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ANOTHER "INVENTION"—A 70 KNOT SUBMARINE BOAT?

The editor frequently receives communications from correspondents who evidently have a taste for matters of scientific and mechanical interest, asking that the SCIENTIFIC AMERICAN take up for discussion subjects which the correspondents have found treated in flamboyant style in the columns of the daily press. As a rule, if the subject has not been taken up for discussion in the SCIENTIFIC AMERICAN, it may be assumed that there are good reasons for silence on the part of the editor. So many startling scientific items appear in the columns of the daily press that are utterly fabulous in nature that it is quite impossible for the editor to take up all subjects therein treated for consideration. One of the most flagrant instances of this character has recently come to our notice. In the columns of a daily contemporary recently appeared an article descriptive of a "disappearing" submarine torpedo boat, said to have been recently added to the navy. An elaborate engraving accompanied the article, showing in detail the interior construction of the boat.

It was stated in the article that "for two years a force of workmen specially selected from the government yards has been engaged in the construction of this model boat. The main difficulty encountered has been a device for stopping and slowing the boat when running at high speed. Even the 'Turbinia,' which yields a speed of 37 knots, is slow by the side of this boat, in which a trial shows it to be easy to develop 70 knots an hour. The amazing speed obtained under these tests has caused the utmost surprise, not only to the people in the Naval Bureau of Construction, but also to the inventor himself, who did not expect more than 40 knots at the utmost."

The picture of a submarine boat being driven at the rate of 70 knots an hour naturally caused the editor some uneasiness, but the description of the boat was so circumstantial and the medium in which the article appeared was of so high a character, it was thought that the subject at least should be examined into. With this object, a representative of the SCIENTIFIC AMERICAN called at the Bureau of Construction in Washington and innocently asked for full details of the construction of the boat, with a view to verifying the published description and also to substantiate the tests alluded to. The Chief Constructor informed our representative that he had never heard of the submarine boat in question and that the newspaper article was absolutely false. Other inquiries brought out the fact that the boat was quite unknown in Washington.

This case, of course, is a flagrant one, but it is by no means an unusual occurrence, and should serve as a warning to the general reader not to place too much confidence in technical articles appearing in the lay press.

The article that we have been discussing differs in one important particular from those which ordinarily come within our ken. As a rule, articles of this character set forth in rather glowing colors achievements which are, at some future time, to be attained, but in the present case the writer has been dealing with cold facts, and the figures that he gives and the tests that he quotes are put forward as having been actually accomplished. The effrontery of advancing statements of this character appears to be more brazen than the usual method of forecasting the wonderful achievements that are to be attained at some future time. We are glad to learn that the inventor of this extraordinary production has succeeded finally in discovering some means by which the enormous speed attained may be reduced and controlled, and that it is possible to slow the boat down to a full stop. In this respect he is far more successful than the late lamented Keely, whose chief difficulty, it will be remembered, in obtaining final success with his motor, was the difficulty of controlling the powers which he, through the conjuring touch of his genius, had created.

THE GALVESTON DISASTER.

Not since the Johnstown disaster has the country been more horror stricken than over the destruction, or partial destruction, of Galveston. The sympathy aroused has been well nigh universal. That this sympathy is more than a mere sentiment is shown by the generous contributions that have flowed in from all sections of the country. The accounts describing the conditions preceding and following the terrible disaster have been fully described in the contemporary press and need not be dwelt upon now. The civic authorities have had a very serious problem to deal with in addition to the immediate horrors with which they were surrounded, namely, the policy to be adopted with reference to rebuilding the city. The frequent visitations of floods to the city of Galveston render this problem a very difficult one to determine. Galveston is situated at the extreme end of an island some thirty-five miles long, which varies in width from one to five miles. The part of the island upon which the city is located is almost flat and its highest point is only about eight feet above mean tidewater. The bay, which is known as West Bay, separates the mainland from Galveston Island and extends about eighty miles inland. The harbor itself was an important one, the United States government having expended some six millions of dollars in building jetties and wharves for the purpose of providing the city with a deep-water sea port, and its facilities for handling commerce were unsurpassed. The importance of the city may be determined from the fact that the exports have amounted to as much as a hundred million dollars a year.

Once before has the city of Galveston been visited by a most destructive flood, and many times has it been seriously threatened. It is no wonder, therefore, that the question of abandoning the present site was seriously contemplated. It has been determined, however, to rebuild the city on the present site. In the first place, one of the prime influences which tended to this was the feeling of civic pride and the love of home which is implanted in every one's breast, and the immense value of property still remaining comparatively intact. Then, again, the possibility that additional defenses can be erected against future storm inundations is probably a controlling factor.

From an engineering point of view the question which presents itself is whether it will be possible to provide any means for the protection of the city against a recurrence of this dreadful visitation. In these days of progress we are inclined to regard scarcely any object as beyond the reach of attainment from an engineering or mechanical point of view; and although the physical conditions in the present case seem to render the problem almost hopeless of solution, it would seem that some method would be devised by means of which at least the lives of the inhabitants might in the future be vouchsafed. The late storm, of course, was an exceptional one, but the cruel fact must be faced that the city lies in the pathway of tropical storms, and that similar conditions will probably again arise.

What course will be taken by the authorities in obtaining protection against the loss of life and property in the future remains to be seen, but there is no doubt that some practical methods will be suggested by engineers which will at least lessen the dangers that in the past have so frequently afflicted the city.

NEW TORPEDO DESTROYERS FOR HOLLAND.

In a recent issue of the SCIENTIFIC AMERICAN appeared an article relative to the consumption of petroleum for the propulsion of vessels. Tentative efforts have been made by one or two of the powers to avail themselves of this fuel, but the experiments have not been sufficiently exhaustive to prove the efficacy of the oil for this particular class of work. That petroleum is an advantageous, economical and powerful fuel has been amply demonstrated by the utilization of it for the propulsion of the express locomotives of the Great Eastern Railway in England. Many of the fleetest express trains upon this system consume oil, and so satisfactory have been the experiments, that several other engines are being equipped with the necessary apparatus.

The Dutch government are also determined to prove the efficiency of oil for marine purposes. Messrs. Yarrow & Company, Limited, the well-known shipbuilders of Poplar-on-Thames, England, have just constructed two first-class topedo boats, "Hydra" and "Scylla," for the Dutch government, and they are intended for service in the Dutch East Indies. They are each 130 feet in length over all, with 13 feet 6 inches beam, and have a displacement of about 90 tons.

The machinery for propelling these crafts consists of a set of inverted triple expansion surface condensing engines of 1,200 I. H. P. The air and feed pumps are driven off the forward end of the crankshaft. There is one very important feature, however, which has been introduced into these engines, which causes them to differ from the machinery supplied to torpedo boats. That is the introduction of the system of forced lubrication, analogous to that which is sometimes adopted in certain land engines. By the utilization of this principle the working parts of the engines are completely inclosed. The great advantage accruing from this principle is that the engineering staff need not evince the least anxiety regarding the lubrication of the engines, which is most essential to insure smooth and perfect running. Consequently, if the exigency arose, the engine room staff could be decreased, as the lubrication being practically automatic does not require attention.

Water tube boilers of the Yarrow pattern have been adopted. The tubes are naturally straight. This type of boiler, by the way, as the result of continued practical experiments, has been proved by the naval authorities of the various powers to be eminently satisfactory, and it is being widely installed in a large number of battleships.

Both vessels have been supplied with Holden's oil spraying apparatus, which is the same as that employed upon the Great Eastern Railway, since the government intend to burn astatki. This oil is plentiful in the Dutch possessions in the East Indies, and, therefore, as its cost will be very small, there is no doubt that the Dutch naval authorities will be able to effect a very appreciable saving in their coal bill. Both the vessels went under a full speed official trial to test the possibilities of this oil spraying apparatus, and it worked smoothly and without the slightest difficulty.

In the official speed trials, which were carried out under the superintendence of Mr. Loder, the chief constructor of the Royal Dutch navy, the vessels attained a mean speed of 24·37 knots per hour for three hours, with a pressure of 160 pounds, imparting about 400 revolutions per minute to the propellers.

The armament of the vessels consists of three 18-inch swivel torpedo tubes and two 6-pounder quick-firing guns.

HAND-LABOR IN CHINESE MINES.

According to a report presented by M. Levitoff to the Russian Society of Encouragement, it appears that Chinese hand-labor has made its appearance in the Trans-Baikal region since the construction of the railroad, and the influx of the Chinese element is becoming more considerable every day. Hand-labor, which has been scarce ever since the construction of the Trans-Siberian, is now more abundant, and its cost has been considerably reduced. On the Amoor River, the unloading of boats, which was paid only a few years ago at the rate of $1.60 per ton, is now paid at $0.80 per ton, or one-half. In general, the Chinese workman, on account of his smaller productiveness, is paid only one-half the wages of a Russian workman. As an example, in the cement works of Siberia, $0.80 per day is paid to a good Russian workman, and only $0.40 to the Chinese workman. Generally these are engaged for $2.50 to $3 per month by the Chinese contractors, who supply the food and lodging. Even on this small pay, the workmen contrive to save money and send their savings to China. The Chinese excel in certain kinds of labor, such as gardening, shoemaking, etc., where the Russian cannot compete in price, but, on the contrary, he is not good for all kinds of work, and especially refuses to work in the water, or even in damp places. For masonry work, it is estimated that a Russian workman, himself inferior to an Italian, equals four Chinamen. Among the Siberian industries, it is the gold mines especially which have adopted Chinese labor. Formerly, in the mines belonging to the Czar, it was forbidden to employ the Chinese; but when on account of the scarcity of hand labor the price had reached $0.25 per pound of gold, the government decided to let out the work to contractors. The Chinese were engaged by these for $0.13 per pound, which reduced considerably the price of the gold extracted. M. Levitoff remarks that the Chinese carriers in the region between Irkutsk and Khabarovsk have the habit of stealing the gold and sending it to China. Another thing to be deplored is the clandestine sale of Chinese brandy, called khanchine. In spite of the advantages enumerated, the writer says that it is urgent to stop the invasion of the Chinese element, and he recommends emigration from the rural population of European Russia.

TRAFFIC IN EUROPEAN PORTS.

The figures have been recently given for the maritime traffic in the principal European ports for the year 1898, according to the official statistics. The port of London comes first for the number of ships as well as the tonnage; it received, in 1898, 11,306 vessels of a tonnage of 9,400,000. After London follow, in the order of tonnage, Hamburg, with 7,990 vessels and 6,700,000 tons; then Antwerp, with 5,358 vessels and 6,500,000 tons; Liverpool, with 3,652 vessels and 6,200,000 tons; Rotterdam, 5,881 vessels and 5,400,000 tons; Marseilles, 4,141 vessels and 4,400,000 tons. Genoa has 2,339 vessels and 2,500,000 tons; then come Havre, with 2,375 vessels and 3,300,000 tons; and Trieste, with 8,708 vessels and 2,100,000 tons; then Bremen, 2,494 vessels and 2,100,000 tons; and Amsterdam, 1,734 vessels and 1,400,000 tons. Since 1871 the tonnage has almost doubled at Liverpool. It has more than doubled at Bremen, Trieste, Genoa, Marseilles and Havre; tripled at London, and more than tripled at Antwerp, Amster-

dam and Rotterdam. At Hamburg it has almost quadrupled. In 1871, Liverpool took the lead with 3,300,000 tons, then came London with 3,100,000 tons, all the other ports being far in the rear. Antwerp, Hamburg and Marseilles received but 1,800,000 tons. London has surpassed Liverpool since 1875; and Antwerp and Hamburg also surpassed it in 1893. Antwerp even took second place in 1897, but yielded it to Hamburg in 1898. The increase of tonnage is due especially to the increase in the dimensions of vessels. From 1871 to 1898 the actual number of vessels has diminished for the ports of Marseilles, Havre, Genoa and Liverpool; it has increased at least 12 per cent for Bremen, Trieste, Antwerp, Amsterdam, and 27 per cent for London; for Rotterdam it has increased 65 per cent, and for Hamburg 90 per cent.

THE HEAVENS IN OCTOBER.

BY HENRY NORRIS RUSSELL, PH.D.

The planets which show so brightly in the evening skies are passing out of sight toward the sun, and the shortening days and the chilly air are no clearer signs of the arrival of autumn than is the appearance above the eastern horizon of the advance guard of the familiar winter constellations.

At 9 P. M. on October 15, Taurus is well above the eastern horizon, recognized unmistakably at once by the Pleiades, below which is the equally distinctive but perhaps less familiar group of the Hyades in form of a V lying on its side. At its lower extremity is the brilliant red Aldebaran, which marks the eye of the Bull, and between this and the point of the V is the pretty double star Theta Tauri, which is easily divided by an ordinarily good eye, the component stars being about 5½ minutes of arc apart. It seems almost incredible, however, when looking at the stars that their distance is over one-sixth of the moon's apparent diameter, but such is actually the case, as the moon's diameter averages about 31 minutes of arc.

North of Taurus is Auriga, the charioteer, marked by the bright yellowish star Capella, whose spectrum shows it to be very much like our sun in constitution.

Above and to the right of Taurus an oblique triangle of moderately bright stars forms the head of Aries, and further north is the conspicuous constellation Perseus, in the Milky Way, with Cassiopeia higher up.

A little east of the zenith is the great square of Pegasus, between which and Perseus is Andromeda.

Almost the whole of the southeastern sky is filled with the huge shapeless mass of Cetus. The head of the monster is marked by an irregular pentagon of stars almost below Aries, while Beta, the brightest star in the constellation, stands almost alone, a little to the left of the southward extension of the eastern edge of the great square of Pegasus. The two lowest stars of the head, with another smaller one below, form an obtuse angle triangle, not unlike the head of Aries, and the longest side of this triangle, if extended to the right for a little less than its own length, points out the remarkable variable star Mira, the first object of the kind known. For most of the time it is of the ninth magnitude and entirely invisible to the unaided eye, but at intervals of about eleven months it brightens up enormously, becoming occasionally the brightest star in the constellation, and being in such a case about 1,000 times as bright as at its minimum. It usually remains visible to the naked eye for about six weeks. The star is now approaching a maximum, which will afford a good chance to watch its light without losing sleep for the purpose.

The only other conspicuous object in the southern sky is Fomalhaut, a lonely bright star, low down near the meridian, belonging to the constellation of the Southern Fish.

West of the zenith are Cygnus, Lyra, and Aquila, Hercules and Ophiucus are lower down, and in the north the Dipper is swinging low, with the pointers almost under the pole.

THE PLANETS.

Mercury is evening star in Virgo and Libra throughout the month. On the 29th he reaches his greatest eastern elongation, but is not favorably placed for observation, being very far south and setting less than an hour after the sun.

Venus is morning star in Cancer and Leo, rising about three hours and a half before sunrise throughout the month. She is still very much brighter than anything else in the morning sky, though her light is not much more than half what it was in August. Mars is morning star in Cancer, rising before 1 A. M. and gradually, but slowly, increasing in brightness as the earth overtakes him.

Jupiter is evening star in Scorpio. By the middle of the month he sets at 8 P.M. and before its close he can only be seen in the twilight.

Saturn is also evening star in Sagittarius, setting about 9 P. M. in the middle of the month.

Uranus too is evening star. On the 19th he is in conjunction with Jupiter, being less than half a degree south of the latter, and could be easily identified with a field-glass, were it not that both planets are very low in the twilight.

Neptune is in Taurus, rising about 9 P.M., but it is always invisible to the naked eye.

THE MOON.

First quarter occurs on the evening of the 1st, full moon on the morning of the 8th, last quarter on the night of the 14th, new moon on the morning of the 23d, and first quarter again on the night of the 30th. The moon is nearest the earth on the 7th, and farthest from it on the 20th. She is in conjunction with Neptune on the morning of the 13th, with Mars on the evening of the 16th, with Venus on the afternoon of the 19th, with Mercury on the morning of the 25th, with Uranus and Jupiter on the afternoon of the 26th, when an occultation of Jupiter will be visible in the Western States, and with Saturn on the morning of the 28th.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The first and most obvious difference between the American and British meetings is the great prominence given to the meeting here by press and people. All the newspapers in the United Kingdom teem with full reports of the proceedings, while the local papers give many full pages daily to the reports.

The attendance of members and associates exceeded nineteen hundred. Many papers of great scientific interest were presented, beginning with the address of the president, Sir William Turner,* and the several presidents of sections.

Prof. Turner discussed at length the problem of cell life in organisms both animal and vegetable, but his address has been already published in full, so I need not attempt to summarize it.

Probably the boldest of the addresses of presidents of sections was that of Prof. W. J. Sollas to the geological section, in which he essayed the difficult task of harmonizing Kelvin's and Joly's estimates of the age of the earth. An exhaustive review of the whole subject from the best data attainable seems to show an age of somewhere near 100,000,000 years.

Sir George Robertson, in the geographical section, made a very patriotic address, and therefore very pleasing to the people here. He urged the necessity of government control and extension of ocean cables and of means of transportation.

Electricity is, after all, the dominant feature of the meeting. Important papers were read on theoretical and practical questions connected with it.

On the side of theory was a long discussion of ions, by such men as Lodge and Fitzgerald, in which, however, no really new ideas seemed to be brought out, at least none that could be accepted as adequate explanations of the remarkable phenomena involved, which really are so intimately connected with the ultimate constitution of atoms and molecules as to require for their solution a knowledge of the alternate constitutions of matter.

In practical applications of electricity, an epoch-marking paper was that of Sir Wm. Preece, describing the complete success of wireless telephony in actual operation over a distance of about eight miles from the north coast of Ireland to a near island, and capable of extension certainly for several miles further, and this with comparatively short base lines. The success of this experiment resulted from the discovery that the efficiency of the apparatus was vastly enhanced by connecting the wires with plates at each end immersed in water.

The speaker recommended the system as applicable to communication from ship to ship by stretching the wire in each ship from bow to stern, bringing it up around over the topmasts. This, when ships are nearly parallel to each other, must give excellent telephone communication. How it would be with ships at right angles is not yet known,

Sir Wm. Preece also presented a project for a monorail electric railway, devised by Mr. Behr, and soon to be actually constructed between Liverpool and Manchester, 34½ miles. This distance will be covered in twenty minutes more cheaply, comfortably and safely than ordinary surface travel. The car, weighing 45 tons and seating 64 persons, rides a sinlge rail saddle-wise with its center of gravity below the rail, and having guide wheels on each side supported on light ties. There will be no stops between stations, but electricity of 10,000 volts pressure will be transmitted over the wire, and reduced to one thousand volts, at which it will be supplied to the motor and by actuating it with 1,600 horse power at the start will communicate velocity to the car at the rate of 1½ feet per second, which is as much as can be given with comfort to passengers, till after 110 seconds the car attains a velocity of 110 miles an hour, when 500 horse power will maintain it.

Mr. Aldrich described an electric automobile bus, supplied by light overhead trolley system of two wires; which, as it requires no rails, is the most economical means of road propulsion, and the system is actually in successful operation in the outskirts of Paris. Kinematograph views of the bus in motion were given—the first time the kinematograph has been used in the association.

* This lecture is published in the current issue of the SUPPLEMENT.

The lecture to workingmen by Silvanus P. Thompson was on electricity applied to industries, and brought a great throng to St. George's Hall. The lecturer said that whereas the nineteenth century had been the age of steam, the twentieth must be that of electricity. He urged the consumption of coal at the mouth of the mine, and generation of electric power, to be thence distributed, thus saving the cost of transportation of coal, the great loss in generating power by applying it as now in production of steam, and the purification of the air from the oppressive smoke cloud which overlies the whole north of England. He says that England can produce electric power cheaper by the use of coal in this way than America can by utilizing her abundant water power.

The lecture of Prof. Gotch on animal electricity showed a wonderful power generated by several electric fishes, notably the malapterurus, which has 3,000,000 cells consisting of nerve ends arranged beneath its skin, and gives a sharp electric shock.

Prof. Perry, in commenting on this paper, said that these studies were of immense practical value, because by the study of animal life we should probably succeed in securing electro-chemical composition of fuel, which is that whereby the animal utilizes its food, and this means the utilization of 98 per cent of the fuel instead of the waste of 88 per cent of it now made in the best marine engines down to 99½ per cent in poor engines.

Space must still be found for a word as to the fine Municipal Technical School and the fine exhibit of industrial work there. It is pronounced exactly adapted to the needs of industrial workers in Bradford. A fine array of textile fabrics produced by students was shown. Several looms were seen in actual operation, also machines for testing strength of material. I was particularly struck by the excellent imitation of silk produced by mercerization of cotton, a process named after Mr. Mercer, of Bradford, who invented it. The process consists in stretching a hank of cotton thread taut between two bars, and, while stretched, immersing it in suitable liquid; several kinds are used, the most simple being water, which produces a marked effect in giving the silky gloss. The thread is also dyed while still stretched. While the mercerized fabric has very much the appearance, it has not at all the strength of silk.

The next meeting will be held at Glasgow, beginning September 11, 1901, and the meeting for 1902 will be at Belfast. Some of the members already begin to talk of arranging another American meeting soon.

Prof. A. W. Rücker, secretary of the Royal Society, has been elected president of the Glasgow meeting.

WILLIAM H. HALE.

THE INTERNATIONAL PHYSICAL CONGRESS.

The International Physical Congress opened at Paris on August 6, with President Cornu in the chair. Among those present were Lord Kelvin, Prof. Alexander Graham Bell, Prof. John Millis, Prof. Cleveland Abbe, Prof. Arthur G. Webster, Secretary S. P. Langley, of the Smithsonian Institution, and Carl Hering. The French vice-presidents were MM. Cailletet and H. Poincaré and the foreign vice-presidents were Prof. Alexander Graham Bell, Sir W. Roberts-Austen, M. Schivendoff of Russia, Herr Warburg of Germany, Herr Vanderwaals of Holland, M. Exner of Austria, Signor Righi of Italy.

The Congress comprised seven sections; the first dealing with general questions, such as measuring units and teaching; second, mechanical and molecular physics; third, optics and thermodynamics; fourth, electricity and magnetism; fifth, magneto-optics, cathode rays, etc.; sixth, cosmical physics; seventh, biological physics.

Each section was provided with a president, one French and two foreign vice-presidents, and two secretaries. The programme included seventy-eight papers, which, when published, will make three volumes. Many of them were of the highest possible interest, specially those of Prof. Poincaré and Prof. Kelvin, the former dealing with the philosophy and methods of physical science, the latter with the ether hypothesis. The President of France held a reception for the members of the Congress; Prince Roland Bonaparte also held a reception for them. Many of the papers were illustrated, and demonstrations were given by MM. Becquerel, Curie, Cornu and others. Mme. Curie, who is well known for her brilliant discoveries in physical science, was secretary of one of the sessions.

THE CHICAGO AUTOMOBILE SHOW.

An international automobile exhibit and race meet opened at Washington Park, Chicago, Ill., September 18. More than four thousand persons witnessed the contests, and the grandstand was crowded. Among the events were automobile parades for manufacturers, races for steam, gasoline and electric automobiles, obstacle races, automobile parades for private owners, 10-mile races, 5-mile races for motor tricycles, etc. The short distance automobile speed records were broken by T. E. Griffen, who made a mile in 1:06. Alexander Winton made 10 miles in 16:02.