Typewriter's Cramp.

Sufferers from writer's cramp are, in the majority of cases, quite able to produce manuscript by means of a typewriting machine, but an instance in which this resource failed is recorded by Dr. F. Hampson Simpson in a recent number of The Birmingham Medical Review. He states that he is not acquainted with any authentic record of a similar case, although he has recently met with two examples of what was called typewriter's cramp; one of these patients, however, seemed to suffer from neuritis and the other from pain and fatigue in the right hand unaccompanied by muscular weakness or spasm. The patient whose symptoms Dr. Simpson describes is at present a muscular man, thirty-three years of age. He became a clerk when eighteen years old, and then wrote with a pen on an average from seven to eight hours daily. In March, 1889—that is, after about seven years of this employment—the initial symptoms of writer's cramp declared themselves, and at the end of three months all the fingers of the right hand were invaded by spasm, which seriously interfered with writing. In 1889 he learned to use the typewriter machine, and in 1890 he commenced learning to play the harp, but after a few months he found that playing brought on cramp, affecting the right hand generally, more especially the first and second fingers, so that he gave up the harp at the end of 1890. For three years (1893-94-95) he was at sea as interpreter on board a transatlantic steamer. In January, 1897, he entered an office as typewriter, but was only engaged in working the machine from two to three hours daily. Toward the close of one of the days at the end of February, while at work "typing," his right index finger became bent by cramp. From this time on, a repetition of the cramp occurred toward the evening of each day, a slight involuntary flexion at the wrist being superadded, and in less than a month the exaggeration of the spasm led him to substitute the middle for the index finger; six or seven days later this middle finger also became the seat of similar spasm. Dr. Simpson observed very little tendency to spasm in the operating finger of the right hand during the early portion of the day's work, but after about two or three hours typing the index finger of the right hand (and the middle finger since its substitution) became very fatigued, and to the flexion of the finger and wrist incidental to striking the keys there was superadded a spasmodic contraction which overflexed those parts. This did not appear, however, to seriously impair the precision of his touch, and an inspection of his type-written work revealed no objective evidence of the spasm in the right finger. It was suggested that he should strike the keys with a little hammer or percussor, and he employed this with much benefit and relief for some little time, but the cramp now affects the whole forearm, and he intends to abandon his present occupation for another of a totally different description. He has been a pianist for many years, and his piano-playing is not in the least interfered with by any digital spasm; his technique and execution are above the average, and his prestissimo passages are perfect.

The Chemistry of Gout.

The results of an investigation recently carried out by Dr. A. P. Luff, as to the value of certain drugs in the treatment of gout, throw considerable doubt upon the views held concerning the efficacy of alkalies as remedial agents in that disease, so far as regards the removal of uric acid from the system by their solvent action. From Dr. Luff's experiments it appears that neither potassium nor sodium bicarbonates, lithium carbonate, potassium or lithium citrates, or sodium phosphate, exercise the slightest influence in delaying the conversion of quadriurate into biurate. A similar conclusion was drawn from experiments with salicylates, piperazine, and lysidine. None of these substances was found to increase the solvent power of the blood for sodium biurate, and hence it is inferred that their administration to gouty subjects with the object of removing uratic deposits in the joints and tissues appears to be useless.—Pharmaceutical Journal.

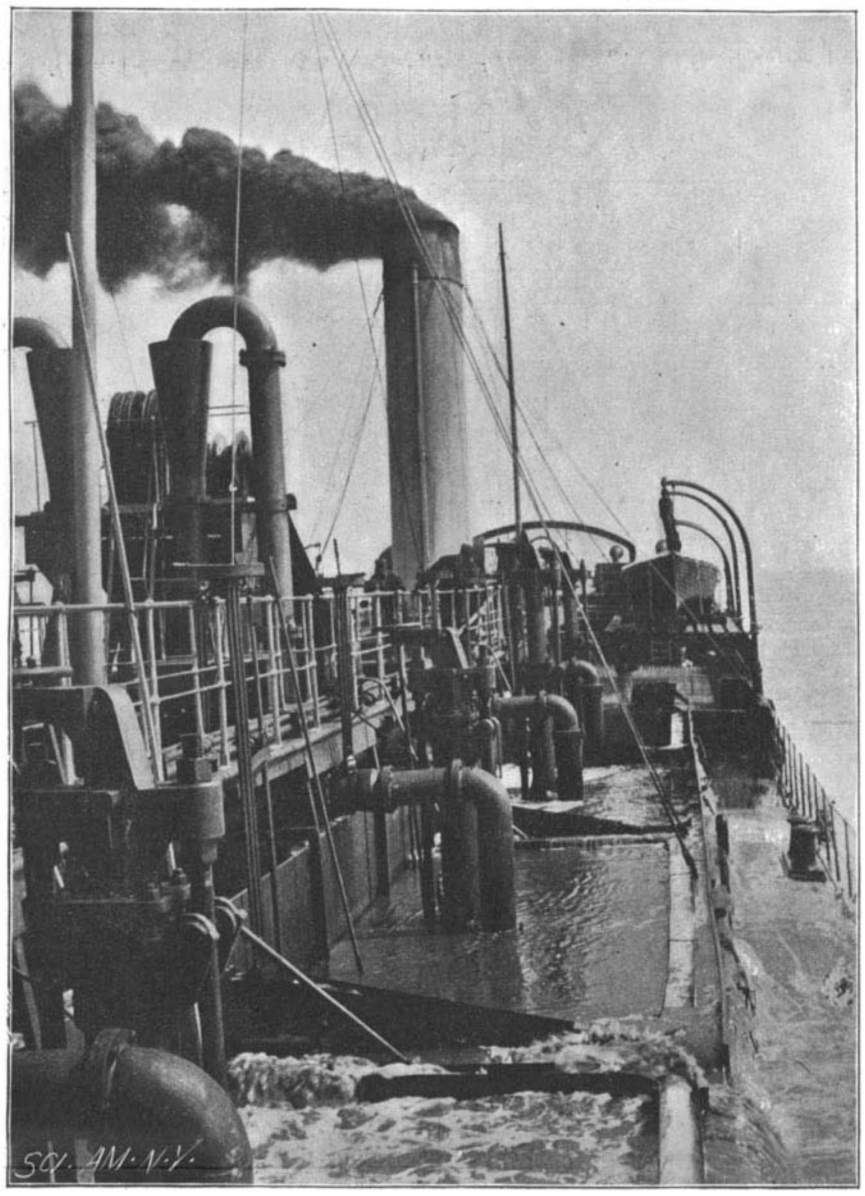

Fig. 1.—DECK VIEW OF THE "BRANCKER," SHOWING THE TANKS AND THE HYDRAULIC HOISTS FOR TANK CYLINDERS.

THE GREAT SEA-GOING DREDGES ON THE MERSEY BAR, LIVERPOOL.

An examination into the local tidal conditions at Liverpool shows that the estuary of the river Mersey and the channel in front of Liverpool are very much like a bottle, with the large part above Liverpool and the neck right at the city, and then an expanding, flaring mouth out to sea. The tides, which are at "springs" 31 feet high, rush twice each twenty-four hours through the neck and up into the great bottle and out of it again. The current acts with tremendous force as it rushes in and out, scouring a channel in front of Liverpool 60 feet deep through the narrow, contracted neck of the bottle. But up in the bottle it spreads out and moves about here and there great masses of sand, shifting its channel of flow from time to time, and generally conducting itself in the most independent and erratic manner. When it rushes out at ebb, or falling, tide, trying to empty the bottle as quickly as possible, it scours its way to sea through the sands which the ocean waves have drifted in. Such was the force of the outgoing current that it was able to maintain a channel through the sea bar eleven miles from the shore line with 10 feet of water in it at low tide at the shoalest point, or 42 feet at high tide.

Here occurs a very interesting episode in which one of our own engineers played an important part. In 1883, the Manchester Ship Canal project had assumed definite shape and had been presented to Parliament, which alone has the power in Great Britain to authorize the building of railroads, canals, or other commercial works. Manchester is about thirty-five miles from the deep water in the estuary, and lies on one of the small rivers, the Irwell, that empties into the Mersey. The plan proposed to Parliament was to come down with the canal from Manchester to Runcorn, on the estuary, and from that point to build training walls and to dredge a channel out into the estuary for several miles until deep water was reached. Liverpool, which looked with disfavor upon the canal project, since it would, if carried out, cause loaded vessels to pass by it going up the canal to Manchester instead of unloading goods at Liverpool, opposed the project before the Parliamentary committees.

The Mersey Dock and Harbor Board of Liverpool employed Capt. James B. Eads, the distinguished American engineer, to investigate the effect of building the canal into the estuary of the Mersey. Capt. Eads studied, compared, and worked out the hydraulic conditions, and presented to the Committee of Lords, which had the subject in hand, a clear, graphical exhibition of the great and potent causes that maintained a channel of 10 feet at low water on the Liverpool bar. He proved that this depth was entirely due to, and was essentially dependent upon, the reservoir capacity of the estuary; that to reduce this would reduce the depth on the bar; that in every average tide, twice each twenty-four hours, 500,000,000 cubic yards of water passed into and out of the estuary; that every yard of this water was needed to maintain the depth eleven miles out in the ocean; and that, consequently, the building of the walls of the canal several miles into the Mersey would occupy the tidal area and injuriously affect the depth of water on the sea bar. He convinced the committee, but they asked him how he would himself build the canal if he had it to

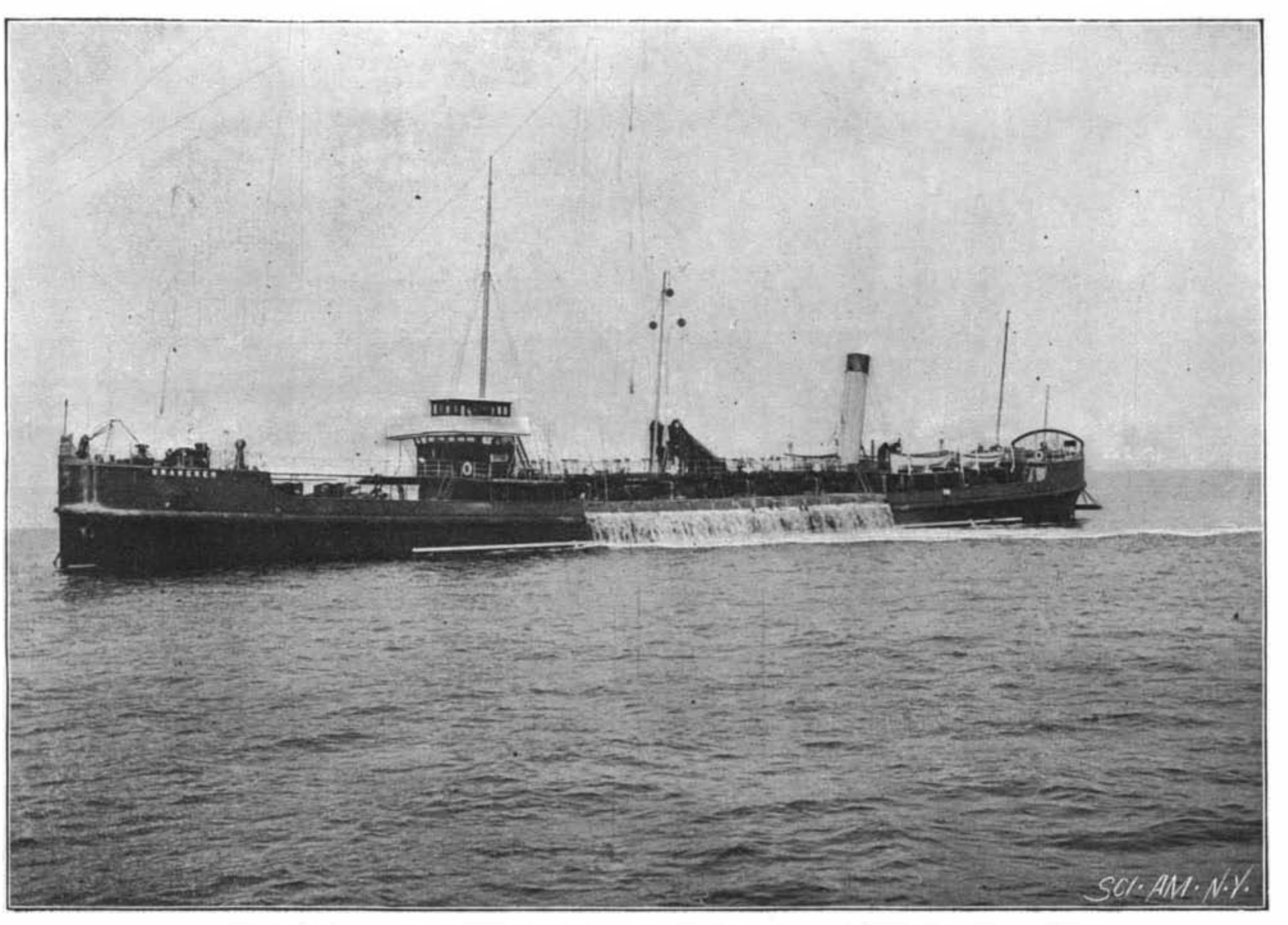

Fig. 2.—THE SEA-GOING DREDGE "BRANCKER" AT WORK ON THE MERSEY BAR, LIVERPOOL.

Length, 320 feet; beam, 47 feet; depth, 20½ feet. Capacity, 2,700 tons per hour.

do. He replied that he would carry it along the banks to Eastham, several miles beyond Runcorn, where he would find deep water near the shore. Whereupon, at the next session, a new proposition came before Parliament from Manchester, embodying this suggestion of Capt. Eads. The bill went through, and the great canal has since been built.

Careful velocity observations show that eleven miles out to sea on the bar, this great body of tidal water, issuing from the estuary, maintains a velocity at ebb tide of from two and a half to three miles per hour. The magnitude of the forces employed by Nature to maintain the channel there will be appreciated if we consider what 500,000,000 cubic yards of water amounts to: This body of water would fill the trunk of a fair-sized ship canal between New York and Chicago, a thousand miles long. It would fill a reservoir such as that in Central Park, in New York, 400 feet deep.

It was necessary, however, to increase this depth of 10 feet at low water to 26 feet; but so far out in the sea was this channel that training works to concentrate the tidal flow were out of the question on account of the enormous expense; just as they would have been at the sea channels out of New York Harbor, down by Sandy Hook. The necessity for a channel that would admit at once on arrival the vessels of the deepest draught, like the "Campania," grew greater and greater. The United States had gone to work with hydraulic dredges to make a channel 30 feet deep out of New York at all stages of the tide, and had accomplished it. The Suez Canal was being enlarged and its depth increased to 28 feet, and it had been decided by the International Commission to deepen it to 30 feet. Southampton had unexpectedly come forward as a competing port with Liverpool, and the American line of steamers had gone there, as 30 feet of water at low tide had been obtained. Other great ports of the world were working for 30 feet, and Liverpool must have it, and the old and inconvenient method of transferring transatlantic passengers upon a lighter fifteen miles out from the landing stage at Liverpool could no longer be tolerated.

After some experiments with a small plant had shown satisfactory results, the subject was attacked vigorously and the decision reached that a mammoth hydraulic or suction dredge beyond anything that had been attempted would be necessary to make and maintain a channel under such extraordinarily difficult conditions: a great seagoing monster that could work effectively in almost any weather or seaway. Thus the great dredge came into existence to overcome the obstacle to the prompt dispatch of business. The dredge is herculean in size and work. The accumulations of the Augean stables, cleaned out by Hercules with his hydraulic flushing, would have lasted about two minutes if this dredge had been there, and had a fair chance at it. It is as big as an ocean steamer: a steel hull 320 feet long, 47 feet wide, and 20½ feet deep, with a loaded draught of 16 feet. It is a veritable machine shop for doing this work. Its output is immense. It sucks the water and sand up through a pipe that a good sized boy could walk through, nearly 4 feet in diameter and 76 feet long, so as to dredge in 53 feet of water. It discharges the material into eight tight pockets or hoppers in its own hull. They hold altogether 3,000 tons, and the solid mass of sand which the dredge can pump up from a depth of over 50 feet is equal to 2,000 cubic yards lifted in three-quarters of an hour. In one day it has raised from the bar, dumped into itself, carried 4 miles out to sea and let go in water many fathoms deep, a mass of sand which, if built into a monument 30 feet square at the bottom and 15 at the top, would rise into the air to a height of 415 feet, nearly twice the height of Bunker Hill Monument and well up toward the top of the Washington Monument. There has been removed and carried out to sea by this and companion dredges 27,287,110 tons to date, equal to 17,000,000 cubic yards of solid earth; a mile square of dirt 25 feet high. It would fill a street nine miles long like lower Broadway between the building lines and as deep as the highest of the "sky scrapers."

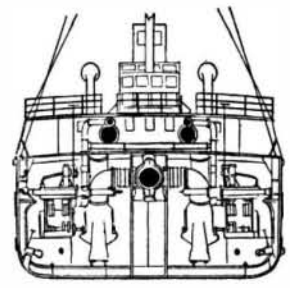

Fig. 3.—SECTION SHOWING THE CENTRIFUGAL PUMPS.

The channel which has thus been made and maintained is 1,500 feet wide and over 26 feet deep at low tide, or 57 feet deep at high tide. Neither "Campania" nor any other ship has now to wait a moment, and you can get aboard of the Cunard and White Star line steamers at the New York dock and be landed without any detention at a landing stage in Liverpool; and the cars that come alongside of it will take you to London at the rate of 60 miles an hour.

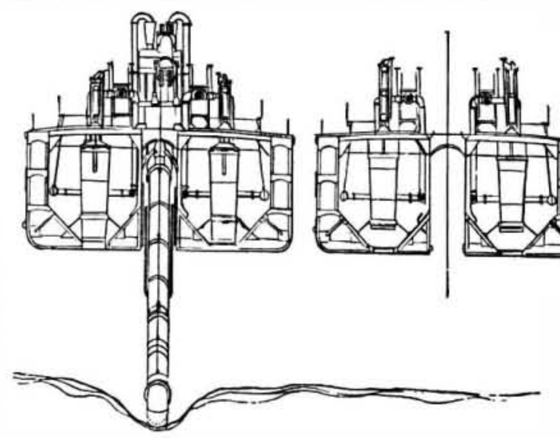

Fig. 4.—SECTIONS THROUGH THE "BRANCKER," SHOWING THE TANKS IN THE LOADING AND UNLOADING POSITIONS.

Some details of the methods of working these mammoth tools—for there are two of them now—will be of interest and serve to explain the illustrations.

The pumping machinery comprises, first, two centrifugal pumps, each 6 feet in diameter, which run at 150 revolutions per minute. From each of these leads a 36-inch circular steel suction pipe, which unites with a main suction pipe, 45 inches in diameter, which is so hung on a trunnion by a ball and socket joint that. even in a seaway, when the waves are running ten feet high, the great dredger keeps steadily at work. The suction pipe has been broken but twice in several years' work. The water and sand are discharged into eight tanks built in the hull of the boat. When they are full, the pumps still keep at work, since some of the material pumped up is water; but this is allowed to run overboard through overflow sluices, as shown in the illustration of the boat at work. When the whole mass in the tanks has thus become solid sand, the pipe is raised and the anchors also, and the load is taken to sea and dumped in deep water.

This dumping is done in a very ingenious manner, by a method designed by Mr. Lyster, the engineer of the Liverpool docks. In the bottom of each tank is a circular opening, 4 feet in diameter. A circular tube of the same size fits down on the edge of the aperture, thus preventing the escape of the sand through the opening while pumping. To discharge the load from the eight tanks, these tubes or cylinders are all lifted a short distance by hydraulic power, and the sand runs out of the bottoms of the tanks. To facilitate its exits, jets of water are thrown into the mass of sand from the cylinder and from the sides of the tank. The whole load of 3,000 tons is dropped into the ocean in the space of five minutes.

The following disjointed facts will answer questions that will naturally arise in the mind of the reader. The sand weighs about 124 pounds per cubic foot. Sixty per cent of the mass pumped up, as it comes through the pipe, is solid material. The pumping engines are each of 750 horse power. There are 41 employes on board, working 24 hours in shifts. It costs, to pump the sand, carry it to sea four miles, discharge it and return to the dredging cut, 1½ cents per ton, or 2⅓ cents per cubic yard, not counting interest on plant or depreciation, but everything else. The length of channel that has to be dredged is 1¼ miles. The dredge at work does not move forward or backward, but swings on anchors placed ahead and abreast, by means of several steam capstans and winches, her two rudders, and the two screws, thus swinging back and forth over the arc of a great circle—a giant mower, cutting a swath through this ocean bar to make a path for commerce. The full navigable depth dredged, 26 feet at low water and 1,500 feet wide, with a central sounded depth of 27 feet, was maintained by the estuary tidal currents without any dredging from December 7, 1896, to May 25, 1897. There are two dredgers at present, the "Brancker" and the "G. B. Crow," the latter recently built and with some minor changes —the suction pipe being longer than that of the "Brancker," so as to dredge in somewhat deeper water, 53 feet, as against 47 feet of the "Brancker." The cost of each of these dredgers was about $180,000.

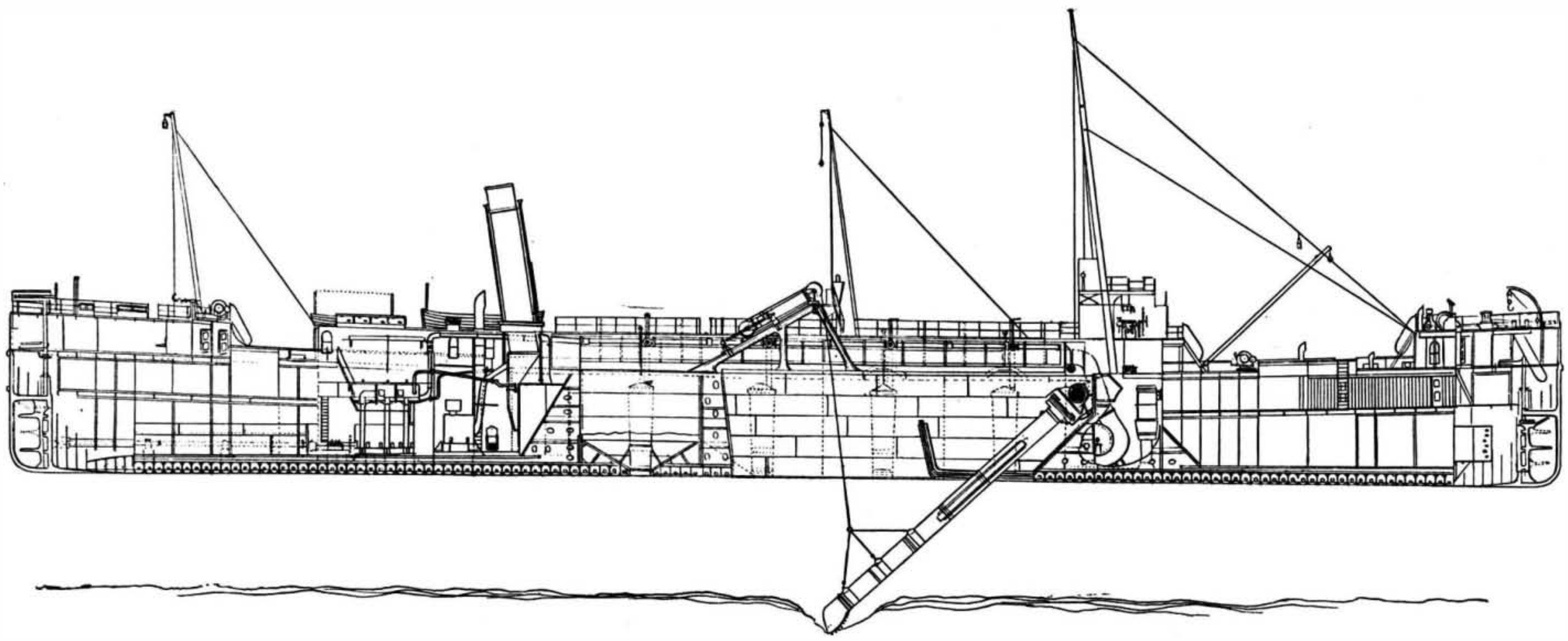

Fig. 5.—LONGITUDINAL SECTION THROUGH THE SEA-GOING DREDGE "BRANCKER."

West India Weather Service.

The West India Weather Service was practically commenced August 10, when the Washington office received reports from six of the ten observation stations recently established there. Prof. Willis L. Moore said the system was now in complete working order. The department will be enabled to forecast the terrible West Indian hurricanes that for years have swept the Atlantic coast without warning. The whole group of islands has been plotted, and meteorological conditions are charted daily at the recently established stations. It was feared that the West Indian service might be hampered by delays in the cablegrams, but Prof. Moore stated that the reports reached the Washington office within an hour and a half after the observations were made.

IN advocating the practice of boiling all water (and milk) of uncertain purity, Prof. Bizzozero combats the prejudice against boiled water as a beverage. He maintains that the "taste" frequently complained of in boiled water is really caused by the kettle, and can scarcely be due to the absence of CO_2 or dissolved air, of which water from wells of great depth often contains very little.—Practitioner, lxi., 63.

The American Association for the Advancement of Science.

THE JUBILEE MEETING AT BOSTON.

We have given preliminary announcements of the jubilee meeting of savants in Boston, from August 22 to 29. It will be of value now to mention a few especially interesting papers of which our correspondent obtained notes in advance, to be followed in our next number with more full reports of the proceedings.

Contemporaneously with the birth of the A. A. A. S., that is to say, about half a century ago, certain radical views began to be promulgated that have since revolutionized scientific thought. The cell doctrine was suggested in 1839, and about that time was worked out the law of the correlation and conservation of forces. Darwin's theory as to the origin of species, Huxley's idea that protoplasm forms the physical basis of life, and Spencer's argument for the unity of nature date from about that epoch. It is only since 1843 that the sciences of embryology and morphology have been placed on a firm basis.

Hence much interest was awakened by the opening address of Vice-President A. S. Packard, of Brown University, before the section of zoology, on "A Half-Century of Evolution." He said, in substance, that the two leading problems confronting zoologists are: "What is life?" and "How did living beings originate?" Coming centuries may, perhaps, solve the first, but a solution of the second has been generally accepted. The theory of evolution is the one indispensable instrument on which the biologist must rely. In one sense this theory has been in the air ever since the days of the Greek philosophers, yet the modern views as to the struggle for existence, the preservation of favored forms, by variation, adaptation, and selection, result from the labors of investigators like Darwin, Haeckel, Wallace, Spencer, Huxley, Hooker, Gray, and many other recent workers, who have established it on a firm basis and made it a useful tool for every department of scientific research. The nebular hypothesis teaches that the same process observed on our own planet has applied to other members of the solar system, and probably to the universe. Although opposed by many, the immediate effects of the acceptance of this theory have been most happy.

Collectors, instead of narrowly gathering one or two specimens for their cabinets and being content therewith, have looked at the environment and distribution of what they have gathered, and philosophically considered the relations of present forms to past geographical changes. Light, heat, cold, gravity, the atmosphere, electricity, and geological laws have been studied to explain the extinction or renewal of plants and animals.

Dr. Packard passed in review the more important epochs in geological history, showing wherein different classes of beings arose, and particularly noting the result of the uplifting of the great Appalachian chain, at the close of the Paleozoic period, which he regarded as the most influential event in geological progress. New forms and classes are related to the opening of new areas of land, as is peculiarly illustrated by the age of reptiles. During that age the competition amid jungle, forest, and plain became so fierce that the pterodactyls took to flight and, developing membraneous wings, lived in a medium before untried by any vertebrate. They were gigantic, but did not last, because of the change in their environment. The feebler forms succumbed to the agile, tree-climbing dinosaurs, while the birds, waxing stronger, exhausted the food supply for these colossal bats. Another class of reptiles essayed the problem of flight with better success, replaced older types, and has now become four times as numerous as the reptiles and six times outnumbers the mammals.

In a similar way the speaker reviewed the effects of other revolutions in the animal forms, showing how, as they gained in shrewdness and brain power, the line of development culminated in man. So strong is the piled up testimony geology affords to evolution that, if it should be necessary to give up this theory, it would also be necessary, in the opinion of Dr. Packard, one of the best and strongest of American naturalists, to give up the theories of gravitation, the correlation of forces, and the conception of the unity of nature. All these are interdependent, and together they form the foundation of science.

One of the most important addresses was by Dr. Charles D. Walcott, director of the United States Geological Survey, regarding the topographical work of the survey, its development, and its application to engineering problems. Nearly twenty years have passed since this bureau of the Department of the Interior was created. During this time ten million dollars have been appropriated for its work, embracing topographic and geologic surveying, investigations in hydrography, forestry, and other branches helpful to geology. About three million five hundred thousand dollars have gone for topographic maps as the basis for other surveys and investigations.

Prof. Walcott reviewed the methods that each year have led to the production of maps of higher precision and practical value. The first expeditions, sent out by the War Department early in the century, excellent for that time, left little of present utility. Between 1867 and 1879 various independent explorations were made of selected regions; e. g., the survey of the fortieth parallel, under King, the survey of the Territories under Hayden, of the Rocky Mountains under Powell, and of the region west of the one hundredth meridian under Wheeler. This work was generally by fair triangulation, the details filled in by long distance sketching. Topographic mapping passed thus from the expeditionary to the reconnaissance stage. The scale was four miles to the inch, and a contour interval was used of from 20) to 300 feet. About 360,000 square miles of territory was thus surveyed.

When, in 1879, the four independent surveys were replaced by the United States Geological Survey, the new organization inherited the methods of its predecessors. "Changes," Prof. Walcott stated, "have been made from time to time in these methods, with a view to improving the character of the work, a general adoption of traversing being especially mentioned. Originally the magnetic courses and distances were recorded and sketches made in a notebook, the results being afterward platted. The advantages of the traverse plane table soon became apparent, and its use in present methods has marked an important era. This plane table is a simplified form of that in general use." In time it became evident that the standard of the maps must be raised above that of reconnaissance surveying. The scale, which had been about two miles to the inch, was changed to one mile. Yet there is no such thing as an absolutely accurate map. The best work of the survey costs from ten dollars to fifteen dollars per square mile, for the inch scale; but from one hundred dollars to ten thousand dollars might be expended on a square mile and still leave certain requirements unsatisfied.

A step in advance was taken, only last year, by an act of Congress, authorizing the establishment of permanent bench marks, at intervals in areas under survey; being brass-capped iron posts, or copper tablets fixed in masonry, on which elevations above the sea level are stamped. This requires spirit leveling of a higher order of accuracy than heretofore. Thus, by one change after another, the work of the survey has been steadily improved, till the maps now produced equal the demands of the times. They even show the culture, drainage, and other features by colors.

The States of Connecticut, Massachusetts, Rhode Island, Delaware, and the District of Columbia and the Indian Territory have been completely mapped, while one-half the areas of Arizona, Kansas, Maryland, Utah, Virginia, and West Virginia have been surveyed. No more than 10 per cent of any other State has been surveyed. At the present rate one hundred years will be needed to complete the topographic atlas of the United States, exclusive of Alaska.

Prof. Walcott called attention to the limitations to the utility of such work. Location is rigid, but sketching relative. The minute details are not attempted. They serve the interests of the community rather than of the individual. They may not locate a ditch for a farm, but would aid in determining the irrigating system for a region. They show the catchment areas, altitude, and slope of each stream. The speaker went into detail as to the utility of these maps in certain ways. He quoted the testimonies of railroad officials and of city engineers, as to the great saving thus effected, in showing the exact drainage areas, the sources of water supply, the configuration of the surface, and the relative elevations of localities. Among the authorities thus cited was the chief engineer of the Croton Aqueduct Commission, of New York city.

Dr. B. E. Fernow, late chief of the United States Forestry Division, and now director of the newly established New York State College of Forestry, at Cornell University, addressed Section "I" on the aims of that college. Only 25 years ago, at the suggestion of the late Dr. F. B. Hough, this very section of the A. A. A. S. addressed a memorial to Congress that secured recognition for the previously unknown science of forestry; and now this movement has culminated in the creation of a College of Forestry by the Legislature of New York. This act also provided for the purchase of a demonstration area in the Adirondack Mountains in a manner to withdraw it from the baneful influence of politics. The course of study leading to the degree of Bachelor in Forestry occupies four years, two of which are devoted to physics, chemistry, geology, botany, entomology, and other necessary sciences, while the remaining two are given to professional forestry courses, ten in number. Provision is also made for popular courses.

The "demonstration area" is to consist of 30,000 acres in the Adirondack region. The motto is not the sentimental one of "Woodman, spare that tree," but the practical one of "Woodman, cut those trees judiciously." The handling of a slowly maturing crop like forest trees is unlike any other problem. Fully a century is oftentimes needed for the mature growth. Obviously it would be unwise to cut down the ripe product and then wait another century for further income. A system is needed that takes the interest in trees ready for the ax, while the great principal, the forest itself, remains practically intact. Spruce, useful for pulp, might be substituted for some of the less valuable hard woods, and be permitted to grow only to the best condition for pulp. The school forest, in addition to silviculture, teaches as to reforesting denuded areas, methods of transportation, road building, and the improvement of watercourses.

Prof. Emerson, of Amherst College, presented an outline map of Southern New England. His work has included the complex districts of central and western Massachusetts, over which he has tramped in every direction, and he is an authority on the geology of the Connecticut Valley. His map covers Massachusetts, Connecticut, and Rhode Island. It shows, first, the line of Archean outcropping rocks which extends along the axis of the Green Mountains, from the Hoosac Tunnel to the Highlands on the Hudson; and, secondly, the eastern Archean granite area from Southboro to New London. The order of the successive formations was noted, as well as the distribution of feldspathic material toward the northeast and the eruptions that furnished softened matter to blend with it. He also spoke of the disposition of the great beds of sandstones and shales, their folding and compression into gneiss and marble. He explained the later processes by which the present topography was produced, the whole forming a paper of much interest to the geologists assembled in Section "E."

An illustrated address was given by Dr. H. C. Hovey, before the geological section, concerning the "Region of the Causses." The causses are lofty tablelands in southern France, along the declivity of the Cevennes Mountains, and the term comes from the Latin "calx," meaning limestone. Dr. Hovey was one of a party of explorers led by Mr. E. A. Martel, last September, through the winding gorges of the rivers Tarn, Jonté, and Dourbie, much of the journey having to be made by canoe or on the backs of mules and through a region almost as little known to the ordinary tourist as if it were in the heart of Africa. The causses vary in height from 2,000 to 5,000 feet, and the canyons cutting through them resemble those of Arizona, both in grandeur and brilliant coloring. The cliffs are from 500 to 2,000 feet in vertical altitude, and are mostly of Jurassic dolomite, with occasional beds of shale, and topped by the Oxford limestone, retreating in gigantic steps. The rapidity of the streams was ascertained by staining the water with aniline dyes, which added to the splendid coloring of the gorges. At Pas de Soucy the Tarn is lost amid caverns, to reappear a mile below.

The walls of the canyons abound in cliff dwellings, recent and prehistoric, and many dolmens are found on the summits. The main causses are those of Sauveterre, Méjean, and Noir, although there are several smaller ones. They are the remains of a vast plateau gradually lifted and meanwhile cut by canyons. Many large caverns were explored, some of them long known to the local inhabitants and others wholly new. From one of them 300 human skeletons have been taken, and from another the bones of more than 100 cave bears. Many of them are utilized as sheepfolds, and some of them are inhabited. The cave of Darjelan has 20 halls, from 65 to 600 feet long, the lowest of them being 400 feet deep. The party discovered and explored the wonderful "Aven Armand," whose total vertical depth is 680 feet. The descent into such pits is by long rope ladders, and subterranean streams are explored by portable canvas boats. Martel's methods of systematic underground exploration were explained, and reference was made to the important work being done by the "Société de Spéléologie" in all parts of Europe. Few caverns equal that of Bramabiau, swept by the river Bonheur, the measured length of the tunnel being 2,610 feet, and the dry ramifications bringing the distance up to more than four miles. Where the stream emerges it leaps down seven waterfalls, the last one being 37 feet high, under an arch nearly 300 feet in altitude. Besides explorations in caves and canyons, the party visited an extraordinary rock city called Montpellier le Vieux, formed by the erosion of the Causse Noir at the junction of the Jonté and Dourbie. It resembles the weathered rocks around Pike's Peak, and its curious pinnacles, natural fortifications, and temples cover an area of 2,000 acres. The region of the causses has many other interesting features and deserves to be made widely known.

Among other papers offered may be mentioned an interesting historical note by Mr. John Murdoch, of Boston, concerning the Rosy Gull, known to ornithologists for many years but rarely seen, not more than 110 specimens being known to exist in all the collections in the world, of which 81 were taken by the Point Barrow expedition, in 1881-2, and only 15 since. Their main breeding ground is probably on Keenan Island, north of the Pinot. They keep close to the loose edge of the main ice pack, moving south with it in winter and retiring far within the Arctic Circle in summer. It is small, with a wedge shaped tail, and is of a deep rosy color where other gulls are white. This extraordinary and beautiful Arctic bird is represented in the collection of the American Museum of Natural History in this city.