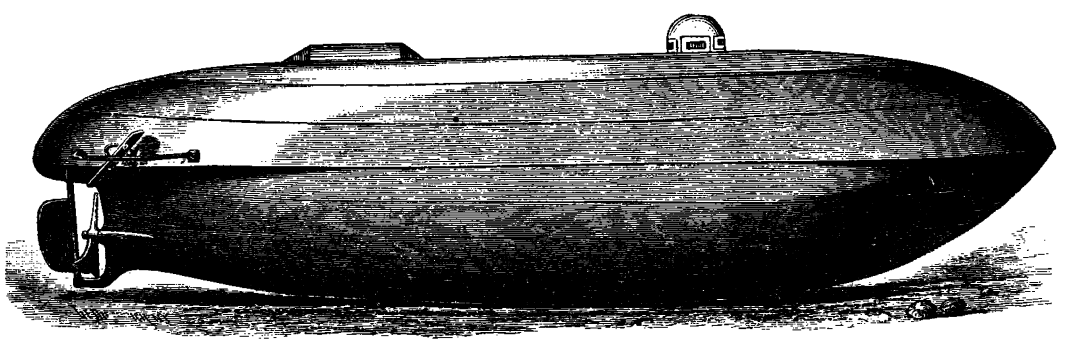
ally lists of subjects upon which papers are desired by the section, as was done to some extent in the recent circulars of the section. In this way, live subjects are apt to be most beneficially canvassed, and experiment and discovery kept in the right paths. It may be well, in this connection, to mention some inventions which are now, so to speak, 'in the air;' of course, we all recognize that the flying-machine belongs to this class, in one sense if not in another, and a paper upon it has been presented which may prove of interest to you. What is needed, however, is a sufficiently light motor, without which a flying-machine cannot be expected to succeed. Steam power, also, for agricultural work in its many forms, is not yet an accomplished fact; and we may mention one machine greatly needed, — a cotton-picker. Then, too, there is the electric motor for street traffic, which needs further improvement; also the transmission of power over great distances, electric lighting, etc., etc.

But I have said enough to indicate how large a field may, in my judgment, be covered by this section of mechanical science and engineering, and how its meetings may in the future be made still more useful and interesting than they have been in the past.



TUCK'S SUBMARINE TORPEDO BOAT.

## *A NEW SUBMARINE TORPEDO BOAT.*

The accompanying illustration represents a new submarine boat, invented by Mr. J. H. L. Tuck, and now being tested in this city, with highly satisfactory results. On Tuesday, August 24, the first public exhibition of the vessel was given in the Hudson River, opposite 86th street, in the presence of a number of scientific men. Manned by a crew of two men, pilot and engineer, she started off at a good rate of speed, disappeared, travelled perhaps half a mile without making a ripple to indicate her whereabouts, and reappeared at the pleasure of the pilot. During the two hours' test, she travelled several miles, answering her helm as readily as a steam yacht. The boat is an iron spindle thirty feet long by eight in diameter, with a propeller, and vertical and horizontal rudders. The motive power is a fourteen horse-power Westinghouse engine, furnished with steam from a caustic-potash reservoir, which is charged from an outside source. Deadlights in the conning-dome forward, together with a compass, enable the pilot to shape his course. Ingress and egress are effected through an aperture in the hatchway near the stern, which may be hermetically sealed from the inside.

## *NOTES AND NEWS.*

The officers for the next meeting of the American association are as follows: President, S. P. Langley. Vice-presidents: mathematics and astronomy. Wm. Ferrel; physics, Wm. A. Anthony; chemistry, Albert B. Prescott; mechanical science and engineering, Eckley B. Coxe; geology and geography, G. K. Gilbert; biology, W. G. Farlow; anthropology, D. G. Brinton; economic science and statistics, Henry E. Alvord. Permanent secretary, F. W. Putnam; general secretary, W. H. Pettee; assistant general secretary, J. C. Arthur. Secretaries of the sections: mathematics and astronomy, Henry M. Paul; physics, C. Leo Mees; chemistry, C. F. Mabery; mechanical science and engineering, Geo. M. Bond; geology and geography, T. B. Comstock; biology, J. Henry Comstock; anthropology, F. W. Langdon; economic science and statistics, Wm. R. Lazenby. Treasurer, William Lilly.

— Twenty drops of bromine in an ounce of olive-oil, applied freely four times a day, and the affected part washed with warm water and castile soap twice a day, is said to have completely cured seventy-five cases of ivy poisoning.

— The Brazilian government has appointed a commission of physicians, from Rio, Bahia, Maranhao, and Pará, to study the *beri-beri*. This disease is particularly prevalent through the littoral provinces of the north, and has been gradually gaining ground of late.

— An examination, by an oculist, of the eyes of one thousand one hundred persons who work by the incandescent electric light, fails to show any injurious effects produced by that light. The arc-light may cause eye-trouble if in too close proximity.

— That human hair retains its characteristics for long periods of time, and, indeed, is well-nigh indestructible, is a fact of common observation. A remarkable instance of this is found in a wig which has recently been discovered in an Egyptian temple at Thebes, and is now deposited in the British museum. It is supposed to have been part of the attire of an Egyptain priest, and from the circumstances of its discovery is regarded as being at least 3,400 years old.

— Food given when cold is more likely to be retained by a sensitive stomach than in any other condition, and ice will not be rejected when all other substances are thrown off; acting upon this fact, frozen milk is now given in cases of sickness attended with irritable stomach, especially in fevers.

— London consumes daily two million eggs, and the rest of England an equal number. Of these one-half comes from Italy via the St. Gothard tunnel, and the others are brought from Denmark, Germany, Belgium, and France.

— At the Michigan state sanitary convention, to be held at Big Rapids in November next, the following topics will be discussed: The hygiene of schools; Pasteur and protective medicine; public-health laws; alcoholic drinks, — are they foods or are they poisons? the injuries of every-day drug-taking; what to eat, when, and how; and, the prevention of communicable diseases.

— *La graphologie*, a French journal, describes a new method of reading character, known as 'scarpalogy.' It consists in a study of the heels and soles of shoes. If these are worn down evenly, the wearer is a good business man, energetic and quick in decision; if the outer side is worn more than the inner, he is of an adventurous turn of mind. Weakness of character is indicated by a heel and sole worn most on the inner side.

— Prof. C. L. Ford, of the L. I. college hospital, called attention, in 1862, to the fact that the lower limbs were not always of the same length in the human subject. This statement induced anatomists and surgeons to make an extended series of measurments, and the results confirm the opinion expressed by Professor Ford. Garson, in the *Journal of anatomy and physiology*, sums up these observations. In seventy skeletons examined, he found the lower limbs equal in but seven. His measurements show that in 54.3 per cent the left limb was longer than the right; in 58.5 per cent the left thigh-bone was longer than the right. The right tibia was longer than the left in 41.4 per cent, and the two bones were found equal in but 10 per cent. The difference in the length of the lower limbs varies from one-eight of an inch to one inch and five-eights, without any deformity being recognizable. In a series of measurements of the collar-bones, only six, in twenty-two cases examined, were found to be equal.

— The scientific writings of Henry James Clark have received careful attention from Prof. Fred. Tuckerman, in his biographical notice for the catalogue of the Massachussetts agricultural college (1886). The bibliographical list contains twenty-six titles, — three new ones being added to the national academy list. Professor Tuckerman has also improved the national academy list by references to numerous English reprints of Professor Clark's papers. British students will find these of use. The third title, of some interest in the history of American zoölogy, reads as follows: 'Contributions to the natural history of the United States, 1857–62 (conjointly with Prof. Louis Agassiz).'

— The practice of medicine in Russia is exceedingly onerous and unremunerative. A physician who fails to respond to the summons of a patient is punished by a fine of from five to one hundred roubles. If the case was a dangerous one, and the physician knew it, he may be imprisoned in the jail for three months. The legal fee for an ordinary visit is from seven and a half to fifteen cents; for an accouchement, seventy-five cents. These laws are strictly enforced. An elderly German physician, an invalid, was called, on a stormy winter night, to attend a case seven miles distant. He objected to go unless he was reasonably remunerated, naming his fee. The messenger left to ascertain whether this amount would be paid, but did not return. The physician was subsequently arrested, tried, and condemned to eight days imprisonment. Besides, he had to pay his lawyer two hundred and fifty dollars in advance.

— A few weeks since, some members of the Davenport (Iowa) academy of sciences explored

several mounds in Louisa county in that state. In the one most thoroughly examined, from near the surface to the bottom, were found decayed logs of from six to ten inches diameter, lying in irregular positions, not charred, but lying in and covered by a thin layer of ashes. In this mound was also discovered a skull, and near it several relics. Under the skull was found a copper axe, entirely covered with cloth, and wrapped in bark, well preserved. Four other copper axes were also found, all showing they had been wrapped in cloth. Near these were three copper awls, one found lying and two sticking upright in the floor of the mound. Also a quantity of shell beads and sheets of mica. Two curved-base pipes were also found near the head, one of ordinary gray pipe-stone, bearing a well-carved figure of a hawk, with pearl eyes; the other was a plain round bowl, but is unique in material, being made of calcite, beautiful in form, and quite translucent. Several other mounds were partly explored, but nothing of special interest was found in them.

— *Il popolo Pisano*, an Italian journal, claims that Pasteur's method of preventing rabies by inoculation with virus, was practised in Italy by Dr. Eusebio Valli as long ago as 1799. He employed for this purpose the saliva of a rabid dog, mixed with gastric juice. Having ascertained by experiments upon the lower animals that this method of treatment was a safe one, he inoculated two residents of Pisa with the same material. Although these persons — one a child, the other an adult — had been bitten by a mad dog, rabies did not develop in them.

— Bichloride of mercury, commonly known as corrosive sublimate, has of late years been largely used by the medical profession in a state of solution, whenever, in the treatment of wounds, antiseptic or germicidal agents were desirable. This same substance is now extensively employed as a germicide in the purification of articles and places which are infected with disease of a zymotic nature. Statistics have recently been collected which tend to prove, that in the strength usually employed, 1 part of the bichloride to 1,000 parts of water, the use of this solution is not without danger when brought in contact with any portion of the surface of the body from which the skin or the mucous membrane has been removed, as, for instance, in open wounds. There have been reported and verified thirty deaths which are attributable to the use of this solution in the strength mentioned. It is, however, when properly employed, not only a very valuable, but also a perfectly safe agent; and it will doubtless be found, that, as an irrigant to exposed surfaces of the human body, more dilute solutions will accomplish all that is desired. Where it is used as a disinfectant for articles of clothing or furniture, no danger can possibly accrue from its use, even in the proportion of 1 to 1,000.

— The great advantage, from a hygienic point, of the electric light over gas in halls where large numbers assemble, is well shown by the elaborate researches of Dr. Breslauer, and recorded in the *Deutsche medicinische zeitung*. The experiments were made in the Munich theatre, and included an inquiry into the air of the different portions of the house as to temperature and the products of combustion. The temperature was increased in the parquet ten times more with gas than with the electric light, and three times more in the gallery. The amount of carbonic acid per 1,000 was, —

| | Electric light. | Gas. |
|---|---|---|
| In parquet..... ..... ..... | 0.055 | 3.926 |
| In gallery..... ..... ..... | 0.870 | 3.151 |
| In centre of gallery..... | 1 178 | 4.353 |

This increase in the amount of carbonic acid is one of the principal disadvantages of gas as compared with the electric light. The conclusions which are drawn from these observations are that the air remains much purer and at a lower temperature in all parts of the house, especially in the galleries, when electric light is employed as a means of illumination.

— Turkey has a medical school at Constantinople, at which there are annually more than three hundred students, of which number some sixty graduate. Each course continues during nine months of the year, and six years must be spent in medical study before a diploma can be received. Instruction is given in the Turkish language, as most of the students are Turks.

— Constantinople has at the present time a water-supply from Lake Dercos, twenty miles from the city. This was introduced by a French company, and was intended to supplant or supplement the supply, which the city has had for years, from an open reservoir six miles distant, in which the rain collected, and from which it was brought in iron pipes.

— From the *Medical and surgical reporter* we learn that the willow is now being largely cultivated in America for medicinal purposes. On one farm in Georgia there are 400,000 willows grow-

ng, and 80,000 additional slips have recently been put in. At the end of two years the switches are cut and made into bunches like sheaves of wheat. The leaves and the bark contain the medicinal salicin. This substance crystallizes in plates, is white in color, not very soluble in water, and somewhat bitter to the taste. Like other bitters, it promotes the appetite, and aids digestion, and is regarded as an excellent tonic in some forms of dyspepsia. It is also largely used in the treatment of acute rheumatism, and to some extent in malarial fevers as a substitute for quinine. It is said that the willow switches, when dry, are worth two hundred dollars a ton. The leaves and bark are sold at the rate of twenty-five cents a pound.

— A young woman is said by a writer in the *Medical and surgical reporter* to have acquired the habit of eating roasted coffee, eating sometimes as much as half a pound a day, and continuing it for four months. She was very pale, sallow, and nervous; she had a weak pulse, impaired digestion, and got out of breath easily going up stairs.

— Professor Bystroff has recently examined 7,478 children in the schools of St. Petersburg, and finds that 11.6 per cent suffer from headache. He regards it as due to irritability of the brain, brought on by the excessive forcing of the education.

— The entire population of Germany, as enumerated in the quinquennial census of December last, is given at 46,840,587, an increase of 1,606,526 over that of 1880.

— The entire length of railroads of the world, up to the end of 1884, as recently published by the Prussian minister of public works, was 291,000 miles, an increase of twenty-seven per cent, or over sixty thousand miles, during the preceding five years. Of the entire length, very nearly one-half is that of the American railroads, mainly in the United States.

## *LETTERS TO THE EDITOR.*

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

### A contribution to the psychology of the polar bear (Ursus maritimus Lin.).

THE fact that bears occasionally create rotary currents in water by means of their paws, for the purpose of bringing floating objects within their reach, has several times been verified by different observers (Romanes' 'Animal intelligence,' New York, 1883, pp. 351, 352; Darwin's 'Descent of man,' New York, 1875, p. 76). Still, this act of bears has not been so often recorded as to render the present instance uninteresting.

In May, 1886, happening to be in Central park, New York city, I visited the bear-pit. This pit is divided through the centre by a partition of iron bars, black bears being confined on one side and two polar bears on the other. The water supply is furnished by an oblong basin about eight feet long by four or five wide, so placed that the above mentioned partition runs through its short axis. One of the polar bears was resting on the side of the basin, opposite to the front of the pit, with the side of his head snug against the partition, the body being stretched out alongside the margin of the basin, and his fore-paws hanging over its edge. In his fore-paws he had a portion of an ordinary walking-cane, about a foot and a half long, and from this he evidently derived, by playing with it in the water, a great deal of enjoyment. Let this bear be known as No. 1. The other bear, not being able to reach across the basin, nor to reach over the head to the fore paws of No. 1, and having no plaything of his own, was apparently highly discomfited. This discomfiture he manifested by his quick and uncertain turns around the pit, ever returning to the edge of the basin or the back of No. 1, there to again make an unsuccessful attempt to obtain the cane. Let this bear be known as No. 2.

An interested group of spectators had now collected, and one of them, out of sympathy for No. 2, threw him a small painted stick about eight inches long. This No. 2 immediately began playing with, taking it in his mouth and tossing it around in various directions. Finally the little bit of wood fell into the basin of water within reach of No. 1, who hastily appropriated it, much to the seeming chagrin of No. 2, — this bear once more becoming very restless and uneasy. The stick and the cane, however, were too much for No. 1 to manage, for in his maneuvres, seeming unnoticed of him, he lost his hold upon the stick, and it fell into the water. At once No. 2, who, at the time, was sitting on his haunches at the front side of the basin, appeared to comprehend this, and began pawing the water with the right and left paw alternately, thus creating a current in the water which brought the little piece of wood to him from the other side of the basin in about two minutes. Hastily taking it out of the water, No. 2 laid it on the edge of the basin, for in the mean time No. 1 had changed his hold on the cane in such a way that he confined it between his paw and the side of the basin at the water's level. His paw being at the very remote end of the cane, thrust partly through the bars into the black bear's side of the pit, the cane seemed to be free upon the water. No. 2 now went through the same motions as had secured him the small piece of wood. After keeping his exertions up for about one half-minute, he seemed to perceive that the cane did not move towards him: so careening his head around, he brought into full view the paw of No. 1, and appeared to comprehend that the cane passed between the paw of No. 1 and the basin wall, for instantly he stopped pawing the water, and went to playing with his own piece of wood.

Throughout this whole scene, it seemed to me that there occurred a notable change in the facial expression of each bear as he gained or lost a point. There was no evidence of anger; and while No. 2 was creating the water current, his face wore the impress of the most profound earnestness, which gave way, when the stick was obtained, to an expression of great elation, this in turn being replaced by an in-