Dr. Isaac Hays.

Dr Isaac Hays, for fifty-two years editor of the *American Journal of Medical Sciences*, died at Philadelphia, April 13. Although eminently successful as a practitioner, Dr. Hays' reputation rests almost exclusively upon his connection with medical periodicals and his contributions to transactions of the numerous learned societies of which he was a member, at home and abroad.

Dr Hays joined the Academy of Natural Sciences in early life, and was always an active member, serving as president from 1865 to 1869. He was also one of the original staff of Willis' Hospital, filling the position of surgeon in that institution from its organization until about 1857. In 1830 he was elected a member of the American Philosophical Society, and subsequently curator, and up to the time of his death was a member of its Board of Councils. He was the oldest living member of the Franklin Institute, of which he was one of the founders, and for a number of years its secretary, and was also prominent in the foundation of the American Medical Association, of which he was the first treasurer, serving in that capacity for a number of years. Dr. Hays was chairman of the Building Committee of the College of Physicians, and it was principally through his efforts that the present building at Thirteenth and Locust streets was erected.

Besides contributing to the periodicals with which he was connected, Dr. Hays was also a contributor to the Transactions of the American Philosophical Society, one of his latest being a paper on the occasion of its recent centennial anniversary, and the author of the Code of Ethics adopted by the American Medical Association in 1847, and since adopted by every State and county medical association in the United States. Among his principal literary labors was the editing of Hall's edition of Wilson's "American Ornithology," Philadelphia, 1828; Hoblyn's "Dictionary of Medical Terms," etc., 1846; a new edition of the same, from the last London edition, 1855; Lawrence's "Treatise on the Diseases of the Eye," 1847, and successive editions; and Arnott's "Elements of Physics," 1848.

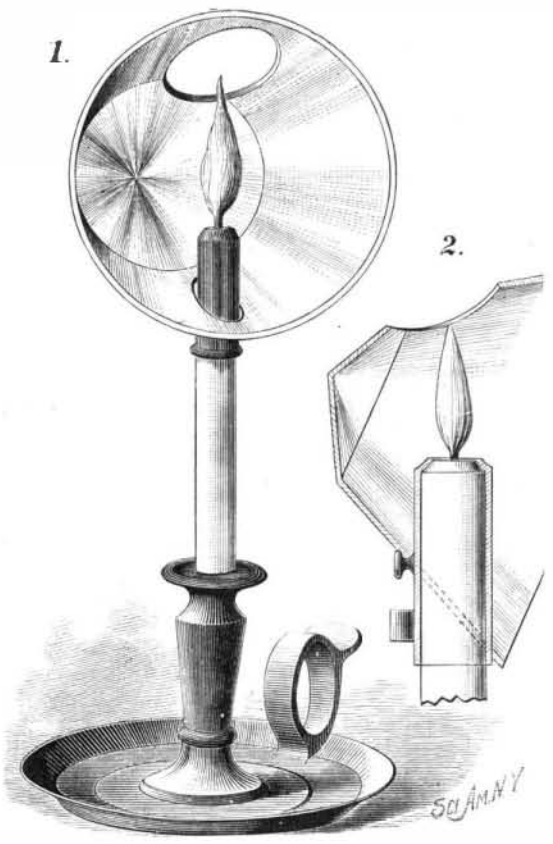
Dr. Hays was born in Philadelphia, July 5, 1796, and was the oldest living editor in continuous service in America.

Five Thousand Dollars to find out the Distance of the Sun from the Earth.

At the meeting of the National Academy of Sciences in April last, a resolution was adopted authorizing the appointment of a committee to consider a plan proposed by Professor Newcomb for determining the distance of the sun by measuring the velocity of light. The members of the committee were: President F. A. P. Barnard, Professors Wolcott Gibbs, Henry Morton, George F. Barker, and E. C. Pickering. Their report was so favorable to the plan proposed that it was sent to the Secretary of the Navy for transmission to Congress. An appropriation of five thousand dollars for the required purpose was thus secured, and the work of constructing the necessary apparatus will be commenced as soon as the appropriation is available. The expenditure of the funds is intrusted to the Secretary of the Navy. In the act of Congress establishing a National Board of Health, which became a law in March last, the Academy is requested and directed to cooperate with this board, and report to Congress at the next session. A communication was received from the president of the board April 15, inclosing a certified copy of the act, and requesting the Academy to appoint an agency with which the board will confer to carry out the provisions of the law.

REFLECTOR FOR CANDLES.

The accompanying engraving shows a novel device, recently patented by Mr. M. C. Meigs, of Washington, D. C., for utilizing the light from a candle. The invention consists in a cap, or partly closed tube, carrying a small reflector; the cap being of the proper size to receive the end of the candle. As the candle burns down the metallic cap settles down and keeps the reflector always in the same position in relation to the flame.



MEIGS' REFLECTOR FOR CANDLES.

The reflector is supported in such a position as to throw the whole or greater portion of the light in parallel rays in one direction.

NEW HYDRAULIC GRID.

We annex illustrations of a new arrangement of hydraulic grid, which has been lately brought out by Messrs. Clark and Standfield, of Westminster. This grid is especially suited for use on the banks of tidal rivers and other places where there is a large rise and fall of tide, and also for use in wet docks and tidal basins, provided it can be constructed before the water is let into the dock. In such cases Messrs. Clark and Standfield consider that it may be constructed at about one half of the cost of an ordinary graving dock. It can also be advantageously used in deep water, but at a somewhat increased cost, and whereas floating and other docks require 10 feet or 15 feet extra depth below the bottom of the vessel, the grid requires only an additional depth of 2 feet, and is thus especially useful in shallow docks and places where the depth of water is limited. In the arrangement now illustrated, the vessel is raised by a row of hydraulic presses sunk in the ground directly under the center of the grid and the keel of the vessel, with a few additional presses at the sides under the shoring frames to keep the grid level and give transverse stability. They are divided into three groups, with an equal number of presses in each group; one group supports one third of the length of the vessel, and the other two groups support the remaining two thirds, one of them controlling the port and the other the starboard side, so that the vessel may either be maintained level or put on an uneven keel at pleasure. The grid is a strongly built longitudinal wrought iron girder directly under the keel of the vessel, with ribs projecting from each side to carry a working platform. Some of the central ribs carry side shoring frames, which are used in conjunction with the sliding keel blocks.

In using the dock the grid and presses are lowered to the bottom, and the keel of the vessel is brought directly over the center and secured in position by the bilge blocks and side shoring frames, the presses are then worked and the vessel lifted till the grid is above high water mark. When in this position a number of struts or swinging frames (which were previously held up in a horizontal position under the grid) are liberated and allowed to hang in a vertical position. The grid is now lowered a few inches until the whole of these struts rest on raised bearings cast on the head of the presses, and the whole weight of the vessel and grid rests on them. The rams are now allowed to sink down into the presses, where they remain in fresh water, and are consequently not exposed to rust. The supports are hinged or swung at the top so as to fall accurately into their places, and suitable means are provided for raising and lowering them simultaneously by means of chains and shears. These frames are of considerable breadth, and some of them swing transversely and others longitudinally, so as to obviate any tendency of the grid to move in either direction. There are also, in addition, strong cast iron columns, with guides, against which the grid slides as it rises and falls. The pumps, pipes, and valves are similar to those used in ordinary hydraulic docks, and the method of working them is so well understood as to require no description.

The advantages of the hydraulic grid arise from its economy in first cost and the small weight of material required. The rams are applied directly beneath the vessel, and in consequence of this the transverse girders which carry the pontoon and vessel, the lifting chains, the tall guide columns, and the pontoon can be dispensed with, and their place supplied by a simple pontoon girder or grid and a few guiding columns. Perhaps the most important of the new features in the dock is the automatic safety valve for insuring that the grid shall at all times remain perfectly level. The action of this arrangement is such that it is impossible to raise or lower one corner of the grid without equally raising or lowering the others.

This dock is, of course, perfectly well suited for the use of pontoons of the usual character, and the only objection to their introduction lies in the fact that the pontoon would cost as much as an additional dock. Fig. 1 shows an end elevation, Fig. 2 a side elevation, and Fig. 3 a plan of one of these grids erected on the side of a tidal river.—*Engineering.*

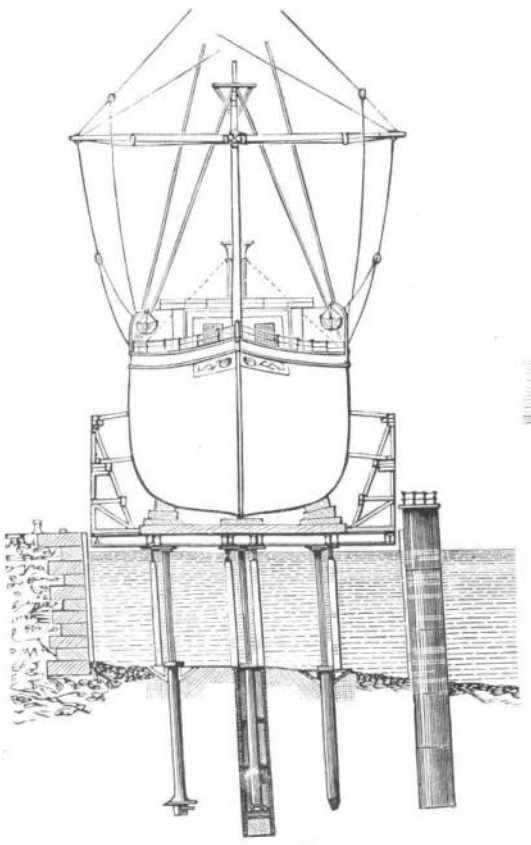


FIG. 1.

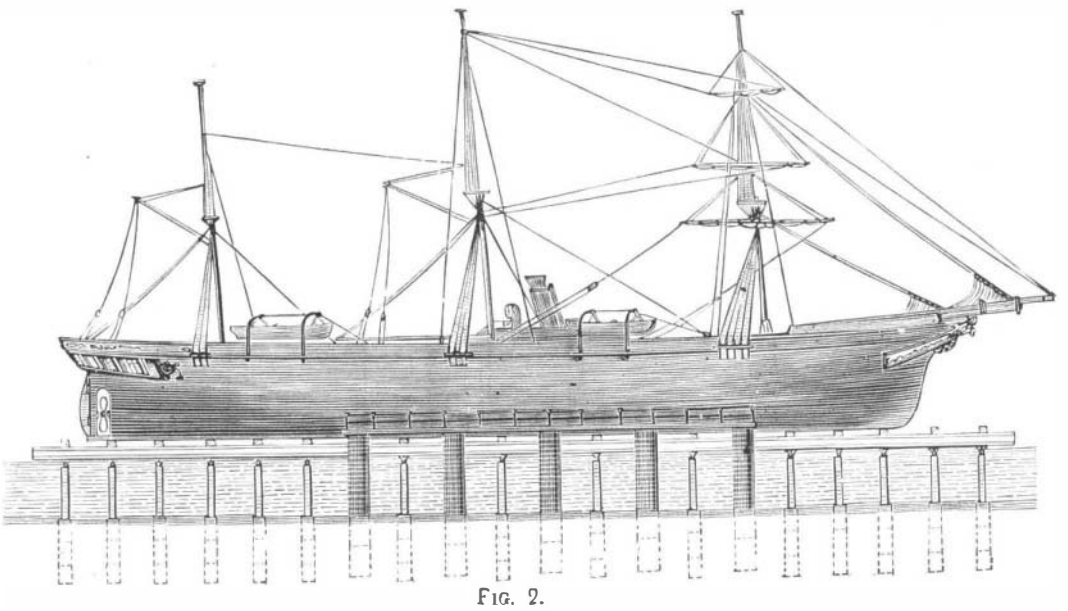


FIG. 2.

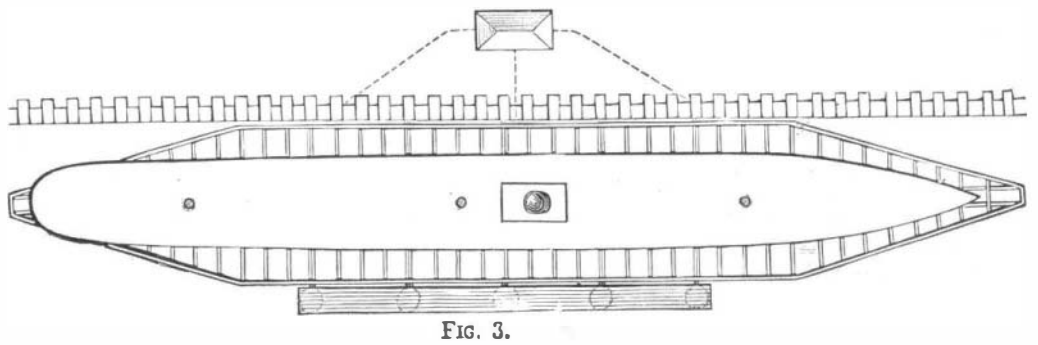


FIG. 3.

NEW HYDRAULIC GRID.

Pain and the Weather.

In his paper on the relation of neuralgic pain to storms and the earth's magnetism, read before the National Academy of Sciences, Professor S. Weir Mitchell reported the following observations:

Captain Catlin, U. S. Army, lost a leg during the war, and since that time has suffered from traumatic neuralgia, sometimes in the heel, but more frequently in the toes, of the foot. He has carefully noted the effects produced on himself by changes of the weather. Dr. Mitchell's own studies in this case, as he says, "would never have proved successful had it not been for the unusual ability, interest in the task, and perseverance of the accomplished gentleman who has obliged me by making his own torments useful in the solution of the question of how far weather effects the production of certain kinds of pain." The hourly observations cover a period of five years. "For the first quarters of these five years there were 2,471 hours of pain; for the second quarters, 2,102 hours; for the third quarters, 2,056 hours; and for the last quarters, 2,221 hours. The best yield of pain is in January, February, and March, and the poorest in the third quarters, July, August, and September. During these five years, while the sun was south of the equator, there were 4,692 hours of pain against 4,158 hours while it was north of the equator; and the greatest amount of pain was in the quarters beginning with the winter solstice, and the least was in those beginning with the summer solstice. The average duration of the attacks for the first quarters was 22 hours, and for the third quarters only 17·9 hours.

By taking the four years ending January 1, 1879, it is found that of the 537 storms charted by the Signal Bureau, 298 belong to the two winter quarters, against 239 for the summer quarters. Hence we have the ratio of the number of storms of the winter quarters and summer quarters corresponding to the ratio of the amounts of neuralgia for these respective periods, and the ratio of average duration of each attack for the same time corresponds closely with the ratio of the respective total amounts of neuralgia for the same periods. The average distance of the storm center at the beginning of the neuralgia attacks was 680 miles. Storms coming from the Pacific coast are felt furthest off, "very soon after, or as they are crossing the Rocky Mountains," while storms along the Atlantic coast are associated with milder forms of neuralgia, and are not felt until the storm center is nearer. Rain is not essential in the production of neuralgia.

It was found that the severest neuralgic attacks of the year were those accompanying the first snows of November and December. One of the most interesting and valuable results of this series of observations is thus stated: "Every storm, as it sweeps across the continent, consists of a vast rain area, at the center of which is a moving space of greatest barometric depression, known as the storm center, along which the storm moves like a bead on a thread. The rain usually precedes this by 550 to 600 miles, but before and around the rain lies a belt which may be called the neuralgic margin of the storm, and which precedes the rain about 150 miles. This fact is very deceptive, because the sufferer may be on the far edge of the storm basin of barometric depression, and seeing nothing of the rain, yet have pain due to the storm.

A NEW LOCOMOTIVE.

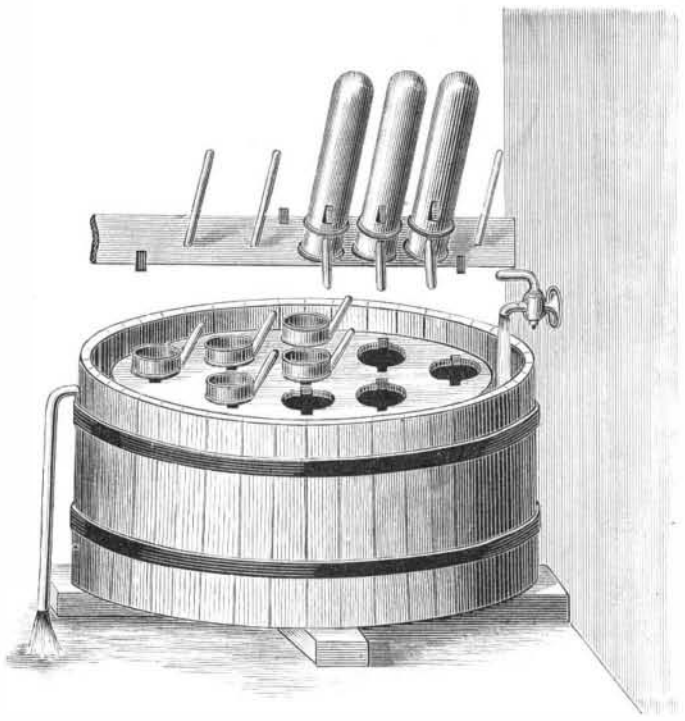
The accompanying sketch shows the plan of a small locomotive designed and constructed by the Baldwin Locomotive Works, Philadelphia, Pa., especially for sugar plantations and other similar service, where it is desirable to use either wood or coal as fuel. Having six wheels it is quite steady on the track, and moves along smoothly without plunging and without undue wear either in itself or in the track. It will be noticed that the fuel and water are carried at the back of the engine by the pony truck; by this arrangement the distribution of weight is made as nearly perfect as possible, and the center of gravity is kept low. The weight of the boiler and machinery is carried on equalizing levers midway between the driving wheels, so that the weight is equally distributed on the four driving wheels. This arrangement renders it impossible for an excessive weight to come upon any one wheel. It is never necessary to turn the engine, as the engineer can have a good view in either direction. One of the most important features of this engine is that it is carried on three bearing points only, and is therefore peculiarly adapted to a rough, uneven track, such as is usually found on a logging railroad, and it is capable of passing curves much more readily than a four or six wheeled connected engine, the pony truck under the tank being provided with a swinging bolster and radius bar which leads the engine to a curve when running ahead.

No wood is used in the construction of the engine excepting the bumper beam, cab, and floor. The general arrangement of the parts admits of a large fire box, which is required for burning wood, and if necessary a rack may be placed around the water tank for holding wood. The manufacturers inform us that the style of engine may have a separate tender, and the truck may have four wheels instead of two, if preferred.

MILK COOLER.

Our engraving shows the Austrian mode of cooling milk, which is very simple and, in some respects, novel. It consists of a vat or tub through which cold water is constantly circulating. On the surface of the water floats a circular wooden plate, provided with a number of round holes, into which are inserted the vessels containing the milk. These are made of sheet zinc, two feet long, and each, according to the *Wiener Landw. Zeitung*, contains a little over a gallon of milk.

It takes about fifteen minutes to cool the milk down to a temperature slightly above that of the surrounding water. When not in use the cylinders are turned upside down, on a wooden rack, as shown in the engraving, to drain and dry.



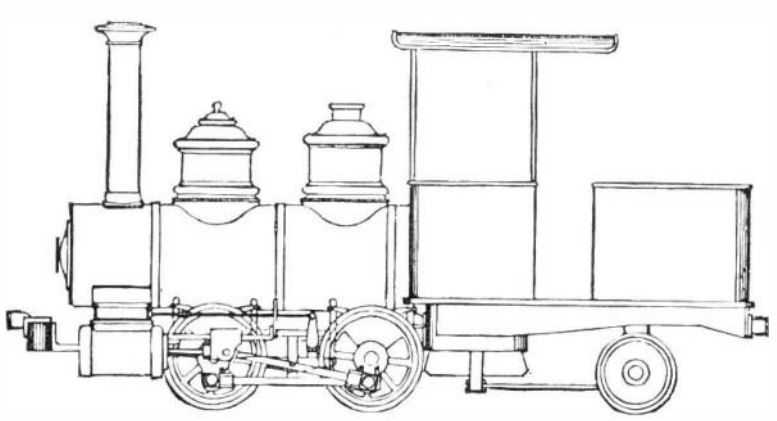
THE VIENNA MILK COOLER.

Cheap Freighting.

The transport of Pittsburg coal to the towns along the Ohio river is described as the cheapest freight transport in the world. The *Commercial* of Louisville, Kentucky, tells how the business is managed.

In and about Pittsburg there are 50 operators or firms engaged in the coal business; about one half of whom sell at the mines, the other half are shippers engaged in running coal to southern ports. The shipments for Southern consumption from Pittsburg amount annually, on an average, to 80,000,000 bushels of coal and 20,000,000 of coke, which is sent south by the shippers on the tides as they occur. For this purpose they employ 96 tugs or tow boats and about 1,500 barges and shells in which the coal is transported. Each barge costs about $1,000 and carries from 12,000 to 13,000 bushels. The shells cost about $500 and they carry about 24,000 bushels. The barges, when unloaded at their destination, are returned to the mines; the shells are generally sold in the South and broken up for other uses by the purchasers. On an average there are ten coal tides or rises at Pittsburg during the year, which occur suddenly, and frequently last only from 24 to 36 hours. The barges and shells must, therefore, be kept loaded and ready for departure at an hour's notice. When the opportunity arrives, the tows are lashed to the tugs, each taking about 10 barges, containing, say, 150,000 bushels of coal, the great length of the tows and the short time allowed by the rapidly falling river requiring the most expeditious movements.

By this admirable barge system coal is kept at a price but little above that of Pittsburg to the cities above the falls of the Ohio, the expenses of running the coal to Louisville, including the cost of returning the barges to the mines, being only about 1½ cent per bushel.



SMALL SIX-WHEELED LOCOMOTIVE.

Discovery of Male Eels.

We are glad to state that finally what we believe to be genuine male eels have been discovered. In the January number of this journal it was announced by Prof. Packard that he had discovered male eels. A number of the supposed males were afterward again examined, by Prof. Packard and Dr. C. S. Minot, who were then led to conclude that the so called male eels were immature females, and the mistake was corrected by Prof. Packard in the February *Naturalist*. A large number of living eels were then examined by Messrs. Packard, Kingsley, Pierce, and Minot without success, until at Prof. Packard's request Mr. Kingsley spent a few days at Wood's Holl, at the laboratory of the U. S. Fish Commission, in the last of February, examining living eels supplied by Mr. Vinal N. Edwards, by favor of Prof. Baird, U. S. Fish Commissioner. One hundred and ninety-three eels were there examined, and of these three were found by Mr. Kingsley to be, in his opinion, males. His observations made on these living individuals, which were speared in a pond through the ice, are as follows:

"On February 18, 19, and 20, I examined one hundred and ninety-three eels, at Wood's Holl, and found three males, the testes of which agreed closely with Syrski's figures as reproduced in the U. S. Fish Commission Report for 1873-4 and 1874-5, p. 719. Although I made careful examination I could find no external characters to separate the sexes. The three males were each about seventeen inches long, while the females examined varied from about twelve inches to nearly three feet. This average length of males agrees closely with Syrski's (430 mm. in length). The principal criticisms I would make of his figures, or rather points of difference that I found, are that his enlarged figure showing the lobulation of the testis has the lobes far more crowded than they were in the specimens I examined. His drawing of the histological structure was greatly larger than what I supposed to be the same. His cells measure, according to the explanation, about $\frac{1}{440}$ of an inch on their major axis, while I saw nothing that could have been over $\frac{1}{440}$ of an inch. The structure of the testis was similar to that which I have seen in the testes of the cod, perch, smelt, cat, deer, rooster, monkey, dog, and man. On teasing it out under a Tolles one fifth, I saw what I am confident were spermatozoa, although I could not distinguish the tails. The heads were oval and from one half to one third the size of those of the smelt, or about $\frac{1}{2000}$ of an inch in length; they had an independent motion, changing their position on the slide without reference to any current in the water in which the tissue was placed, and this motion was wholly different in its character from the vibrations of the Brownian movement."

Prof. Packard examined, independently of and in company with Mr. Kingsley, preparations made by himself, and found scattered through the tissues, nucleated and nucleolated testis cells, of the same appearance as those of the animals above named, which were kindly obtained by Prof. Pierce. Moreover, Prof. Packard, found two mother-cells, containing several immature nucleated spermatozoa. So that after the examination of about five hundred female eels and three males, we are glad to be able to affirm the entire accuracy of Syrski's observations and figures, he being the first observer, so far as we are aware, who has discovered the male sex of the Italian eel. Which species of eel it was that Syrski examined is not stated. In making these investigations we have to acknowledge the aid of Prof. John Pierce, of Providence, in the use of a fine series of mounted histological specimens and lenses of high powers. He has worked jointly with us, and is of our opinion as to the sex of the three males. Dr. Minot examined one of the three males, preserved in alcohol, and found, as Freud and Brock had done previously, a follicular structure, the follicles being filled with small spherical cells, which Dr. Minot considered to be probably immature spermatozoa, although the development could not be traced.—*Advance proof from American Naturalist for May.*

Singular Action of Pilocarpine.

According to the *Pharmaceutical Journal*, a singular action of pilocarpine has recently been made known by Dr. G. Schmitz, of Cologne. In the course of his ophthalmic practice, Dr. Schmitz had two cases in which the patients were bald, and found that after the use of subcutaneous injections of hydrochlorate of pilocarpine (with the object of causing absorption of inflammatory residue within the eye) the scalp rapidly became covered with young downy hairs. In one of these cases a man sixty years of age had his head covered in four months, partly with gray and partly with black hairs of considerable growth, so as quite to hide his previous baldness. If this stimulant action on the hair bulbs be proved to generally follow the use of jaborandi or its alkaloid (pilocarpine) a rapid increase in the demand for the latter may soon be expected.

A SPRINKLING of lime, plaster, or sulphur over the leaves of the strawberry at the first appearance of the blight, is suggested as a remedy for this disease, which has made such sad work with the foliage of this delicious berry.