiana, 38 from Ohio, 29 from New York, 27 from the District of Columbia, 26 from Illinois, 23 from Michigan, 19 from Massachusetts, and so on from nearly every State and Territory. The next annual meeting will be held in August, 1891, in Washington, D. C.

Devices for the Fruit Garden.

At this moment I have four fine Mazzard cherry trees covered with mosquito netting to keep off the birds. When only a few cherry trees are grown, as is now the case in central New York, robins, cedar birds, and cat birds will take every cherry within five days of their coloring. But this fruit is not only very delicious to me, but invaluable as a health preservative. In my judgment the sour cherries when fully ripe are the most wholesome of all fruits. Generally I cover not only Mazzards, but Early Richmonds and Late Montgomery. Of course the cost of covering will be more than the value of the fruit as a market product; but the same cover will last for two years. Thus protected, one can gather delicious cherries from July 5 down to the end of September. The fruit does not decay badly before September, but ripens and then gets riper and riper till the fruit is good enough for Asgard. This device is valuable when one cannot induce his neighbors to plant cherry trees by the thousand, and so have enough for birds and planters. When we grew a few raspberries, it was just the same—the birds took the bulk of the crop; but now the cat birds and robins are welcome to help themselves and pay for the privilege with music. We do not miss what is taken, because we harvest a hundred bushels and are glad to pay a percentage to an orchestra. The cherry tree ought to be planted again in this State as freely as it was fifty years ago. The black knot has entirely left off troubling them here, and, therefore, even the lazy can grow them.

My remedy for currant worms is to plant gooseberries about the currant gardens, and on these the worms first appear. If thoroughly dusted then, the attack is far less severe on the currants. They prefer the gooseberry just as they prefer the white currant to the red. Of course, such preferences are not discoverable when very little care is taken of the bushes, and worms multiply beyond all measure. The currant ranks next to the cherry as a matter of wholesome diet. It is to be preferred far above all other berries.

I have quinces again bearing like the old-fashioned quince bushes of my father's day. Thirty years ago I found it difficult to get crops, and till now have only had an occasional peck of quinces. Two years ago I drew the limbs together in November with stout twine, then wound on straw or hay. The result has been heavy crops of fruit. The quince needs only slight protection here. It is best to plant on a south or southeast slope, and have an evergreen hedge or tight board fence to the north.

I had great trouble with my berry gardens, owing to the lopping down and tangling of the bushes. To remedy this I set stakes about twenty feet apart in the row, and fasten to these one wire, about four feet high. To this wire I tie the new canes in September with strong twine, two to four in a bunch. Then I leave the canes standing six feet high to bear. They are never broken down in winter, and never in the way in summer. The cost is a trifle.—*E. P. Powell, in Garden and Forest.*

The Debts of the Counties.

According to the returns of the new census for 1890, the existing gross indebtedness of the several counties of the various States of the Union is $145,693,840, toward which the amounts held in sinking funds, cash, and other resources are $30,468,955, leaving $115,224,885 as the actual debts not provided for. The annual interest charge is $7,318,374.

The following is the county indebtedness by States:

Alabama	$1,392,020	Maine	$449,878	South Dakota	$2,690,484
Arkansas	1,592,582	Maryland	872,131	Ohio	7,856,810
California	5,607,450	Massachusetts	4,008,660	Oregon	782,015
Colorado	3,190,258	Michigan	1,615,028	Pennsylvania	8,654,943
Connecticut	44,713	Minnesota	3,275,387	Rhode Island	
Delaware	618,400	Mississippi	1,238,124	S. Carolina	1,141,550
Florida	390,616	Missouri	9,974,734	Tennessee	2,237,659
Georgia	465,060	Montana	1,937,150	Texas	6,678,563
Idaho	1,320,795	Nebraska	5,302,091	Vermont	5,151
Illinois	11,760,596	Nevada	857,278	Virginia	1,691,434
Indiana	6,827,674	N. Hampshire	495,175	Washington	1,170,637
Iowa	3,643,814	New Jersey	5,159,339	W. Virginia	1,023,887
Kansas	14,817,780	New York	10,064,372	Wisconsin	1,681,256
Kentucky	5,741,636	N. Carolina	1,521,086	Wyoming	1,081,482
Louisiana	156,915	North Dakota	1,382,583		

TERRITORIES.

Arizona	$1,549,697	New Mexico	$1,650,837
Utah	$74,110		

Total $145,693,840

Canadian Natural Gas.

The Toronto *Mail*, speaking of the Provincial Natural Gas Co., in Humberstone and Bertie townships, publishes a description of the ten completed wells and their output of 22,000,000′ of gas per day. Two more wells are approaching completion and another is about to be commenced. The company has seventy-five square miles of land under lease. Of the ten wells which have been drilled on these lands, eight are good producers. The operations have been carried on in the center of this territory. The wells are about one mile apart. The center of the group is 11 miles from Buffalo, 13 miles from Niagara Falls, 19 miles from St. Catharines, 45 miles from Hamilton, and about 60 miles in a straight line from Toronto. The cost of piping is about $7,000 a mile. An important factor in conducting gas great distances is the pressure it has at the well. So far the gauge has shown a rock pressure of over 500′ to the inch.

Cold Water without Ice.

The following method of obtaining a constant supply of cool water at all times is described by the *Railroad and Engineering Journal* as being in general use in Hanover, York County, Pa.

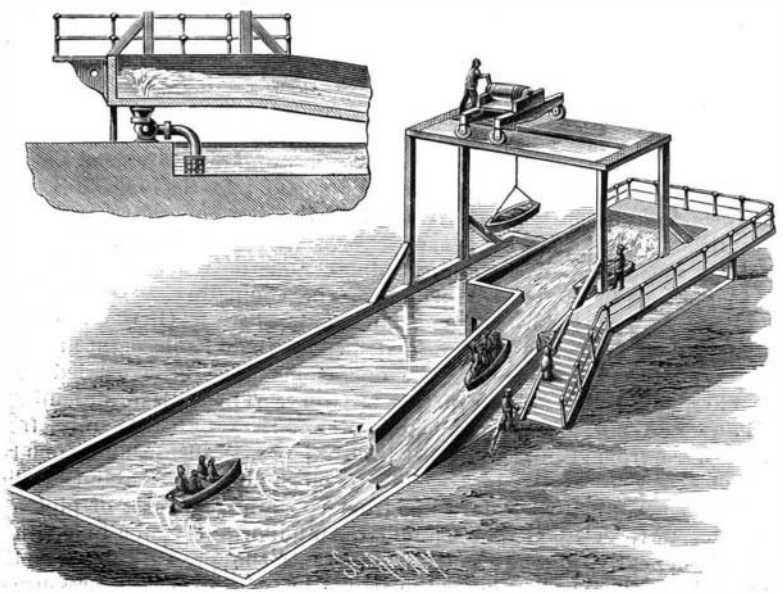
The town, says the *Journal*, is closely built up and without any system of drainage, so that the water from the wells is unfit to drink. Some years ago these reasons led to the introduction into the town of a supply of very excellent water from a large spring about three miles distant. This water is brought through iron pipes, and when it reaches the consumer in summer is warm, while the water in the wells is cool. For this reason many of the inhabitants drink the well water, and, as a consequence, typhoid fever is a prevalent disease in that community. In order to obtain pure cool water, not impregnated with lime, some of the inhabitants of the place have adopted a plan which is so simple and gives such excellent results that it is worthy of general adoption wherever there is a water supply other than wells or springs.

The plan is as follows: A cylindrical galvanized sheet iron tank, 12 inches in diameter and 4 feet or 5 feet long, is placed in the bottom of a well. This tank is then connected by a galvanized iron pipe with the water supply pipes, and another pipe is carried from the tank to the surface of the ground, or to any convenient point for drawing water, and has a cock at the upper end. The tank is consequently always filled with water from the water supply, and being in the bottom of the well, the water is cooled off and acquires the temperature of the well; so that that which is drawn from the tank is as cool as well water, and is without any of the impurities with which the latter is contaminated. The water drawn from the tank in one of the wells in the place named had a temperature of 56° when the thermometer in the atmosphere above stood at 76°

This method gives an abundant supply of cool water during the whole summer, and can be adopted in all cities, towns, or in the country. If a well is available, it can be used; if not, by simply digging a hole in the ground, deep enough so as not to be affected by the surface temperature, and burying the tank, it will answer equally well. This hole might be dug in a cellar or outside the building. If the water has any impurities in suspension, such as mud, the tank should be made accessible, so that it can be cleaned occasionally.

AN ARTIFICIAL LAKE AND WATER SLIDE.

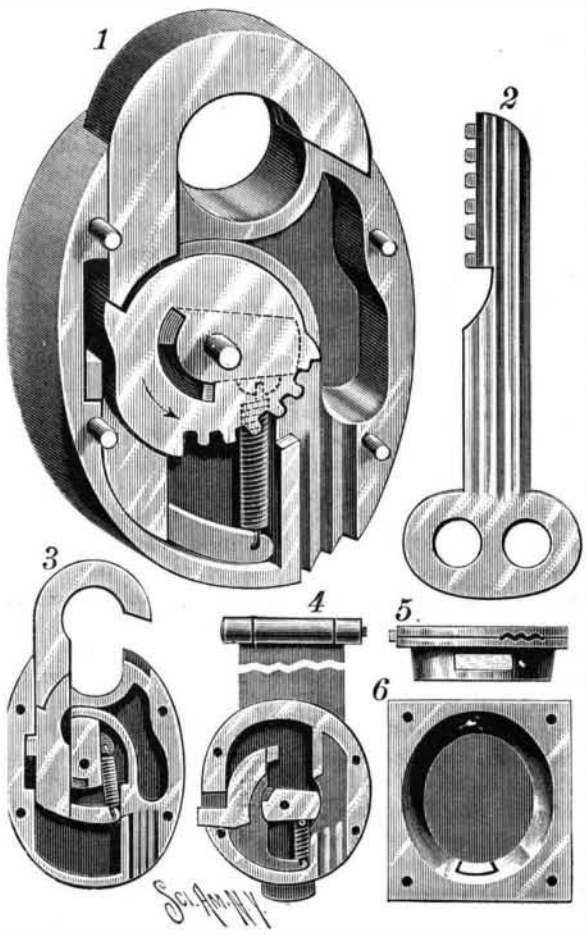
The illustration represents a water slide intended for amusement and recreation, which has been patented by Mr. James Inglis, of No. 8 Custom House Square, Montreal, Canada. The primary object of the inventor has been to provide a form of amusement for the people which might be utilized in connection with the Chicago World's Exposition, as well as at minor shows or at popular summer resorts. From a suitably constructed tank a chute extends downward to an artificial lake or reservoir, the latter also extending to one side under the tank. The part of the reservoir which extends under the chute is connected with pumping machinery, as shown in the small view, for raising the water back into the tank, thus providing for a constant flow down the chute into the lake. The slope or incline of the chute may be varied as desired, but is intended to be such as to cause a current that will carry boats or floats with sufficient speed to produce an exhilarating effect upon the passengers. At the lower end of the chute is a pivoted apron, floating freely and horizontally in the water, to prevent boats coming down from diving too deep into the water at the end of the descent. Above the tank, and over the back part of the channel, is a frame supporting a guideway on which travels a carriage with a hoisting apparatus adapted to lift the boats above the level of the tank. After they have been thus lifted the carriage may be moved transversely and the boats lowered into the tank to float down the chute



INGLIS' ARTIFICIAL WATER SLIDE FOR PLEASURE RESORTS.

AN IMPROVEMENT IN LOCKS AND KEYS.

The accompanying illustration represents a lock of novel construction recently patented by Andrew S. Fisher, Bedford, Bedford County, Pa. This device has all the advantages of other locks, with the additional merits of durability, security, and simplicity, and consequent cheapness of manufacture. Fig. 1 represents a perspective view of the padlock with the lid of casing removed. Fig. 3 is a top plan view thereof, with top of case and tumbler removed. Fig. 2 is a detailed view of the key. Figs. 4, 5, and 6 represent the same principle applied to a trunk or hasp lock, of which Fig. 4 is a top plan view with top of case and tumbler removed; and Fig. 5 a bottom edge elevation thereof, entire. Fig. 6 is a top plan view of the socket plate to receive hasp, said socket having a suitable opening in its circumference to receive the bolt of the lock, when the hasp is in position. In locking the bolt is pushed to place by means of a projection at the side of lock, as shown in Fig. 4, and can be released only by using the key. The construction and operation of locks for other purposes on this principle is substantially the same as those shown herewith. Numerous combinations are made by varying the number, size, and shape of teeth in the tumbler and key. In operating, the meshing of the teeth of the key and tumbler revolves said tumbler, and with it the dog from its engagement



FISHER'S LOCK AND KEY.

with the shackle, at the same time drawing on the spiral spring connection between said dog and shackle. When the shackle is finally released, the retractile power of the spring throws it forward, and the lock is then open. In closing, the spring draws the dog into its locking position, when the shackle is pushed to place. This invention was patented March 5, 1890, No. 422,759. Any information regarding its manufacture or sale will be given by addressing the patentee, or John O. Smith, Bedford, Pa.

Condition of Workers Here and Abroad.

The House of Representatives has recently passed a bill ordaining that eight hours shall be considered a day's work for all laborers, workmen, and mechanics, now or hereafter to be employed by the government.

In the course of the debate on this bill, the Hon. J. O'Donnell, of Michigan, made an eloquent speech, in the course of which he gave the following:

Eight hours for labor, eight hours for sleep, eight hours for improvement and recreation, will make the days gladsome for those who toil. Mr. Speaker, the workingman is better off in this country than in any other. It will be seen that the nation and its inhabitants have not suffered by the lightening of the hours of toil; the country is the most prosperous in the world. Our people are accumulating wealth; there are some sharp contrasts in the social conditions, but the general average of wealth and comfort is rising all the time. I know the number of millionaires is increasing, but it is gratifying to realize that the number of citizens worth four, two, and one thousand dollars is increasing wonderfully faster. The aggregate wealth is large, and the distribution is as nearly equal as will ever be reached under any government.

We are in the forenoon of our national existence, but what a change in the condition of all in the last century, and for the better—improvement and progress. This is the genius of our people and is inwoven in the fiber of our free institutions. This, compared with the "good old times" we hear of, is an era of luxury in all strata of society. The statistics show that in the savings banks of this country (six States not reported) there are 4,021,523 depositors, with $1,425,239,349 to their credit, an average of $354.40 for each depositor. In my own State of Michigan there are 99,245 depositors in savings banks, who have $24,015,207 on deposit. If you compute the millions deposited in building and loan associations, to secure homes for themselves and families, you will find our artisans and laboring population are in the sunshine of prosperity.

One of the enterprising papers of Michigan two years since sent fifty workingmen to Europe to see the condition of their fellow laborers abroad. They visited many points in Great Britain, France, and Germany, and, after due observation, they were of opinion, without exception, that "the American workmen are better housed, better fed, better paid, better clothed, and generally better off than their European fellows." This pleasing picture of American contentment is supplemented by the report of the statistician of the Agricultural Department, who states that labor here secures a larger share of reward than in other countries; there is one pauper here to twenty-two in Great Britain; our people consume double the amount of meat here over those of Great Britain, and nearly four times the meat the inhabitants of other lands have; our consumption of cereals is three times as great as that of Europe, in proportion to population nearly the same gratifying ratio of bread, while our inhabitants have the same excess of clothing and other comforts.

An Imprisoned Fish.

The following was related to the Chattanooga *News* by one of its correspondents residing near that city:

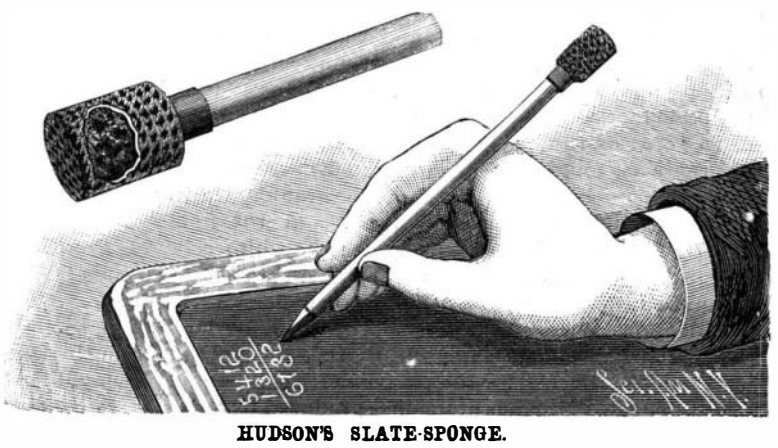
"My cousin owns a watermill, and in removing some obstructions found an immense log embedded in the stream which must have been submerged for a number of years. The log had to be cut in two to remove it, and much to our surprise we found it hollow, although it had every appearance of being solid. One of the negroes while examining the log looked into the hollow and thought he saw something moving. He began using his ax, and soon had the log cut into in another place.

"Imagine our amazement when we discovered a live catfish which had grown to an enormous size and length, and was so completely wedged in the hollow as to be unable to move except to open its mouth and wiggle its tail. The fish was very lively and apparently in the enjoyment of excellent health.

"The question is how did the fish get into the log, as the only means of ingress or egress we could discover was a small round hole not more than two inches in diameter. We surmised that he must have entered the little opening when no larger than a minnow, and grown great in his solitary confinement."

A CONVENIENT SPONGE FOR CLEANING SLATES.

The illustration shows a device especially intended to facilitate the wiping of school-slates, or the erasing of certain portions only of what may be inscribed thereon. It has been patented by Mrs. Emma C. Hudson, of No. 327 Arch Street, Seattle, Washington. It consists of a flexible casing having meshes or perforations, and adapted to hold a small piece of sponge, the casing being preferably a rubber net-work, and formed with a neck adapted to be engaged by the end of a pencil. The sponge is thus always at hand when needed, and can be readily wet sufficiently for the use designed, while it is retained in shape by its casing.



HUDSON'S SLATE-SPONGE.