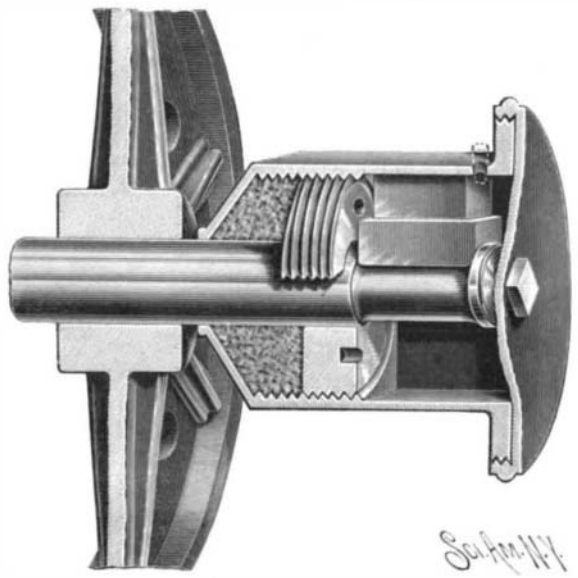
AN IMPROVED CAR AXLE BOX.

An axle box designed to absolutely prevent the entry of dirt and grit to the bearing parts, while facilitating their perfect lubrication with oil only, is shown in the accompanying illustration, and has been patented by Carolus Noyes, Jr., of Valley Falls, R. I. It has a circular, tapering inner portion, and a square outer portion, hermetically sealed by a screw cap or cover, the circular inner portion being threaded to receive a packing ring screw, which may be screwed against an oakum or other packing by a suitable tool. If convenient to facilitate the use of a packing ring of any desired shape, the thread may be dispensed with and



NOYES' CAR AXLE BOX.

the packing ring held in position and pressure given to it by extending rods from the ring to a similar ring resting against the cover of the box, when the screwing of the cover into position would give the same results. In the square portion of the box, on the neck of the axle, are two bearing blocks or brasses, the weight of the car coming upon the box directly over the blocks, and in the top of the box, at its outer end, is an opening for the introduction of the lubricant, which should be allowed to rise to a point above the concave bottom of the lower block, thus completely submerging the axle.

ELECTRIC FERRY BOATS.—Eight small electric ferry boats were put into service some time ago at Bergen, Norway, to replace the old inadequate rowboat system, and afford interesting evidence of the growing appreciations of electric motor possibilities. The boats are about 16 feet long, of 6½ feet beam, and 2½ feet draught, and have a displacement of about 6 tons. They are built symmetrically fore and aft, and are provided with a screw and rudder at each end. The screws are on a common shaft, direct coupled to the motor, which is series wound, weighs about 600 pounds, and is rated at three horse power. It is placed in the middle of the boat, under the flooring. The storage batteries are placed partly under the flooring and partly under the seats. The plates of each battery weigh about 3,000 pounds, and have a capacity of about 20,000 watt hours. The battery itself consists of 32 cells in series, and weighs altogether about 5,280 pounds. The average speed, with a power of 2,300 watts, is about five miles an hour. Each boat runs about 37½ miles a day, and about 1,800 passengers, on the average, have been carried by the ferry each day. After the day's work is over the boats return to the charging station, where the accumulators are charged during the night, and the necessary cleaning is done and repairs made. The charging station is fitted with a compound portable steam engine, a dynamo of 30 horse power, and a suitable switchboard. During eight months' run of uninterrupted operation the plant is said to have proved excellent in every respect.—Marine Record.

THE INGERSOLL CYCLOMETER.

In old days the wheelman was willing to pay a very high price for a cyclometer, a necessity which no longer exists. We have prepared the accompanying illustration with a view to showing our readers one of the newest forms of cyclometers. It is made partly of aluminum, the wheels and dial being of that metal. It is attached by a clip to the fork side, so that the front wheel axle nut need not be disturbed, this being no slight improvement over the usual method of attachment. The striking pin also possesses a peculiar feature. It is a cylindrical pin ending in a split screw which straddles one of the spokes, and it is secured and adjusted for protection by two nuts, one on each side of the spoke. To prevent the pin from swiveling, a tongue is used which, inserted between the nearest spokes, prevents the possibility of its swinging around the spoke to which it is attached. The adjustability of the pin for length is a very great improvement, as wheels differ in proportion so greatly. The Ingersoll cyclometer registers up to 10,000 miles and is provided with a hand which, going one circuit of the dial for a mile, gives readings to 1-100 of a mile. The weight is 1¾ ounces. It is manufactured by Robert H. Ingersoll & Brother, 65 Cortlandt Street, New York City.

AN ELECTRIC WELDING MACHINE FOR USE ON BICYCLE FRAMES AND SIMILAR WORK.

We have from time to time published articles upon various systems of electric welding, especially when such work has been done in welding railroad rails. In the accompanying illustrations, for which we are indebted to London Engineering, we show apparatus adapted for use in smaller work, such as welding bicycle frames, steel pipes, etc. Our contemporary says:

This system is now being introduced by Mr. T. Scott Anderson, of the Royal Insurance Buildings, Sheffield. It is known as the Zerener system, and is founded on the well known phenomenon of the deflection of the electric arc by a magnet. The mutual action of an electric current and a magnet is, of course, the basis of dynamos, galvanometers, and of most forms of electric instruments, but the effect is nowhere so strikingly shown as when a powerful electromagnet is placed beside an arc playing between two carbon points. The arc is then driven outward until it resembles a blowpipe flame, and can be used as such, but with this difference, that the temperature is enormously higher. It will be readily imagined that with this flame some very difficult jobs in soldering, brazing, and welding can be attacked with much better prospects of success than if any other means are employed.

There are two forms of apparatus for applying the deflected arc, according to the size and power of the flame required. Fig. 1 shows the smaller form. The current passes from carbon to carbon, forming the arc, and the feed is arranged by means of a small thumb-spring. By means of the horseshoe electromagnet, the position of which is adjustable, the arc is deflected at will to any position, and the heat is thus spread over

THE INGERSOLL CYCLOMETER.

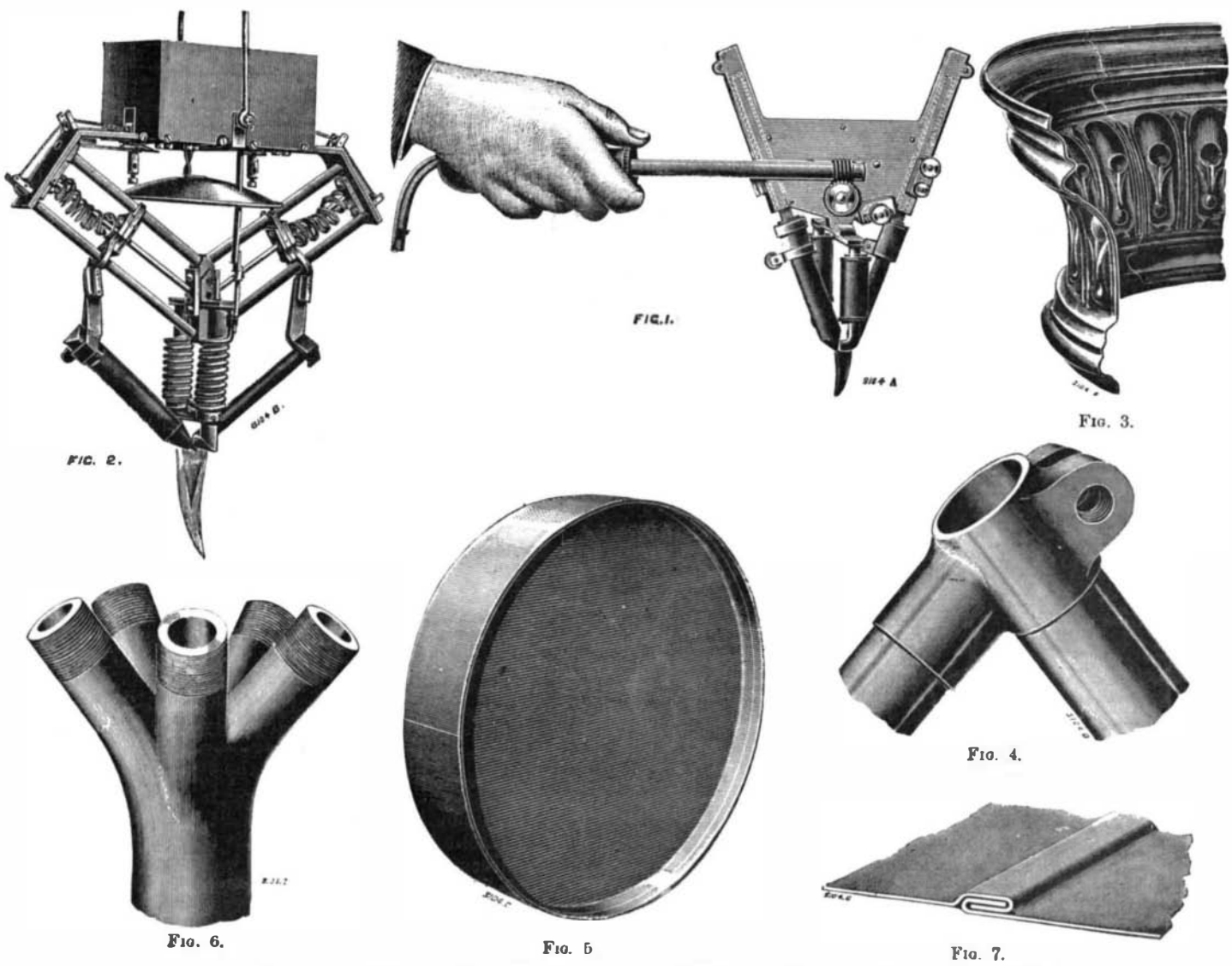
any desired area. One of the smallest of these plants, operated by one workman, and driven by a 5 indicated horse power engine, has made 2,000 brazes in a week of 54 hours, and Figs. 3 and 4 show specimens of the work thus done. Tubes of brass, copper, aluminum, steel, and iron have been thus brazed as brass to brass, copper to copper, or as copper to steel, brass to iron, etc.

A large number of trials have been successfully carried out to meet the requirements of the cycle trade, and two complete plants for this work are already in use. Fig. 4 shows a part of a bicycle frame.

In large work, the automatic apparatus is used (Fig. 2); the principle is precisely the same, but here an automatic arrangement is employed for feeding the carbons, and instead of the apparatus being held by the workman, it is suspended or placed in any position required. A considerable amount of work has been done by this large plant, which varies from 150 to 300 amperes output. Steel pipes from ⅛ inch to ½ inch thick have been longitudinally welded, the rate of work comparing favorably with the present system of riveting. Deck plates up to ⅝ inch thick have been satisfactorily welded, and a plant for this particular work, and also the ordinary requirements of a shipyard, is being erected.

Seam welding is probably the finest production of the deflected arc system; we have before us a sample weld in a plate $\frac{1}{16}$ inch thick, 34 inches long, and 8 inches wide, seam welded from top to bottom.

Fig. 5 shows the bottom brazed into a steel barrel. The joint, however, can be equally well welded with a slightly larger expenditure of current. These barrels are welded throughout, ends, longitud-



AN ELECTRIC WELDING MACHINE FOR USE ON BICYCLE FRAMES AND SIMILAR WORK.

inal seam, and bung; the horse power required for this work is about 18 actual, and a steel barrel of 40 gallons capacity has been commenced and finished in just over one hour. Within the last few months two plants for barrel work, to turn out together some 300 per week, have been erected. Another application of the system is the production of hardened and tempered sections for reaping machines, the work being done by a slightly different machine. Fig. 6 shows a sample of pipe welding, and Fig. 7 a brazed joint.

For ordinary machine repairs, castings, boiler plates, locomotive shop works, etc., the system is equally suitable. The plant required for such operations is of a simple description; no accumulators are necessary, and where a lighting plant is installed of suitable output, the cost of accessories is not large. The portability of the apparatus is a great advantage; any work can be carried on in situ, and the extensive range of work possible by one plant should lead to very considerable application, more particularly where the ordinary methods of welding are impracticable.

Life in the Arctic Regions.

At a recent meeting of the Royal Geographical Society, Mr. A. Trevor-Battye lectured upon "The Struggle for Life in the North Polar Region."

Mr. Trevor-Battye said it struck all travelers in the Polar regions that instead of the dreary and barren lands which they might expect to see they found on the contrary abundant and exuberant life—mammals, birds, and plants flourishing in and apparently well content with the conditions of their existence. The fowler of our eastern coasts would recognize the sanderling, the knot, the brent goose, the ducks, and the waders which he was accustomed to shoot from his punt and he would find flowers such as those he had left behind—the dandelion, the cuckoo plant, and, further north, saxifrage. Much of the existence of the various forms of life was passed in sunlessness and extremely severe cold. An interesting question for naturalists was the consideration of this initial presence of organic life in those regions, and how it managed to survive. The question as to why the birds familiar to us in our temperate zone went north for the purpose of nesting was also one of great interest to naturalists. It seemed probable that the north was the original home of the progenitors of many of the species which annually migrate there, and that they retained the memory of their ancient birthplace. Darkness and cold were, of course, the two obstacles to life in the Arctic regions, but they were evidently not so formidable as might appear. It must be remembered that there was only a limited period of absolute darkness, and the fact that so many species of plants flourished in high latitudes was proof that sufficient light reached them. As to mammals, it was well known that the polar bear did not hibernate; he was not a martyr to the "chilly coma" which afflicted the black and brown bear and the dormouse, but roved the land and sea all the winter. Professor Geikie had said that the Polar region was the cradle for tree forms. The deciduous cypress, which is now found only in the United States and Mexico, flourished in the Miocene period as high up as latitude 82. The spruce also was a tree of the far north before it made its appearance in Europe.—Daily Graphic.

Electric Wires Killing Trees.

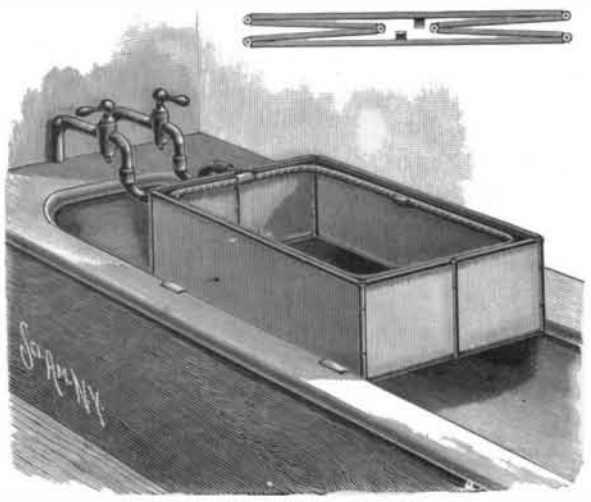
"In France," says Cosmos, "great care is taken in locating the wires that carry high tension electric currents, whether used for light or power, but in America the thing is done more simply. No one bothers himself about what is to be found at the side of the wire, and it passes among the branches of trees and across thickets, unconscious of the damage that it may do. Now in many towns it has been remarked that the trees crossed by the current dwindle and die. It has also been observed that the death of these trees invariably follows the rainy season; the leaves, being then soaked with moisture, become good conductors, and lead the current down into the tree from the wire. The wires, to be sure, have been insulated, but the protective layer has been quickly destroyed by the friction of the branches and the line becomes bare, producing thus results that it would have been well to avoid. And the electricity is the only thing that can be accused of this. It suffices, to convince one's self, to compare the condition of the trees traversed by the wires with that of neighboring trees. It has often been noticed that in a storm all the trees through which wires pass die in a few hours, while the surrounding ones are not touched. This is a very serious source of complaint, and causes some lawsuits."

W. I. Adams.

W. Irving Adams, of the Scovill & Adams Company, of New York City, died at his late residence in Montclair, N. J., January 2. Mr. Adams was president of the company. He had been identified with photography for thirty-five years, and was a writer for photographic journals, as well as the inventor of several improvements and photographic appliances.

A SHOWER OR NEEDLE BATH.

The convenient foldable attachment to an ordinary bath tub shown in the illustration has been patented by Warden R. Humphrey, of Wilmington, Del. It consists of a casing open at the top and bottom, along the sides and ends of which is a perforated pipe arranged to be connected by a hose with one or both faucets of the bath tub. The sides of the box or casing are connected by hinges with the ends, and the latter are made in two parts, connected by hinges, to permit folding, as shown in the small figure. In the box are lugs to support the perforated pipe, and the bath tub is also preferably provided with lugs to support the box in

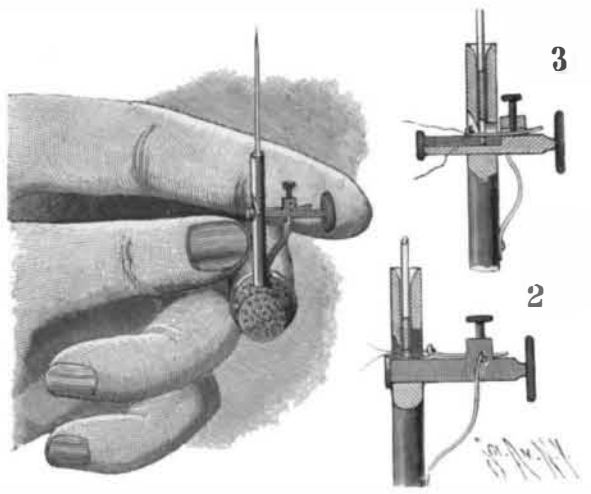


HUMPHREY'S SHOWER OR NEEDLE BATH.

proper position, when the bather, by raising and lowering himself in the box, can readily expose all parts of his body to the jets of water.

AN EFFICIENT NEEDLE THREADING DEVICE.

A device adapted for attachment to an ordinary thimble, to facilitate the easy threading of the needle without trying the eyes, is represented in the engraving, and forms the subject of a patent recently issued to T. A. Somdal, Mansfield, Ill. The device is attached to a thimble, as shown in the main view, by a threaded stem in its lower end engaging a small perforation in the end of the thimble, Fig. 2 showing the needle in place in the holder in position to be threaded, while Fig. 3 shows the thread-carrying hook passed through the eye of the needle in position to engage the thread. The lower end of the needle holder is slotted to receive a slide, on whose upper face is a groove adapted to form a seat for and to center the head of a needle inserted in the holder, there being on the outer end of the slide a thumbpiece. In an enlarged portion of the slide is also held, by means of a thumbscrew, a thread-carrying hook, arranged to be passed back and forth through the eye of the needle when the slide is reciprocated, the slide being normally held in withdrawn position by a spring. In the front side of the slide-receiving opening of the holder is a transverse slot, forming hooks at opposite sides of the passage to receive



SOMDAL'S NEEDLE THREADER.

and retain the thread with which the needle is to be threaded. When the needle is inserted in the holder, the groove in the slide turns the needle into proper position to permit the hook to pass through its eye as the slide is pushed inward, the withdrawal of the slide by the tension of the spring drawing also the thread engaged by the hook through the eye of the needle.

Royal Society Medals, 1895.

The Copley medal of the Royal Society for 1895 has been awarded to Prof. Karl Weierstrass, For. Mem. R.S., for his investigations in pure mathematics; a Royal medal to Prof. James Alfred Ewing, F.R.S., for his investigations on magnetic induction in iron and other metals: a Royal medal to Dr. John Murray, for his services to biological science and oceanography in connection with the Challenger reports, and for his original contributions to the same; and the Davy medal to Prof. William Ramsay, F.R.S., for his share in the discovery of argon, and for his discoveries regarding gaseous constituents of terrestrial minerals.

Annealing Wire by Electricity.

Stahl und Eisen describes a method of annealing wire by electricity, devised by Messrs. Lagrange & Hoho for the hand-drawn wire at the works of H. A. & W. Dresler, at Creuzthal, in Westphalia. The system adopted by Lagrange & Hoho of heating metals by the resistance to conductivity offered by an envelope of hydrogen produced by electrolysis consists of an electrolyzing tank containing a weak solution of salt in water, with a surface covering of petroleum. A plate of lead near the bottom of the tank, connected with the positive pole, forms the cathode, while the hard wire is guided through the tank parallel to the cathode by two insulated rollers immersed at about half the depth of the fluid. As it passes downward it relieves the current from the negative pole by a roller contact, similar to that of an overhead electric railway, and sets up decomposition in water, with an accumulation of hydrogen round it. This causes it to become red hot from increased resistance to the current; it is softened without becoming oxidized, as, on passing the second roller, it is cooled by the upper part of the bath and protecting cover of petroleum on the top. The tension of current is about 200 volts, and the operations of pickling and mashing are not necessary.

Antarctic Expeditions.

The extension of the whale and seal fishing industry seems to be an acknowledged fact. A syndicate has been formed in London for the purpose of sending out an expedition to the Antarctic with a view to carrying on whale and seal fishing, says the London Times. We are informed that all the capital necessary for the purpose has been obtained. It is proposed to send out two whaling steam vessels of 300 or 400 tons, and also one or more smaller steamboats. Mr. Borchgrevink, who last year accompanied the Antarctic to Victoria Land, is to have charge of a small scientific expedition which will be taken out in the ships. Mr. Borchgrevink has reason to hope that he will obtain the comparatively small sum necessary—£5,000. He would take with him eight or ten men qualified to carry on the work of scientific exploration and observation. The idea is that this party should be landed on Cape Adare or on Coulman Island still further south. From either point, Mr. Borchgrevink with two or three companions would make their way inland to the South Magnetic Pole. The headquarters of the scientific party would be Cape Adare, and here they would be left by the whaling ships, which would return for them in the following year. The expedition would leave England about August of next year.

If other syndicates that are talked of are successful, this will probably not be the only expedition to the south next year. We hear of an attempt to form a company in Leith, another expedition being arranged for in Hamburg, and still another in Norway. Then there is the American expedition in two tiny sailing ships, the leader of which, it is stated, hopes to bring home specimens of the strange people believed to inhabit a land whose climate has been calumniated. Still more hopeful is a project for a purely scientific expedition which is being arranged by a well-known gentleman in the North of England interested in natural history.

Counteracting Vibrations of Instruments.

A suspension for physical instruments free from the vibrations of the laboratory would be an inestimable boon to physicists, especially in crowded cities. At Leyden University, Professor Einthoven mounted his delicate capillary electrometer on an iron plate floating on mercury. This device was exceedingly successful, although somewhat cumbersome and bulky, and he was thus enabled to take a photographic record of the instrument magnified 800 times. Sir G. B. Airy was in the habit of placing his artificial horizon upon a table suspended by caoutchouc bands attached to another table similarly suspended, the arrangement being repeated three times. This, however, was even more cumbersome. Now Herr W. H. Julius, in Wiedemann's Annalen, describes a contrivance which is both simple and effective. It consists of a small circular table suspended by three vertical wires about 6 or 8 feet long, the ends of which form the points of an equilateral triangle. A movable weight is attached to a rod projecting downward from the center of the table. It can be clamped in any position, so as to bring the center of gravity of the table and the instrument into the plane of the table itself. Any lateral displacement of the upper ends of the wire will start waves down the wires, which will arrive at the table simultaneously, but will only affect it perceptibly when the period of the disturbance coincides with the period of oscillation of the table about the point of suspension. Even then the axis of the table is always strictly vertical. To clamp the oscillations peculiar to the suspension the author attached little vanes, dipping into oil or water, to the table. With a rough preliminary apparatus constructed in this manner, the author succeeded in reducing the vibrations to one tenth of their original amplitude.—Nature.