A SECTIONAL STEAMER FOR OUR COLONIAL POSSESSIONS.

(*Continued from page* 460.)

notice wherever the transport happened to be. These conditions necessitated further development of the sectional boat, to make it practical for assembling, with the members afloat, or when put overboard separately by the ship's derrick. The department issued a call for bids, stipulating the requirements, and leaving it with the bidders or builders to make their own plans and specifications, and to rely on their own ingenuity to fulfill the contract. The proposal coming from one of the New York yards, the Gas Engine and Power Company and Charles L. Seabury & Co., Cons., at Morris Heights, N. Y., was accepted. The different members of the sections, with the varying size and weight, and the weight of the equipment they carry, must naturally have different displacements when put afloat, and be brought to a common waterline before attaching to each other. They must be quickly assembled, and under great difficulty at times when the sea is rough; they must also have sufficient strength to at once become capable of operation, and to stand the strain of the waves, with their own weight. In the length over all she is 80 feet; beam, 18 feet; draught, 3 feet 6 inches. A light draught is essential, as the greatest advantage would be realized in her use for embarking and debarking men, munitions, etc., in waters which would not be navigable for vessels of great draught. With a full load her displacement will be 72 tons, on which the draught is calculated. She is of steel construction throughout. With the steel deck each member becomes watertight or boxlike in form. The bow section is comparatively short, carrying derrick and the anchor equipment, with chain and store lockers inside. The quarter section, or that next to the bow section, serves both as a hold for the cargo and as quarters for the crew; in fact, will berth twenty men if required. The third section carries the boiler, the coal bunkers, and a portion of the water storage. Her coal capacity will be thirteen tons, giving her a liberal running radius. On the top of this third section is also fitted a pilot house (portable), with or without which the vessel may be operated. The section next aft the boiler, or fourth section, will carry the driving power intact, that is, the two engines, for she will have two, their shafts, and the propellers, thus keeping them in perfect alignment and without danger of being disturbed. A portion of this section, measuring 11 feet 6 inches fore and aft, is cut off with an inside bulkhead to give quarters for the officers. The boiler is of water-tube pattern, and her engines two-cylinder or compound, measuring 6 inches and 12 inches and having piston stroke of 9 inches, capable of giving her a speed of ten miles per hour. The fifth section composes the oval counter, which may or may not be used. As this section comes above the waterline, its omission gives the vessel a square stern effect.

When putting the vessel in commission, the boiler section will first be floated, having the greatest weight and establishing the waterline, and the others may follow in order, working either fore or aft. They are fitted with sea valves, and sea water is admitted into their bottoms until they reach the common waterline. Two sections coming together have their ends fitted with cones of about 14 inches diameter, one set pointing inward, the opposite pointing outward. On the deck of each section is fitted a small windlass with a steel cable which works on a differential system. The cable connects cones of one section to the other, and the windlass being operated, brings the four cones together, one from each section engaging that of the one adjoining. When all have been secured, the water ballast is removed by steam siphon connection, and they are reinforced by connecting bolts, one section to the other. The boat is now ready for use as soon as the steam connection between the engine and boiler sections can be coupled, and the piping for the water feed connected to the pumps.

When required to be taken apart for reloading on transport, the operation is simple, involving only the breaking of the steam-pipe connection, removal of bulkhead staybolts, and relaxing of the cables holding the cones, to disengage them.

The contract provides that a demonstration shall be made prior to acceptance, to prove the practicability of the scheme, and after this has been given official attention, the vessel will be sent to Washington, where she will be used temporarily for drilling, until assigned to one of the transports.

The fact that 75 per cent. of the central electric stations of the United States are in places of less than 5,000 inhabitants, as compared with 22.8 per cent. of the gas plants, indicates the wider distribution of the electric stations which have enabled the inhabitants of the small places to enjoy illuminating facilities confined heretofore to the larger cities and towns.

Correspondence.

Palmetto as a Source of Cellulose.

To the Editor of the SCIENTIFIC AMERICAN:

Your exhibit of facts of the material of the paper trade in issue of November 14 was as valuable as it must be interesting to thousands of readers.

I remember reading recently that the only reason why palmetto in Florida was not used for pulp for paper was because there was no water power there to use in its conversion.

I am very familiar with that State, and I know of *only one* water power in the State possible or feasible. That one is in its wild state, and surrounded by thousands of acres of native palmetto, which grows up and falls down annually, unused.

DR. J. H. MCCARTNEY.

Rochester, N. Y.

The Flight of Birds.

To the Editor of the SCIENTIFIC AMERICAN:

The very interesting articles in your good paper upon the flight of birds lead me to mention a fact not noted by any writer whom I have read. In collecting bird skins I have found innumerable air cells, forming a most delicate and wonderful network, between the body and the skin. In the pelican, one of our largest birds, this network of cells practically covered the whole body, and was very noticeable. Now if these cells work automatically, like the lungs, or like the circulation of the blood, being filled with or emptied of hot air, according to the purpose of the bird to rise, float, or descend, then surely we can better understand the ease with which birds seem to sustain themselves in the air during their long flights.

Passumpsic, Vt. C. D. R. M.

Compressed Straw for Fuel.

To the Editor of the SCIENTIFIC AMERICAN:

While driving through the country a few days since, my interest was aroused by observing the scores of straw stacks just now standing all over the wheat country. Much of this straw will be burnt where it stands, the only way at present of getting rid of it. Could not some better use be made of it? Has no portable machine been devised which would cheaply convert this straw into compressed fuel, right on the farmer's premises, and thus save a large quantity of wood, which is often none too plentiful?

If such a machine is in existence, I would esteem it a favor to be put into communication with the makers. If not, perhaps the problem will commend itself to some of your readers. H. READER.

Kutawa, Assa., N. W. T., Canada, November 10, 1903.

Yellow Fever in Cuba.

To the Editor of the SCIENTIFIC AMERICAN:

In the SCIENTIFIC AMERICAN for October 31 or November 7, 1903, under "Notes," I noticed a statement that by good sanitation, etc., Cuba was *gradually* reducing the number of cases of yellow fever within its borders. This is a misstatement that is absurd to those who have read the medical literature of the last few years and is unfair to Cuba and to the United States army medical officers who helped free Cuba from yellow fever.

Not a case of yellow fever has originated in Cuba since three years ago last September. Occasionally a case is brought here from Mexico, but the patient is at once isolated, and in no case for over three years has the disease spread to others. So Cuba can be said to be entirely freed from yellow fever.

WESTON P. CHAMBERLAIN,
Capt. and Asst. Surgeon, U. S. Army.
Cabana Barracks, Havana, Cuba, November 10, 1903.

Radium and the Laws of the Conservation of Energy.

To the Editor of the SCIENTIFIC AMERICAN:

S. W.'s question, reprinted from Nature in the last issue (Nov. 7) of the SCIENTIFIC AMERICAN without comment, shows the popular confusion of *force* and *energy*. The magnet will attract and hold a certain definite and determinable amount of magnetized metal, and thereby does a certain amount of work, but this done, the magnet has exhausted its power for the time being, until by doing *work against* the magnetic force, by gravity or muscular effort or otherwise, the "unsatisfied affinity" is again operative. When simply reposing in a drawer, it is parting with as much energy as a book lying on a shelf ready to fall to the floor when gravity is allowed to act on it.

Radium, however, is continually giving off heat *without apparent loss* or change, an output sufficient to melt a considerable amount of ice hourly and to *maintain* this rate. It is doing work without apparent signs of weariness, and its disregard of the otherwise established principle of the conservation of energy is what is puzzling the whole scientific world. As to odors, which are extremely delicate tests for the presence of substances, the usual theory, while not absolutely proved, is by no means unreasonable, for the smallest weighable quantity, say 0.01 milligramme, must contain a vast number of molecules, a few of which may well affect our sensitive nerves of smell. It would hence require long periods of time for perfumed substances not noticeably volatile to lose an appreciable amount of weight, and from a closed vessel even ether will not find its way out very rapidly. A solid like camphor, which possesses a strong odor and a high vapor tension, rapidly wastes away in air, but can, of course, be preserved indefinitely in a closed space. ARTHUR D. WYMAN.

Cambridge, Mass.

Optical Atmospheric Phenomena.

To the Editor of the SCIENTIFIC AMERICAN:

The writer once observed a sunset in Iowa which he wishes to describe as he saw it, not only on account of its singular beauty, but also because it furnished the key to the explanation of a piece of natural scenery which had often puzzled him, and the cause of which he had never seen accounted for.

No one can have failed to notice the fan-shaped rays which, at the time of sunset, sometimes, from the sun as a center, shoot up against the sky. Such rays now ascended likewise on the occasion here referred to; but in the place of fading out at some little distance from the horizon, they ran on, growing wider and wider until they passed over the meridian. Thence gradually contracting, they took their course over the eastern hemisphere, and on the eastern horizon centered in another point just opposite the setting sun. As light rays seemed to ascend from the western center, thus from the eastern point of meeting, to all appearance, dark rays arose, until the two systems met and blended in the meridian. The rich yellow and orange of these stripes, mottled in places with tiny clouds, made the sky look like one gigantic melon, and presented a spectacle as gorgeous as it was unique.

Suddenly it occurred to the writer that these rays were cylindrical highways of light, which ran across the sky horizontally (parallel to the surface on which he was standing), at a considerable elevation over his head, and which (like a straight road in the line of vision) owed to perspective their peculiar appearance. They were caused of course by the transmission of the setting sun's light through apertures in the clouds near the horizon. JOHN NOLLEN.

Pella, Iowa.

Canal Locks.

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of October 10 I was very glad to find some data of the new hydraulic canal locks at Peterboro (Ontario). But there were some misleading expressions, and I hope the following facts will also interest a great part of your readers.

At first I must state that the new locks are not the largest in the world, and then there is *not* only one such lock in the world; there are still three locks built after the same principle, i. e., locks supported by a single piston in a cylinder with compressed water. The first one, at Anderton (England), connecting the river Weaver with the Trent and Mersey Channel, was built as early as 1875. Its dimensions are given below.

Two others, at La Louviere, Belgium, and at Les Fontinettes, France, were built in the years 1880-1888; their dimensions are also given below. The hydraulic lock in Germany referred to in your article is built on quite another principle; for the weight of the pontoon filled with water and its supporting structure is counterbalanced by the buoyancy of five swimming tanks, moving up and down in great pits, filled with water and supporting five turrets on which rests the pontoon. The movement is produced by means of four screws, fastened in turrets at the corners of the pontoon and driven electrically, which are connected with the pontoon by four nuts fastened to it in such a way that they will move up and down as soon as the screws are moved by an electrically-driven gear. The dimensions of this lock are given also in the following table, and will show that this is the largest lock in the world. It is situated at Henrichenburg, near Dortmund, in the famous Dortmund-Ems Canal, and was built in the years 1894-1899 by Hanil & Lueg from Düsseldorf and Harkort from Duisburg. The electric plant is from Lahmeyer, Frankfort-on-Main.

Lock at—	Anderton. Meters.	La Louvière. Meters.	Les Fontinettes. Meters.	Henrichenburg. Meters.
Distance between water levels	15.35	15.4	13.3	14-16
Length of pontoon	22.85	43.2	40.60	70
Breadth of pontoon	4.75	5.80	5.60	8.8
Depth	1.35	2.40	2.00	2.50
Diameter of lifting piston	0.915	2.00	2.00	5 x 10
	Tons.	Tons.	Tons.	Tons
Capacity of vessel to be lifted	100	360	300	750

K. A. MULLENHOFF, Engineer.