

THE GREAT JURASSIC DINOSAUR.

BY L. P. GRATACAP.

The distinction gained by American vertebrate palæontology has been measurably due to the extraordinary deposits in the West. The preservation of the skeletons of mammals and the great lizards is so perfect that the lessons they teach in the development of life upon our earth, and the examples they furnish of evolution quite surpass the added results of study in the same geological horizon elsewhere, throughout the world.

The Jurassic dinosaurs of Colorado and Wyoming are to be regarded as among the most remarkable of vertebrate fossils. They reveal the presence in that remote age of a group of huge terrestrial and probably partially aquatic lizards which momentarily, when we realize their great size and singular proportions, impress us as grotesque nightmares.

At that time over the depressed and in places inundated lands of the West, sluggishly moving their enormous bodies in swamp lands, and through low brake-covered uplands, were the great *Diplodocus*, the *Morasaurus*, over forty feet in length, the *Stegosaurians*, with their crest of bony plates, the bird-footed dinosaurs incongruously uplifted upon their long hind limbs, and the formidable carnivorous reptiles, among which was the formidable *Ceratosaurus*. It is difficult to restore even in mental imagery the contrasted conditions of the Jurassic age in Wyoming and Colorado when these impossible creatures were the animal monarchs in a landscape curiously different from the present in these Western States. Cycads, conifers, ferns, and equisetæ (horsetails) characterized the vegetation, a humid and warm climate prevailed, indented shore lines marked the coast of the Jurassic continent, and in harmony with the strange occupants of the land the swimming mosasaurs, or marine reptiles of great size and strength, disported in the open sea or basked in the shallow waters of estuarine bays.

The Dinosaurs comprise perhaps the largest land animals that have ever existed. They varied greatly in size, and from cat-like proportions reached the incredible dimensions of the *Brontosaurus*, whose total length may have been over 60 feet. The front legs were shorter than the hind ones. Williston suggests that their skin was probably bare, without scales or bony plates except in a few instances. Their variety of nature, form and construction was further shown in some genera having bones more hollow and lighter than with birds, while others were of the massive and ponderous type shown in the skeleton now exhibited in the American Museum of Natural History. Again, some species were characterized by horns placed upon their heads over three feet in length, and this unique ornament rose above a tremendous skull seven feet in length, five feet in width and as many in height.

The Dinosaurs have been separated into two broad divisions, the herbivorous and carnivorous dinosaurs, and to the former belongs the great *Brontosaurus* here shown. The dinosaurs ranged in time from the Triassic to the Cretaceous and their distribution over the earth's surface has been almost universal, Australia alone being excepted.

Among the many eventful expeditions sent to the fossil-bearing beds of the West, under the direction of Prof. Osborn, that of

1898 to Wyoming claims distinction. It was then that in the midst of the eroded outcroppings of the Jurassic limestones and marls the series of vertebrae which form the colossal backbone of the *Brontosaurus* were found.

These bones were taken out *en bloc* in the field, from their position, and, retained in the enveloping

were covered with thin sheets of muslin or of tissue paper, stuck on with gum-arabic water, over which strips of gunny sacking were bound; these were covered over with plaster and the whole, thus rigidly retained, was shipped without danger of dislocation.

The observations of Prof. Osborn upon *Camarasaurus* would seem quite applicable to *Brontosaurus*.

We learn from this authority that this dinosaur was, in all probability, "a great wading and swimming quadruped, enjoying a habitat similar to that of the Upper St. John River, Florida, at the present time, namely, a relatively firm bottom gently graded to all depths, supporting a richly luxuriant aquatic vegetation, the river banks bordered by sloping shallows of sand or clays."

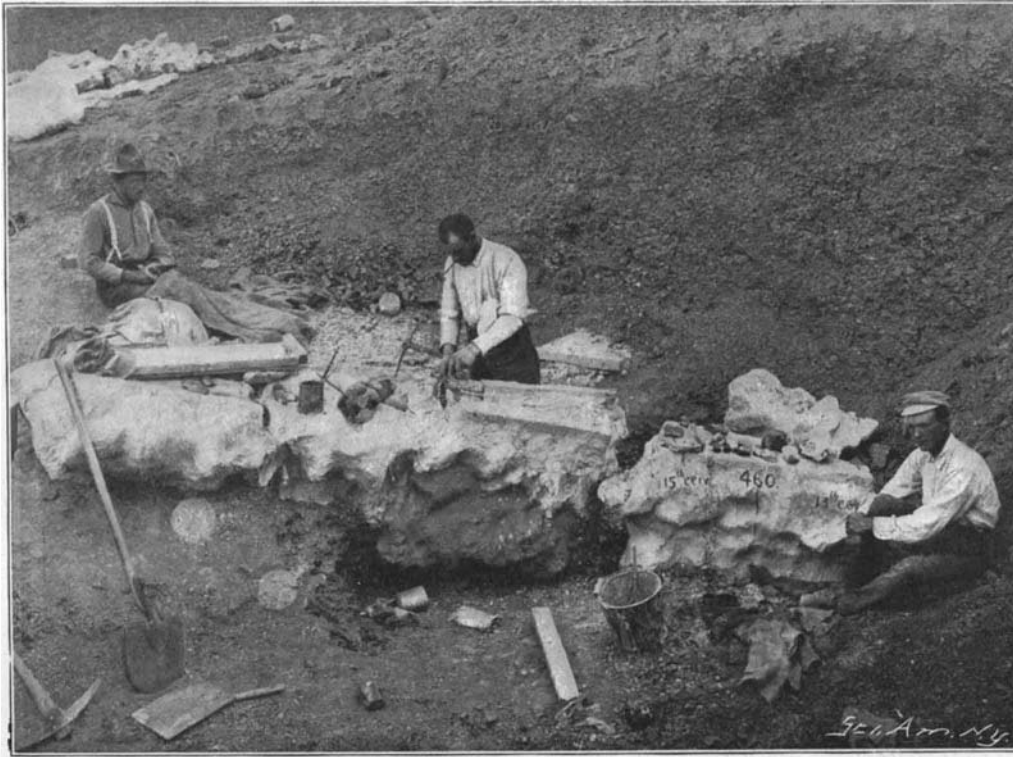
It is also surmised that the animal could walk along the bottom with the forward part of his body raised, that it could even swim, that feeding was done in the water and along the shores, that perhaps its visits to the land were for breeding or egg-laying, that it was exposed to and suffered from the attacks of the carnivorous dinosaurs, and that by means of its powerful spines and through the qu-a-qu-a versal movement of the vertebrae the anterior part of the body could be raised or lowered.

A very interesting and suggestive painting by Mr. C. R. Knight reproduces a scene of the Jurassic continent, richly clothed

with vegetation and bordered by a swampy area, in which the half-emerged bodies of these gigantic lizards appear, with stout necks raised in the air, while a browsing companion on the mainland affords an instructive hint as to their quadrupedal position with arching back and extended head and tail.

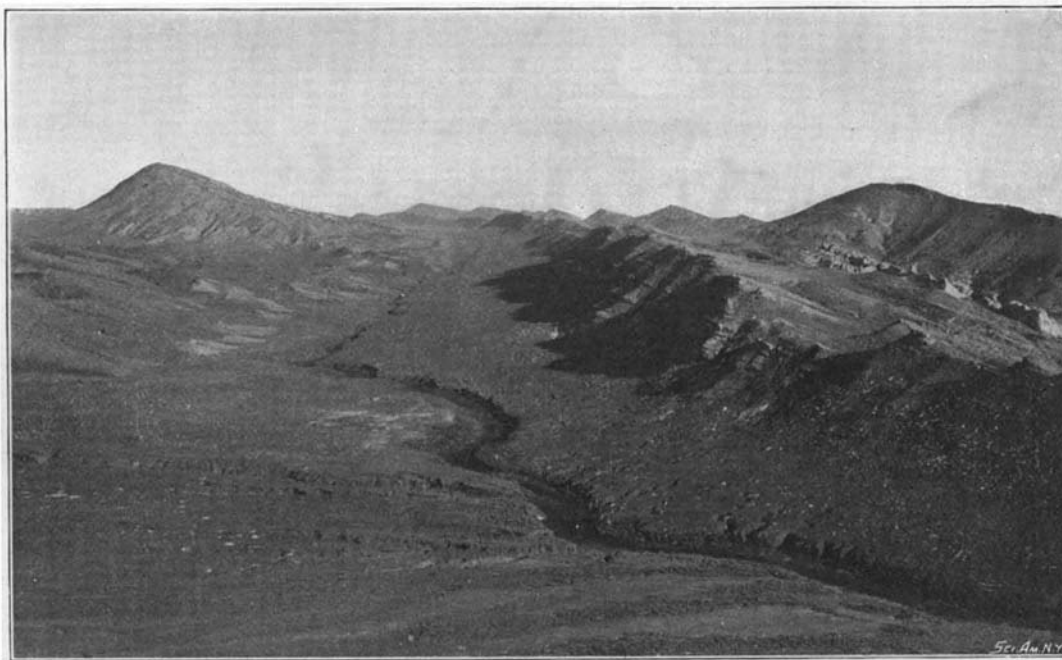
Bagdad Railway.

A new railway branch, known as the Bagdad line, is to unite the Bosphorus with Persia and will traverse the whole of Asiatic Turkey. It is to be constructed by a German company. The present line is to form part of a system which will ultimately connect Europe and India. There are now in Asiatic Turkey, especially in the Anatolia province, about 1,600 miles of railroad. The principal line of this system starts from Haidar Pacha, near Scutari. When the projected Bosphorus bridge is constructed, it will form the prolongation of the great European artery which ends at Constantinople. This line runs along the Marmora Sea and the Sakaria River to Eskisher, where it branches; one branch goes toward Afrium-Karahissar, a center of opium commerce, and Konia, the Holy City of Asia Minor, which forms the terminal station. The other branch passes east to Angora. The new Bagdad line is to join the Anatolia system first at Angora by a strategic line, of which the Turkish government has reserved the construction, and second, by a German line which will lead from Konia. These two branches meet at Diarbekr in Kurdistan. The railroad runs thence along the Tigris, passing Mossou', the site of ancient Nineveh, and Bagdad, where it crosses the river and reaches the Euphrates at a point where the ruins of Babylon are found. From there it descends toward the sea and ends at the Persian Gulf, at Mohamera and the port of Kowet. A project is on foot for constructing another line in Southern Persia which will join the former, and passing along the Persian

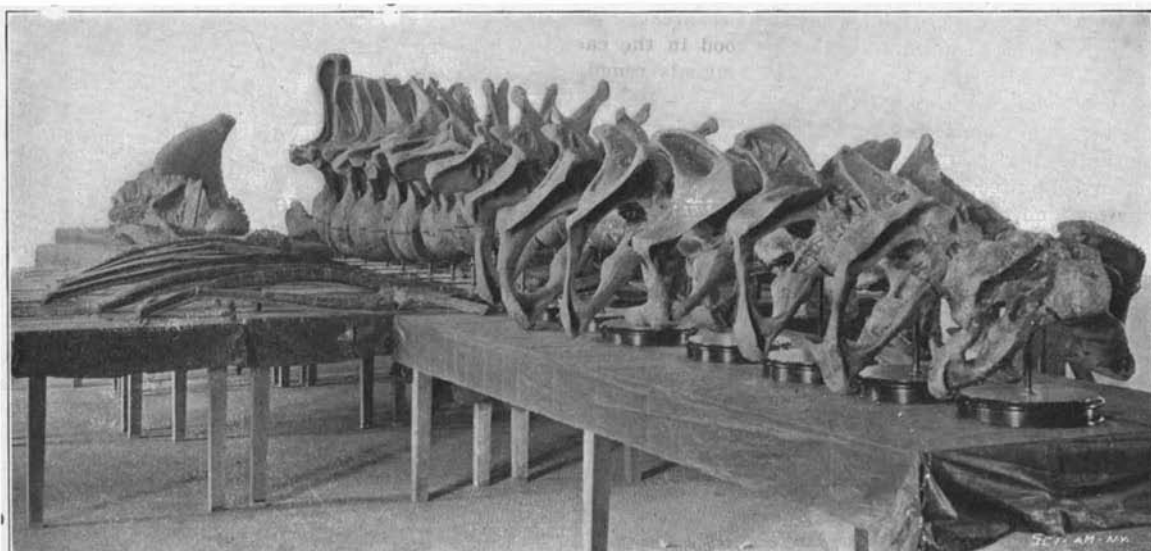


METHOD OF PREPARING FOSSIL BONES FOR SHIPMENT.

matrix, shipped to New York, where a corps of skilled workmen under the supervision of Mr. A. Hermann finally extricated them from their stone sepulcher in the most perfect condition. The field work was directed by Messrs. Peterson, Granger and Gidley, with whom Dr. J. L. Wortman was formerly associated as director. There has, indeed, under Dr. Wortman's suggestion, gradually evolved a very satisfactory method of taking up the specimens, packing and removing them from the matrix. First they



COMO BLUFF, WYOMING (UPPER JURASSIC) SHOWING INCLINED STRATIFICATION WHERE GIGANTIC FOSSIL WAS DISCOVERED.



VERTEBRÆ, RIBS, AND PELVIC BONE OF BRONTOSAURUS RECENTLY PLACED IN NATURAL HISTORY MUSEUM, NEW YORK.

Gulf will traverse Beloochistan and join the Indian system at Hyderabad. It is supposed that nine-tenths of the voyagers will take this line, as it is three times as short and also more economical than the sea route. In this case one can go from Paris to Tonkin in 15 days, and from Hamburg to Calcutta in 12 days. The question of local traffic is an important one, as the territory traversed has a population of over 20,000,000, and when it is united to Europe it may become a source of cereal and other food products. Cotton culture is to be rapidly developed, and the abundant sources of naphtha which have been lately discovered near the site of Babylon are to be worked.

Automobile News.

A novel and ingenious traction system is to be inaugurated upon the old Corniche Road, from Nice to the convent of Laghet, passing by La Turbie. No rails will be laid. The vehicles are to be practically large electric motor cars minus accumulators. The motor is to receive its electrical power from overhead wires. The current will be supplied from a central electrical station. It will pass through two parallel aerial wires supported by posts. One wire will be used by the ascending, and the other by the descending vehicle. Great economy of energy will thus be obtained, besides the gain of all the space, and the avoidance of the weight of accumulators. One feature of the system is the ease with which the motor-cars will make way, or pass round any carriage or other obstacle they may encounter, the connecting wire being sufficiently long to allow of such deviations.

During the maneuvers of the Second corps of the Swiss army, five automobiles were used, and the government is greatly pleased with their performance. They were all of the gasoline type, and comprised three Peugeot machines (one phaeton and two hauling wagons), one Panhard & Levassor and one Daimler. The automobiles were hired by the government at the rate of \$5 per day, the latter furnishing the gasoline and other supplies. The conductors received the pay of under-officers, besides the usual amount allowed for special duty. After the maneuvers the government paid the sum of \$240 for the depreciation of the five machines. Each of these had made an average of 600 miles with a consumption of 25 gallons of gasoline. It is supposed that in view of the excellent services which these machines have rendered during the maneuvers, the Federal Council will ask for the credits necessary to provide an automobile for each of the army corps.

The Paris-Vienna race is to be the great event of next year. It has been decided upon at a recent meeting of the Automobile Club of France, on receipt of a communication from the Austrian Club. The latter refers to the discussion which Dr. Richard de Stern, representing the club, had with Baron de Zuylen, President of the French Club, upon this subject at Berlin, and thinks that after the Paris-Berlin, the Paris-Vienna race would be next in the order of progress. It proposes to choose the route from Paris by way of Switzerland and Bavaria, to Salzburg and Vienna. If the authorities forbid the race in France, it is proposed to proceed as far as the frontier as simple tourists and from there commence the race proper. At Vienna will be organized a series of automobile fêtes, including a mile and a kilometer dash. This communication was received with enthusiasm by the Paris Club, and the date fixed for the beginning of July next. The details of the race will be decided later.

The results of the extensive trials of motor vehicles held at Liverpool last June under the auspices of the Liverpool Self-Propelled Traffic Association have been issued. There were four classes for competition and the judges have made the awards as follows: Class A (load 1½ tons, tare two tons, platform area 45 square feet, speed eight miles per hour)—G. F. Milnes & Co., Balderton Street, London, gold medal. Class B (load five tons, tare three tons, platform area 75 square feet, speed five miles per hour)—Lancashire Steam Motor Company, Leyland, near Preston, Lancashire, gold medal. Class C (five tons, no tare limit, platform area 95 square feet, speed five miles per hour)—Thornycroft Steam Wagon Company, Limited, Chiswick, London. Class D (load four tons, no tare limit, platform area not specified, speed five miles per hour)—Thornycroft Company, gold medal; T. Coulthard & Co., Limited, Preston, Lancashire, gold medal; Mann Patent Steam Cart and Wagon Company, Limited, Leeds, silver medal. In the course of their report upon the trials the judges state that there is a gradual and marked improvement in the construction and behavior of heavy motor traffic vehicles since the first trials held three years ago and reliance may be placed upon the systems to which gold medals have been awarded for regular employment in general haulage operations, where due care and supervision are exercised. The system to which a silver medal has been awarded will give satisfactory results, subject to the points named in connection with the awards.

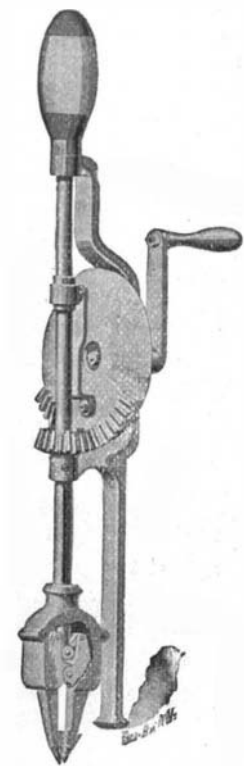
A SIMPLE MECHANICAL NAIL-PULLER.

It has never been an easy matter, even with the most approved appliances, to draw the fastening-nails of boxes or the like. Mr. John B. Salo, 445 W. 50th St., New York city, has devised a nail-puller of ingenious form, designed to afford a ready means for extracting nails.

The device consists of a frame from which a leg extends downwardly to be engaged with a box from which a nail is to be drawn. A draw-rod is held to slide in the frame and in a tubular handle carried by the frame. A horizontally-journalled crank-shaft mounted in the frame carries a segmental bevel-gear meshing with a bevel-pinion which rotates with the draw-rod, but is splined thereon so that the draw-rod can be raised without affecting the pinion. A lug on the draw-rod is connected by a link and wrist-pin with the segmental bevel-gear. At its lower end, the draw-rod is provided with pivoted jaws inclosed in a shell and connected at their upper ends by links. The jaws have their inner surface corrugated in order to grasp the nail firmly, and their outer surfaces formed with auger-like threads.

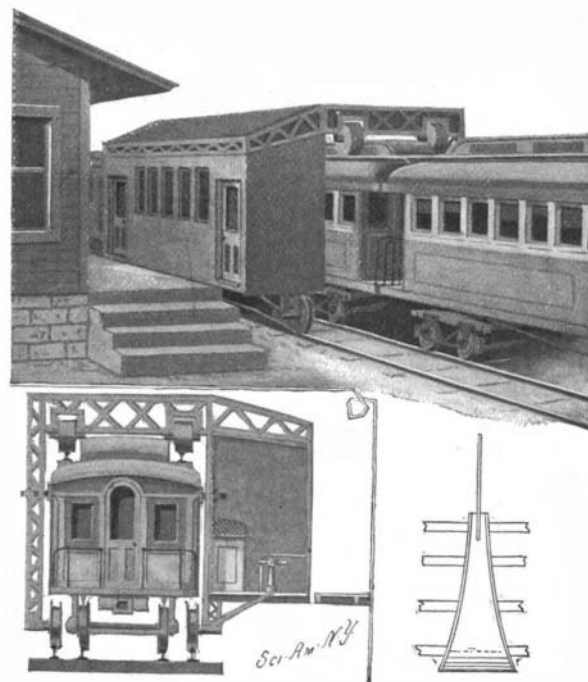
In drawing a nail, the leg is placed upon the box. Grasping the handle with one hand and rotating the crank with the other, the jaws, by means of their auger-like formation, will be fed into the wood until the toothed portion of the segmental bevel gear has passed the pinion. Thereupon the link connecting the bevel-gear with the draw-rod will cause the draw-rod to move upward, causing the jaws tightly to engage the head of the nail, so that as the rod moves upward the nail is pulled.

THE SALO NAIL-PULLER.



METHOD OF UNLOADING PASSENGERS FROM MOVING TRAINS.

Among the patents which have been recently granted in the United States may be mentioned one issued to Mr. John W. Jenkins, of 124 Front Street, New York city, for an interesting system whereby passengers are to be discharged from a train without the necessity of stopping at stations. The characteristic feature of the invention resides in the employment of a number of "saddle cars," which are successively taken up and dropped from the moving train and through the



METHOD OF UNLOADING PASSENGERS FROM MOVING TRAINS.

medium of which passengers may enter or leave a train without interrupting its movement.

The railway cars employed are of the usual construction. Each car is provided on its roof with two rails, and the cars run on standard rails commonly employed. The rails on the roof of the car have their ends projected beyond the ends of the cars and grooved laterally, so that the continuity of the track formed on the roof of the cars will not be broken on a curve. These roof rails serve the purpose of receiving the saddle car. Alongside of the rails upon which the passenger car runs are arranged two rails which receive lower flanged wheels on the saddle car. These aux-

iliary track rails do not extend continuously throughout the length of the railroad track, but are located only at the stations at which it is desired to load and unload the passengers. The auxiliary track rails are each provided with raised portions adjacent to the ends toward which the car is moved, and the ends of these auxiliary rails are tapered. The saddle car itself consists of a skeleton-like structure which is designed to straddle the passenger cars so that the train may pass thereunder. The saddle car also includes a compartment by which the passengers pass to and from the train. The saddle car at its top is provided with broad-faced wheels which are arranged to run on the roof rails of the passenger car. When these broad-faced wheels are engaged with the roof rails, the saddle car will be lifted off the auxiliary track rails, but the raised parts of these auxiliary rails are sufficiently elevated to lift the entire saddle car from the passenger train when the lower wheels of the saddle car engage the high parts of the auxiliary rails, and in so raising the saddle car, to lift the upper broad-faced wheels off the roof rails. As our illustration shows, the roof rails on the front of the car are tapered downward so that they will readily engage under the broad-faced wheels. One of the saddle cars is to be placed at each station on the road. As the train approaches the station, the tapered ends of the roof rails will run under the broad-faced upper wheels of the saddle car, and the saddle car will be lifted off the auxiliary track rails and carried away with the train. The saddle car will ride along the top of the train, and by the time it has got to the last car will have assumed the momentum of the train. The saddle car and train will be locked together, and then the passengers can pass from one to the other. As the train approaches the next station, the lower wheels of the saddle car will engage the raised part of the auxiliary rails and the saddle car will be lifted off the train, thus permitting the train to pass on and leave the saddle car at the station. When the saddle car is thus dropped, the train immediately runs into a second saddle car placed on the other end portions of the auxiliary track rails and takes the second saddle car up with its passengers. This operation is repeated at each station, one saddle car being left at each station and one saddle car being taken up. By this arrangement the train may move without a stop through the length of the road. The saddle cars, of course, are provided with brakes to arrest their movement at the desired point.

The inventor claims various merits for his system, of which we may be permitted to mention a few. The number of cars to be used for a road materially reduces the number of trains, by reason of the increased speed. That the running time of the train over the road will be very considerably shortened, is self-evident. Moreover, one train will be able to make many trips in a day. This system is to be used not so much for interurban traffic as for suburban traffic, for the purpose of enabling residents without the city to reach their destination as quickly as possible. The effect on the value of real estate is also not to be underestimated.

Preserve Your Papers.

By taking a little trouble, when a paper first comes to hand, it may be preserved to form a permanent and valuable addition to the reading matter with which all families and individuals should be supplied. We furnish a neat and attractive cloth board binder, which will be sent by mail, prepaid, for \$1.50. It has good strong covers, on which the name SCIENTIFIC AMERICAN or SCIENTIFIC AMERICAN SUPPLEMENT is stamped in gold, and means by which the numbers may be securely held as in a bound book. One binder may thus be made serviceable for several years, and when the successive volumes, as they are completed, are bound in permanent form, the subscriber ultimately finds himself, for a moderate cost, in possession of a most valuable addition to any library, embracing a wide variety of scientific and general information, and timely and original illustrations. Save your papers.

The Current Supplement.

The current SUPPLEMENT, No. 1357, has for its leading article "The Building of Modern Locomotives," accompanied by a number of most interesting engravings. This is the first installment. "The Practical Building of Lowland Protections" is by Percy H. Wilson, and is accompanied by elaborate diagrams. "Mechanical Shipment of Coal" describes an ingenious method adopted on the Continent. "Weight and Capacity in Locomotives With Vanderbilt Boilers and Tenders" gives valuable information relative to this interesting type. "Physiology" is one of the opening addresses at the British Association and is by Prof. John G. McKendrick, M.D., LL.D., F.R.S. "Recent Excavations of the Temple of Aegina" is by Prof. Rufus B. Richardson. "Relations Between Geology of Petroleum and Its Origin" is a particularly timely article. The usual Trade Notes and Receipts and Trade Suggestions from United States Consuls are published.