

favorable places, from the strata of air nearest the surface. To test this, 300 liters of air were thrown with great force and velocity against a glass plate covered with glue solution, to which the solid particles in the air adhered.

3. Stagnant water in malarial districts seemed not to contain the disease, although it may be, like the lake of Caprolace, extraordinarily rich in lower organisms. Their experiments indicate that a large quantity of water hinders the development of malarial poison and renders the germs which are present inactive.

4. By infection with the above fluids, some directly from the soil and others prepared by cultivation and filtration, a fever was produced in the animal of the regular type, with intermissions, which lasted up to 60 hours, and an increase of temperature up to 40° C. (104° F.)

5. The filtered liquids caused but very slight increase of temperature even when five times the quantity was injected. Even filtering through a double paper filter seems to remove the malarial poison.

6. Animals infected with malarial liquids all showed a swelling of the spleen, and in many of them was found a black pigment.

7. The organisms which were the real cause of the malaria belong to the genus *Bacillus*. They are present in the soil of malarial regions in the form of numerous movable brilliant spores of long oval shape, with a greater diameter of 0.95 micrometer. They grow, both in animals and in cultivating apparatus, into long threads, which are at first homogeneous, but afterward divide and develop again within the limbs. These spores first form on the walls, but finally the whole interior of the member becomes filled with these little bodies. Owing to their peculiar morphological action they must be looked on as a new kind of bacilli, and have been named *Bacillus malariae*.

8. These organisms will not develop if atmospheric oxygen is excluded, and hence belong to the class of Aerobii. They do not develop in water, but will in nitrogenous liquids, like solutions of glue, albumen, and the fluids of the body. Sometimes the fibers reach the length of 0.06 to 0.084 mm.

ANOTHER EXTINCT RACE THAT NEVER EXISTED.

One of Mark Twain's best points was made when he described the Indians of Cooper's novels as an extinct race that never existed. Now Professor Stephenson, of the Hayden surveying party in New Mexico, is charged by a Chicago paper with giving a similar report of the Aztecs. He says they are a myth, and that the tribes known as the Cliff-dwellers are to be credited with all the romance attached to the Aztec name. New Mexico is full of their buried towns and cities. During his summer's work in New Mexico, Professor Stephenson made a number of valuable collections, including skeletons and remains of extinct animals. Among his trophies are two gods of Egyptian character, with finely cut features, outstretched wings, and traces of paint on their faces. The Professor brought away specimens of pottery bearing a close resemblance to that unearthed in the ruins of the Old World, and also secured the secret of its manufacture from the Indians, who still make it in New Mexico.

NOVEL SWIMMING DEVICE.

We illustrate herewith one of the most novel applications of machinery that has come under our notice. It is a singular craft without hull or engine, but nevertheless apparently correct in principle and capable of practical application. This swimming apparatus, recently patented by Mr. William H. Richardson, of Mobile, Ala., consists essentially of a light frame carrying a float and a longitudinal shaft, having at one end a small screw propeller and provided with gearing for running the propeller.

The swimmer reclines on the float, and, grasping one of the hand cranks in each hand and placing his feet on the two foot cranks, proceeds rapidly and easily, with the head far enough above the surface of the water to be comfortable without extra exertion.

The inventor asserts that a swimmer with one of these machines can, under favorable circumstances, make from four to five miles an hour without undue exertion.

Further information in regard to this novel device may be obtained from the inventor.

Substitute for Cod Liver Oil.

According to the New York *Medical Journal*, Dr Thomas A. Emmet, of this city, in his recent work on the "Principles and Practice of Gynecology," recommends the fat of pork, properly prepared, as an excellent substitute for cod liver oil. A portion of a rib, free from lean, is selected and soaked in water thirty-six hours to get rid of the salt. It is then boiled slowly, the water being often changed, until the

meat is thoroughly cooked. It is to be eaten cold in the form of sandwiches, cut very thin. Thus prepared, it forms, according to the author, a very nutritious and concentrated article of diet, and one which can often be retained by irritable stomachs.

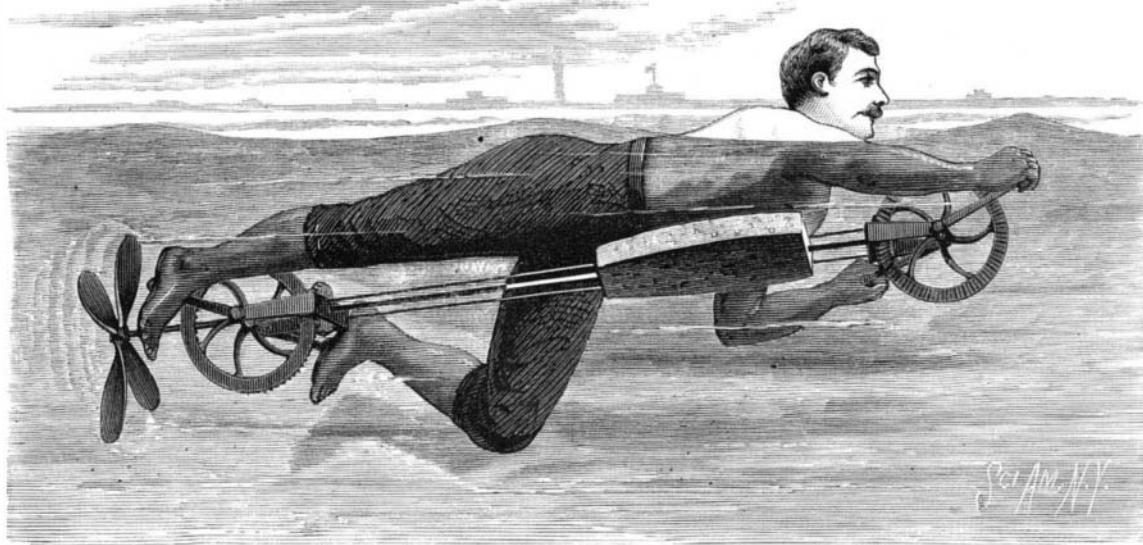
JUVET'S TIME GLOBE.

For many years it has been the ambition of horologists to apply by some mechanical device a motor to a terrestrial



JUVET'S TIME GLOBE.

globe, that, while it should show the exact diurnal revolution, should also be so constructed as to have utility as a timepiece. Various and ingenious methods have been devised, putting a clock in a case and projecting above its base a rod with a gear coupled into another on the equatorial portion of the globe. A French inventor made a globe in the shape of a dome, exhibiting only the northern part of the earth, and by an impelling mechanism turned it on its axis. These and other crude and cumbersome mechanical devices prevent any



RICHARDSON'S SWIMMING APPARATUS.

other than a rigid position, and one that could not accurately illustrate the earth's polar position. A sphere that shows but a half globe, or one that necessitates a fixed horizontal or perpendicular polar projection, is calculated to mislead and not instruct. The requirements for a perfect scientific instrument of this kind are excellence as a time-keeper, accuracy, clearness, and completeness of map surface. It must admit of being easily examined, and should be capable of any inclination necessary for terrestrial or other planetary illustrations.

Any exterior mechanism precludes these essential requirements.

Mr. Louis Paul Juvet, a native of Neufchatel, Switzerland,

but for some time a citizen of the United States, after years of patient effort has devised a time globe which avoids the imperfections of its predecessors. This globe, which is shown in the accompanying illustration, has a chronometer movement in its interior. The shell that envelops the works and protects them against accident or dust is very light and uniform in thickness, allowing the mechanism to turn freely, equably, and in perfect balance. The globe surface is as hard and smooth as a sheet of steel, being made of an entirely new material, which is unaffected by moisture, or heat, or cold. The meridian ring used for the support of the globe at its polar extremities, graduated for the measurement of latitude, is placed at some distance from the sphere to give lightness and beauty, and also to admit more easily examining the globe surface. It is held in any desired position by a simple swiveled clutch and holder. At the northern end the meridian ring is expanded into a holder for a transparent heavy plate glass clock dial, with the usual hour figures and minute marks. The hands are under the dial and the time is easily read, yet the dial is not an obstacle to the free examination of any portion of the globe. At the equator a zone dial encircles the globe, the hour figures and minute marks on which, by following the meridian line of any locality to it, gives the exact time of any place. In the illustration the hands of the clock show 12:20, the local time of New York city, the meridian line of which, it will be seen, stands also before 12:20 P.M. on the equatorial dial. It will be noted, also, that San Francisco is yet on the morning side of the meridian, while London is almost in darkness, and stands before 5:16 evening on the equatorial zone.

One half of the equatorial zone is darkened, being nearly black at midnight and shaded lighter on the left to 6 A.M., and on the right to 6 P.M., thus showing at a glance which part of the world is in daylight and which in darkness. The automatic motion of the globe, reproducing on a small scale the very movement of the earth, illustrates the phenomenon of day and night, and solves a problem that, simple as it is, is yet incomprehensible to many.

This globe is, in fact, a miniature earth in position and motion, being lightly and yet strongly made, with every portion of it visible. A clock and globe gives local and universal time with accuracy. It measures by its motion the comparative, and by the simplest computation the exact size of any country as it passes the meridian ring and equatorial zone. It can be placed in any position without derangement, and we are informed that it cannot be fractured by blows. It is unaffected by climatic changes. It is covered by a map which is a special edition of the celebrated Edinburgh (Johnston's) maps corrected to date, having all the recent political changes and geographical discoveries, and also blue lines indicating average winter, and red the average summer temperature of every country on the globe; the water being represented in blue of a desirable shade clearly shows by the white lines the ocean currents. Whenever a change in the boundaries of countries, addition of States, or important discoveries make it desirable, this globe can be remapped at a nominal expense. The axis of the earth is represented by a gracefully shaped arrow, the feathered end of which is used as a stem winder for the clock within, which runs four days, and is regulated from the outside. The works are simple, and can be taken apart or repaired by any mechanician.

It received the highest award of the Centennial Exhibition at Philadelphia, and has the most cordial indorsement of scientists at home and abroad. It is mounted simple or or-

nate, to meet various tastes. It is a fit ornament for any library, a valuable adjunct in every business office, and a necessity in every institution of learning. This beautiful piece of apparatus is patented in this country and in Europe.

For further information address Messrs. Juvet & Co., Canajoharie, N. Y.*

A Safe Investment—Dividend Every Week.

The commencement of a year and the beginning of a volume are the best periods for subscribing for either magazines or newspapers. The *SCIENTIFIC AMERICAN* at this time embraces both these conditions. A new volume commences with the new year, and any person not a subscriber into whose hands a copy of this paper may fall is

invited to become a subscriber at once, and receive its weekly visits during the year 1880. Nothing will return a better income than \$3.20 thus invested. Dividends every week without any liability for assessments, payable at the home or office of the subscriber, free even of postage. Try the *SCIENTIFIC AMERICAN* for 1880.

FISH CULTURE IN CANADA.—A Canadian official report states that during the fiscal year 1877-78 a sum of \$20,088 was expended in restocking waters with fish, the number of young fish distributed during the year exceeding 27,000,000.

*See advertisement on another page.