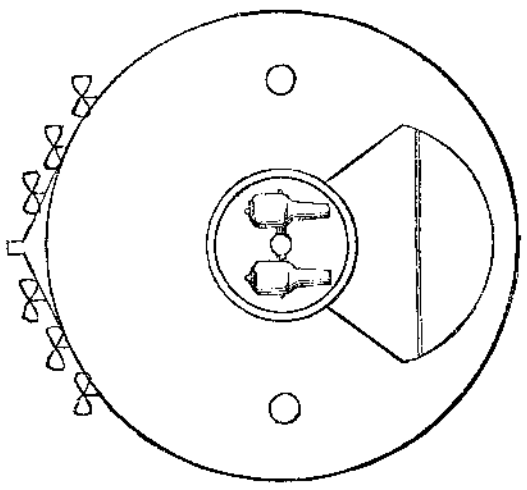
CIRCULAR SHIPS.

The idea of circular vessels is not absolutely new. Probably the earliest practical suggestion was that of Mr. T. R. Timby, of Worcester, Mass., who, in 1843, filed in a working model of a revolving ship, together with specifications, in the Patent Office at Washington. His plan embraced circular ships and revolving ironclad forts and turrets, which have since come into use.

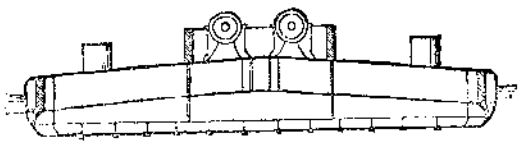
Admiral Popoff, of the Russian navy, has also adopted the idea, and quite recently two vessels, the Kiew and the Novogorod, have been successfully launched at Nikolaief.

We lay before our readers, in the accompanying engravings, sectional and plan views of these curious ships, from the pages of *La Nature*. Each vessel is 99·2 feet in diameter and constructed of iron, planked with wood and sheathed with copper. The draft of water is 12·1 feet, and the spar deck is 2·1 feet above the water line. The displacement is 2,783 tuns. The bottom is perfectly flat, and the sides are vertical, with an overhang aft, sheltering the rudder. In order to insure stability, twelve keels are affixed, each about three inches in depth.



At the center of the ship is a turret, 29 feet 6 inches in diameter and 7 feet high, containing two 11 tun steel guns (probably eight inch bores), breech loading and mounted *en barbette*. The turret has a hollow axis which serves as an ammunition scuttle, and on which pivot the supports of the guns, so that the latter can be pointed over an angle of from 30° to 35° with the fore and aft direction of the ship. The rest of the armament consists of torpedo arrangements.

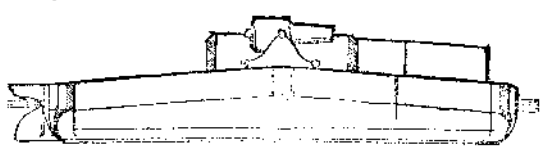
The lower portion of the hull is double, and there is a space of about 2·9 feet between the shells. The lower plating is ·62 inch in thickness and the upper ·23 inch. The hold is divided into a large number of watertight compartments. Parallel to the upper deck and about 6 feet below, is a second deck, both being united to the lower shell by bulkheads.



Forward of the turret is a light superstructure serving as a protection against the sea and as quarters for captain and other officers, eleven persons in all. The second deck comprises a forecastle for the crew of ninety men, and furthest aft the coal bunkers and boilers, each of the latter having a separate smoke stack. Amidships are other officers' quarters and a powder scuttle. There are six eighty horse power engines, built on the Woolf system, each driving an independent screw. Machines and boilers together cost $222,000, about. Below the forecastle are storerooms; and under the officers' quarters, the powder magazine and shot lockers. Two steering wheels are also on the second deck.

The armor consists of two streaks of plating about three feet broad: the upper layer is 9·1 inches thick, and is backed by solid teak 6 inches through; the lower skin is 6 inches, with a backing of 9 inches. The turret is similarly constructed, with the exception of the plates having a uniform thickness of 9 inches. At a distance of about two feet inside the walls of the ship is a watertight bulkhead formed by ·7 inch plating, dividing the battery into two parts, so that in case water should enter one of the exterior compartments, the vessel would still float.

The trial trip of the *Novogorod* was recently made at Nikolaief in presence of the Grand Duke Constantine of Russia. Although the ship was hardly completed, or entirely ready for sea, it is stated that, with a steam pressure of 5·2 pounds, and a vacuum of 21·4 inches, with 62 revolutions. a speed of six knots per hour was obtained. The ship proved herself an excellent sea boat, obeying her helm readily, and turning almost squarely on her heel when the engines on either side were stopped or their speed slackened. With the port engines going ahead and the starboard engines backing, it is stated that she went about the first time in two



minutes, and on a second trial in one minute and nineteen seconds, without hardly changing her place. On reversing both machines, the ship stopped in a few seconds and turned in the opposite direction, also without altering her position.

Correspondence.

The Hair Worm.

To the Editor of the Scientific American:

The following, apparently cut from some book, was sent to me for solution: and, if agreeable to you, I will answer it through your columns. It reads thus:

"A CURIOSITY FOR NATURALISTS TO SOLVE.—Mr. J. H. Horsford writes us from Freedom, Ill., that a horse, owned in that country by a Mr. West, has a worm or snake in his left eye, from two to two and a half inches long, and, to appearance, of the thickness of a small oat straw, squirming with the active motion of a large snake. The horse, he says, has evidently lost the sight of his eye from his snake-ship having taken up his abode there; and it is only about a week since there appeared any difficulty to the eye. He thinks it has been produced by a hair getting in by some means, and changed to a snake, as hairs are known to do in water. To know its wonders is to see it, as it can be plainly, a rod from the object, wriggling about as if too much confined. *Query:* How came it there and what will the result be? Let some of our veterinarians answer."

I hoped that the old notion that a horse hair will turn into a snake had been obliterated years ago. I am surprised that any one should advance such a theory, even in this Darwinian age.

The hair snake, so called, is frequently met with; I have taken them from grasshoppers, from an apple, from a head of cabbage, swimming in the gutter along the curb of our city. I have found them in our streams and in our spring water, of various lengths and shades of color. Indeed, it seems to me, everybody ought to be familiar with the *gordius*, or hair worm, which, in my youth (as I was taught the common notion), I thought was a transformed horse hair. They are so perfectly hair-like in form that it is not very surprising that ignorant persons might so mistake them. Yet the two sexes are readily distinguished. In the male, the tail end is bifurcated, in the female trifurcated (at least in the American species). I have found the female coiled or indeed knotted up, suggestive of the Gordian knot. Could its name be derived from Gordius, king of Phrygia? If so, I am not aware that I ever met with the statement. After carefully unfolding, I discovered that it had within its folds a string of eggs, like beads, in a ball, and seemed tenaciously attached to them, gathering them up carefully, again to take them under protection. The female deposits millions of these eggs, connected in a string. These, in the course of three weeks, hatch; when the embryos escape from the eggs, they are of a totally different form and construction from the parents. Their bodies are only the $\frac{1}{460}$th of an inch long and consist of two portions: the posterior cylindrical, slightly dialated and rounded at the free extremity, where it is furnished with two short spines; and the anterior broader, cylindrical, and annulated, having the mouth furnished with two circlets of protractile *tentaculæ* and a club-shaped proboscis. I am indebted for some of these details to the patient investigation of Mr. Joseph Leidy, M.D., of Philadelphia. He also says: "No one has yet been able to trace the animal to its origin, or what becomes of the embryo in its normal cyclical course," as those he had observed always died a few days after escaping from the egg. These *gordii*, when developed, vary in their length from three inches to a foot; they occupy various positions among the viscera and even in the head, including the muscles, for their living habitation, analogous to the *trichinæ*. And so minute a larva can as well get into the eye of a horse as into the muscles of an insect or animal.

Among the known *entozoa* that infest man is the *monostomum lentis*, of Gescheidt, found in the crystaline lens, and the *distomum oculi humani*, in the capsule of the crystaline lens, others of this latter genus, *d. hæmatobium*, in the tortal vein, and *d. heterophyes*, of Siebold, in the small intestines. To refer to the snake in the horse's eye, then. It is simply this: The minute animal just hatched (the *gordius* is common in streams, where horses may drink or be washe in the water abounding with the minute embryos of the hair worm) could cling to and penetrate the crystaline lens of the eye, and develope into the *gordius*, which may require some living tissues for its development, or if more carefully examined, might prove some other specimen of the entozoa.

I was more astonished to find a *gordius* in an apple; true, it was worm eaten, but I can advance no theory how it got there unless it crept from a dead grasshopper into the apple or hatched in the blossom and developed with the fruit. A shower of rain could easily scatter the eggs or minute embryos.

J. STAUFFER.

Lancaster, Pa.

The Variable Star Algol.

To the Editor of the Scientific American:

The periodical fluctuations in the light of the star Algol have been accounted for in two different ways, first, by supposing that a non-luminous body revolves around this star, the plane of its orbit being directed toward our system, or nearly so, and secondly, on the hypothesis that Algol is a secondary body, revolving round a dark primary in an orbit situated as in the former case.

If the variations are really produced by the intervention of a dark body, and if, at the time of minimum brightness, their dark body is entirely projected upon the disk of Algol, it is evident, from the large proportion of light cut off, that the two bodies do not differ very greatly in size. It seems to me, therefore, that if we admit the existence of a dark companion, it would be more correct to say that both bodies revolve around the center of gravity between them, rather than to say that either of the two revolves around the other.

There is a method of observation at our command, however, by which the truth of this theory of Algol's motion in an orbit, may be put to the test. I refer to spectroscopic observation. In case Algol moves in such an orbit, it is obvious that, at times, it must be approaching our system, and at other times receding from it.

If, therefore, the orbital velocity of the star be sufficiently great, displacement of the lines in its spectrum would result; and by observing the amount of their displacement at different times during the period of variation, the rate at which the star moves in its orbit could be determined, approximately. Of course, in these observations account would have to be taken both of the proper motion of the system from or towards us, and of the orbital motion of the earth.

Spectroscopic observations of Algol, and of other variable stars as well, if conducted in this manner, would, in all probability, lead to the most interesting results.

St. Catharine's, Ontario, Can. J. M. BARR.

Mexican Water Coolers and Filters.

To the Editor of the Scientific American:

In your issue of June 14, you have given a drawing of an Australian water cooler. That is very good for the purpose; but herein you will find a sketch of those used in this country to stand on a table, which are far prettier and more convenient. They are made of red, white, or buff colored clay, with saucers and stopples to match. Many of them are ornamented with wreaths of ivy, or bouquets of flowers in colors. The necks, stopples, and saucers, are glazed; the bodies are left porous. The white and buff become discolored sooner than the red. The latter are very pretty when made of the finest clay.

In this country there is a stone which is used for filtering water for domestic use, and I am sure that it is better than anything gotten up in the United States for that purpose. It is indurated volcanic ashes. The stone is cut in the form of a hollow, inverted pyramid, the smallest size being about 15 inches at the base, 22 inches deep outside, and 2 inches in thickness, the last dimension increasing as it approaches the apex, with the exception of being cut away near the base on the outer surface to form an offset by which it is suspended in a frame. Beneath this, upon a shelf in the lower part of the frame, six or eight inches from the floor, is placed a very thin, unglazed, earthen jar to receive the water as it drops from the stone. This jar is covered with a plate having a hole in the center, upon which rests a small, unglazed pitcher.

Turbid water passes from the filter as clear as crystal, remains in the jar deliciously cool, and is much more wholesome than ice water. The latter article is rarely used here, as our only sources for the supply of ice in this valley are artificial, and the peak of Popocatepetl.

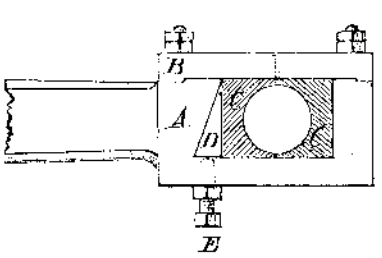
S. E. G.

City of Mexico.

Taking up the Wear of Journal Boxes.

To the Editor of the Scientific American:

In Mr. Crawford's suggestion, published in your issue of September 6, I see no way to take up the wear of the boxes, caused by the end strain that the rod is subjected to. I herewith send to you a sketch of a plan for which I am indebted to Mr. Charles Elms, of Chicago. I have used it, and find it a very convenient, cheap and substantial method of fitting up stub ends, answering all purposes of the strap, gibs, and key, and in some respects better to those, as there are no spring straps and battered keys to repair after a few years' use. The following is a description of the invention: A is the stub end; B, plate or cap fastened at each end by a stud, an offset fitting a corresponding one upon stub end A; C C are brasses; D is a steel wedge to take up wear of boxes or brasses, adjusted by the stub set screw, E.



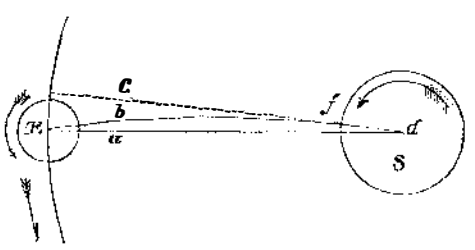
Having been benefited myself by many suggestions and much information received from your valuable paper, I submit this to you, hoping that it will be of some use to my fellow draftsmen and machinists.

New York city. ROBERT C. GRAY.

Planetary Motion.

To the Editor of the Scientific American:

I claim that the following is no mere hypothesis, but a logical deduction from known facts: The sun and earth



tend to approach each other, obedient to the laws of gravitation existing between them. This gravitating force is