screw nut, which also increases or decreases the tension. From the screw peg the spring, A, passes over a triangular lug (see Fig. 2), and connects at its lower end to a metal link, which is also connected to the shutter, as shown. Motion is imparted to the shutter by the pushing action of the spring, through the link.

The trigger, C, is held in proper position by a light spring, and may be operated by a button spring, shown at one of the outside corners of the cover of the box, made to resemble all of the other fixed buttons, or by a pneumatic piston, the cylinder and pipe, E, of which may be seen attached to the interior of the front of the box, just below the upper portion of the trigger (see Fig. 2), and connected by means of a simple coupling at the lower side of the box with a short length of tubing and a rubber bulb. This latter arrangement forms a very convenient method of operating the trigger, as by concealing the pipe under the coat the exposure may be made without attracting attention. The outside pipe may be readily detached from the box, and attached to a shutter for time exposures, affixed temporarily to the outside of the lens tube, when desired.

At the rear of the conical metal lens box is placed the ordinary double plate holder, which is secured in position by two upright flat brass springs (see Fig. 1). Behind this are five other plate holders, which completely fill the box. Metal cells are arranged in this space to keep each plate holder in an upright position.

A metal plate is inlaid in the bottom of the box, provided with a screw thread, which allows the box to be supported on a tripod, as shown in Fig. 4, when used for making time exposures.

In taking a picture with the apparatus as shown in Fig. 3, the cover to the lens is first pushed to one side, the cover of the box is then opened, the shutter, B, (Fig. 2) pushed down until the upper pin is caught under the trigger, C. The slide of the plate holder is next withdrawn and the cover closed; the operator, holding the box in the left hand against the person, looks down upon the ground glass of the finder, and the moment the image appears thereon in the right position, presses with the index finger of the right hand the spring button on the corner of the box, thereby releasing the shutter and making an instantaneous exposure; the cover of the camera is then opened, the slide inserted in the holder, and a fresh plate brought into position.

An important advantage of the form of shutter adopted, is the small size and its rapidity of operation. The lens is arranged at such a focus that objects a few feet or at a great distance will be equally sharp; the size of picture is 2½ inches square, and may readily be enlarged. The weight of the camera when loaded with six plate holders is only 2¾ pounds.

The tripod, shown spread out in Fig. 4, is made of wood in the form of a large cane as shown, when closed up, in Fig. 7, and it is divided equally into three triangular sections, the shape of which is plainly seen in the lower end of the section in Fig. 5. The upper end of each triangular section is made hollow, and is bound with metal, to receive the sliding metal legs which support the head of the tripod. A hollow headed milled screw passes through the metal band on each section and secures the metal leg or rod at any height, similar to the usual plan of adjusting sliding tripod legs.

Fig. 5 shows a larger view of the construction of the head of the tripod; the screw at the top of the head fits into the screw plate at the bottom of the camera; the head itself is free to revolve in any direction on the spindle in the plate to which the tripod metal legs are attached, but may be secured in any position by a set screw shown at one side under the head; this allows the camera to be readily turned and secured in any desired position after the tripod is once leveled.

A thin metal cap having the form of the head of a cane, and provided with bayonet slots at the bottom, fits over and conceals the head of the tripod as shown. A similar cap also protects the bottom spurs of the tripod legs; the two caps thus convert the tripod into a cane, as shown in Fig. 7.

Equipped with a light portable camera and a convenient tripod such as we have described, the amateur photographer can, with considerable comfort, travel about unnoticed, and easily obtain instantaneous views and pretty bits of scenery. What has sometimes been considered as laborious work is thus converted into pleasure, and without realizing it many interesting events and scenes are recorded in such a way as to be of much value and usefulness in after years.

Further information regarding the apparatus can be had from Wm. T. Gregg, No. 318 Broadway, New York city, N. Y., who has also the exclusive control of the invention for the United States.

THE NEW PALEONTOLOGICAL GALLERY OF THE PARIS MUSEUM.

The collections of fossils of the Paris Museum of Natural History have hitherto never been brought together in a special gallery, for the very simple reason that paleontology is, so to speak, a new science in France, and one whose autonomy was not recognized until 1853, the epoch of the erection of the chair of paleontology, which was first occupied by A. D'Orbigny.

The existence of paleontology was not foreseen at the time of the organization of the Museum by the National Convention. About a century ago fossils were considered as petrifactions appertaining to mineralogy. Cuvier, through his admirable researches on fossil bones, laid the foundations of our science, but he studied these objects from the standpoint of comparative anatomy. Later on, Blainville created the word *paleontology*, and from the day that this science had a name its progress and its popularity have never ceased to manifest themselves. It may be said, then, that paleontology is doubly French in its origin.

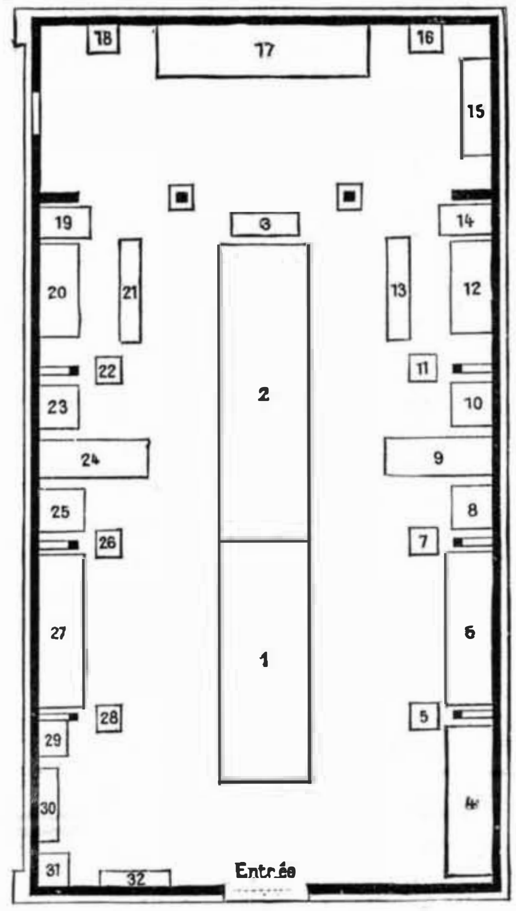

Fig. 1.—PLAN OF GALLERY OF PALEONTOLOGY PARIS MUSEUM

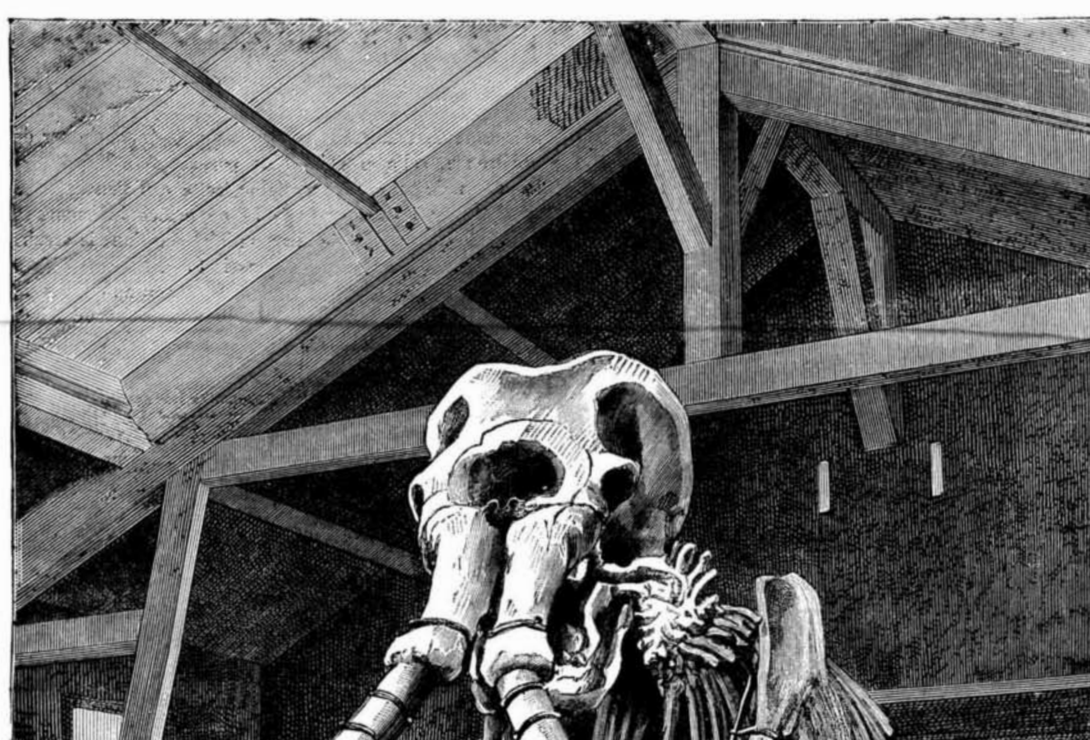
Fig. 2.—SKELETON OF THE DURFORT ELEPHANT.

Nevertheless, the fossils remained distributed between the different chairs of the Museum. The vertebrates were in charge of the professor of comparative anatomy, and the invertebrates in charge of the professors of geology, malacology, and entomology. The founding of a chair of paleontology in 1853 did not improve this situation much, since the appointee had charge of no public collection. But in 1879 a considerable change supervened, for it was then decided by the Minister of Public Instruction that the fossil vertebrates should be placed under the direction of the professor of paleontology, Mr. A. Gaudry, who was naturally designed for such a position through his splendid work on the extinct faunas.

This learned professor, seconded by Mr. Fremy, the Director of the Museum, then formed a plan to bring together in one gallery those fossils which were most remarkable, and which could not be placed in glass cases on account of their large size. These interesting specimens were scattered through the galleries of comparative anatomy and geology, and the laboratories, where they were scarcely accessible to the public

This new gallery was organized in a few months, and was opened on the 17th of March, 1885. When we enter the new hall, we find ourselves in the presence, first, of two enormous skeletons—that of the *Megatherium cuvieri* (No.

1 of the plan) and that of the *Elephas meridionalis*, or the Durfort elephant, so called from the place where found (No. 2 of the plan). The skeletons occupy the center of the gallery. Behind the elephant are three calcareous slabs mounted like a triptych, and derived from the Eocene of Monte Bolca (No. 3). These show the impressions of fishes and leaves, admirably preserved.

Upon passing along the walls from right to left, we find in succession: The *Dinornises*, gigantic birds of New Zealand (No. 4); the *Glyptodon typus* (No. 6), invested with its powerful carapax; the *Cervus megaceros* (No. 9), surrounded by four magnificent tortoises, the largest of which came from Madagascar (Nos. 7, 8, 10, and 11); the *Acerotherium gannatense*, or Gannat rhinoceros (No. 12), surmounted by a viviparous *Ichthyosaurus;* a beautiful *Crocodilus rateli* (No. 14); the limbs of the *Helladotherium duvernoyi* (No. 14), recalling those of the giraffes; and, finally, an *Ursus spelæus* (No. 15), or cave bear, which appears very small amid the colossuses that overlook it.

The end of the hall is occupied by a nearly complete skeleton of the *Mastodon angustidens* of Sansan (No. 17), placed between two heads of *Elephas insignis* (No. 16) and *Mastodon humboldti* (No. 18.) Continuing toward the left, the visitor will remark in succession:

The *Pelagosaurus typus* (No. 21), a small crocodilian whose bones and carapax are isolated; two carapaces of edentates from South America; *Glyptodon typus* (No. 20); *Hoplophorus ornatus* (No. 23); the doe of the Iceland *Cervus megaceros* (No. 24); the hind quarters of an enormous edentate, reaching the stature of the *Megatheria;* the *Lestodon armatus* (No. 25); the skeleton of *Glyptodon typus* (No. 27); an immense slab in which is preserved the skeleton of a *Palæotherium magnum* (No. 30); and, finally, portions of the head of *Dinotherium giganteum* (No. 29) and of *Mastodon angustidens* (No. 31).

In addition to these large specimens, a few others of less dimensions are mounted in front of the columns of the gallery—such as the long bones of large mammals, elephants, mastodons, and dinotheriums (Nos. 5, 22, 26, 28). Above, against the walls and near the windows, are placed slabs of *Mystriosaurus* and *Ichthyosaurus* and of various fishes, and skulls of *Bos primigenius*, *Bison priscus*, *Bubalus antiquus*, *Rhinoceros tichorhinus*, *Cervus megaceros*, etc. Such is the general arrangement of the gallery. We shall now say a few words about the most interesting fossils.

The Durfort elephant (Fig. 2) is the most important specimen in the gallery. Its skeleton measures more than four yards in height. The discovery of this fossil is due to Messrs. Cazalis de Fondouce and Ollier de Marichard. Upon passing near Durfort, these gentlemen perceived the extremity of its tusks just reaching the surface. They began excavating, and found that the entire skeleton was buried *in situ*, the bones being arranged according to their natural connections. Realizing the importance of their find, these zealous naturalists communicated with the professor of comparative anatomy of the Museum, Paul Gervais, who obtained the funds necessary for disinterring the skeleton. The digging was done from 1873 to 1875, and the extraction of the bones presented great difficulties on account of their extreme friability. The skillful moulder of the Museum, Mr. Stahl, had to consolidate them in place with spermaceti before disengaging them from the matrix. Thanks to this process, the elephant was carried without accident to Paris, where it was mounted under the directions of Gervais and Senechal.

The *Elephas meridionalis* is more ancient in Europe than the mammoth, or *Elephas primigenius*. Its chin is more prominent, its tusks are less curved, and its molars are remarkable for the distance apart of their blades and the thickness of their enamel. It is supposed that its skin was not woolly like that of the mammoth. At Durfort it had hippopotami and a few other animals of warm climates as contemporaries, while the mammoth lived in company with the thick-furred *Rhinoceros tichorhinus* and *Cervus tarandus*, which were accustomed to low temperatures. The Durfort elephant was not lying down, but was in an upright position, its head up and its tusks raised, as if it had been buried in a marsh while alive. The remains of many other animals were found in the same bed—fishes, fresh water shells, etc.—*La Nature.*

A New Hæmostatic.

At a recent meeting of the Academy of Medicine, at Paris, Professor Bonafoux read a paper upon a powder which possesses great hæmostatic powers, and is capable, it is said, of arresting the bleeding of large arteries, so that it will prove serviceable in important surgical operations. This powder is composed of equal parts of colophony, carbon, and gum arabic. Experiments have been tried with it on the brachial artery in man, and on the smaller vessels, on the carotid of the horse, and other blood vessels of the same animal, with marked success. It has always prevented consecutive hæmorrhage. The application can be lifted in the course of two or three days, when the vessels are found to be completely obliterated.

National Academy of Sciences.

The regular spring session of the Academy was held at the Smithsonian Institution, Washington, April 21–24, with an attendance of over thirty members. Many of the papers read were highly technical. Among those which were of popular interest the following may be mentioned:

Surgeon-General J. S. Billings detailed the methods of measuring the cubic capacity of crania, as practiced by himself and Dr. Mathews, his assistant. The application of composite photography (Galton's method) to obtain type-pictures of different groups of skulls had at length been successful, by employing proper precautions to secure accuracy of adjustment and superposition of the various negatives and the most desirable length of exposure. The camera and stand and patent lever stand were all leveled by a spirit level. The skulls were adjusted in the craniophore by means of two fine black lines intersecting at right angles. The composite pictures were made from the crania themselves, and not, as in Galton's experiments, from pictures. The results were much more satisfactory than those from pictures. From six to sixteen skulls were thus combined in each composite picture. A series of the composites was exhibited.

The duration of exposure depended on many conditions, and it required skill and experience to gauge it correctly. Where many skulls were to be combined, the exposure of each one was shorter than where there were but few. The dry plate method was used. It is not to be expected that the type-pictures of skulls will give race distinctions with ~~the same clearness with which~~ faces do. The standard of one-half the natural size was recommended.

For measuring the cubic capacity of skulls, Dr. Mathews devised the scheme—using water instead of solid particles. The laws which regulate the fall of solid particles are not well understood, whereas the sciences of hydrostatics and hydrodynamics are well settled and generally known. Earlier schemes for using water as a measure had been very expensive, and not perfectly accurate. The use of wax to render skulls waterproof had been expensive, and the causes of error are the water wetting the skulls and the glasses into which it is poured, making a difference in the measurement. Dr. Mathews uses fresh putty instead of wax, used by Topinard. First wash out the crania—a precaution never to be neglected; then let them dry thoroughly, which requires some weeks. They should be kept till the weight is no more than it was before washing.

Then spray the interior of the skull with shellac varnish, using 10 cubic centimeters, which will leave, when dry, a bulk of 1 cubic centimeter. Three minutes suffices for this process. Then the skull must be allowed to dry, which will not take over twenty-four hours. Then cover any breaks with India rubber and adhesive plaster, and fill the orbits and carotid canal with putty, and cover the base of the skull with the same. Place the skull face down, and cover with a sheet of putty. By observing precautions indicated in filling skulls with water, and in measuring the water, 2 cubic centimeters should be the maximum of variation, in place of 5 on the old system. This method requires more time than others, but it gives the advantage of eliminating the personal equation of the operator, and of securing results which are of universal comparability, whereas those of Broca's method can only be compared when used by persons trained in his laboratory.

The very technical papers on winged insects, by S. H. Scudder, and on some forms of extinct crustacea (Syncaridæ and Anthracaridæ), by A. S. Packard, gave rise to an interesting discussion. Professor Cope remarked that science has developed as a generalization what he had observed in vertebrates, viz., the correspondence of past with present orders. Certain characteristics of later times are acquired before others disappear, and sometimes minor characteristics are the most persistent. Professor Gill thought that Scudder's paper militates against the view formerly held of the relative ranks of metabola and heterometabola. The earliest insect life did not develop from a caterpillar. Insects were evolved from a form intermediate between arachnids and crustacea. Professor Cope replied that the evolution of the caterpillar was due to degeneracy in certain portions of life, during which insects become caterpillars. Professor Gill stated that synthetic types were a stumbling block to the taxonomist. These insects and crustaceans break down the barriers between species as they now exist. In paleontological forms we find united in the same individual characteristics which now mark differences between species and even orders.

Prof. Riley rose to speak, but was ruled out of order. He afterward stated privately the criticism he would have made, namely, that paleontologists in many cases unduly exalt trivial distinctions, as in one of Packard's papers, where the length of the fore legs was used as a specific characteristic. No naturalist would so regard it in classifying extant types.

T. Sterry Hunt read a paper on Classification of Natural Silicates. The bulk of the earth's crust is composed of silicates. The former classification, based solely on sensible characters, was not satisfactory; neither is it sufficient to rely only on chemical constitution. Both must be considered. There is, however, a consonance between them. With increase in density due to chemical constitution comes increase in hardness and in resistance to chemical action. There are three groups of silicates:

1. The protoxide bases. 2. The proto-, per-, or sesquioxides, of which alumina is the most important. 3. The peroxides. This is a genetic system; it has relation to the order of time in which the formations appeared. This system may be extended to the non-oxides, and it paves the way to a truly natural system in mineralogical, as much so as in biological science, the absence of which is the reason that mineralogy has been comparatively neglected. Prof. Remsen remarked that the classification of the carbon compounds foreshadowed these results. The main difficulty is to get the conditions of classification when temperature and pressure differ entirely from ordinary. We must look for results in the direction of synthesis; but as yet we have very little knowledge of the fundamental compounds from which others are derived.

Gen. Comstock's paper on the Ratio of the Meter to the Yard showed that the determination of this ratio in 1880, which was then considered accurate within one micron (millionth part) of probable error, was too small by the 1-120,000 part, and the corrected value of the meter is now stated as = 39·3699 inches.

Prof. Elias Loomis' paper On the Cause of the Progressive Movement of Areas of Low Pressure explained ~~the general drift of storm centers~~ toward the east, sometimes in opposition to the course of surface winds, as due to the prevalence of pressure from the west. In middle latitudes east winds are exceptional, and, even during the prevalence of east wind, the causes that produce west wind are only temporarily suspended. Much of the air on the east side of a storm center rises from the earth's surface, but on the west side it does not rise at all. Hence the storm moves in the direction of least resistance, viz., eastward.

The paper on the Submarine Geology of the Approaches to New York, by J. E. Hilgard and A. Lindenkohl, enumerated three noteworthy features:

1. The submarine valley continuing the course of the Hudson River for about eighty miles in a direction 60° E. of S.

2. Shallow water, extending for one hundred miles south from New York and Long Island, and fringed by a steep declivity.

3. Terminal moraines, extending from northwestern New Jersey in a southeasterly direction far out to sea.

Major J. W. Powell's paper on the Organization of the Tribe was in effect an elaborate homily on the text with which he set out, that "in the light of new material collected throughout the world, a new significance is attached to the kinship of tribes."

He set out with a theoretical tribe of primitive simplicity, wherein all the men call each other brother; all the women are sisters; the children call all men father and all women mother. Admitting that no such society had ever been discovered, he claimed to draw a legitimate inference from some languages which contain words for these direct relationships, but none for indirect relations. He traced increasing complexity of relationships and the two kinds of descent: the paternal, called by Romans agnate, and the national, which is more usual among savages, and for which he proposes the term enati. He then traced the development of the clan, the chief characteristics of which are kinship, either enatic or agnatic, exogamy, and feud protection. Tribes may be fissiparous, and each tribe into which the original divides may have segments of each clan, or only of part of the clans. In Australia clanship presents several peculiarities nowhere else seen.

Prof. Cope read a paper on the Pretertiary Vertebrata of Brazil. He stated that the Tertiary vertebrata of South and Central America belongs to one fauna and to one geological horizon, the Pliocene. The most important fossil of the Peruvian beds is a reptile of primitive form, the *Stereosternum tineidum*, which differs from any previously known genus of the Peruvian beds. It had the ribs fixed immovably to the vertebral lobes, hence was incapable of intercostal breathing.

The discovery of this type was interesting to those who adopt the theory, much exploited of late, of the distinct origin of life at north and at south poles; and it certainly did not at all discredit this theory.

Prof. Rowland gave the value of the ohm as corrected by his own experiments as equal to 106·2 centimeters of mercury one millimeter square.

Prof. A. Graham Bell read papers on the Measurement of Hearing Power and on the Possibility of obtaining Echoes from Ships and Icebergs in a Fog.

Prof. Edward S. Holden, Director Washburn Observatory, Madison, Wis.; Prof. Henry Mitchell, U. S. Coast Survey; Prof. F. W. Putnam, Cambridge, Mass.; Prof. W. A. Rogers, Harvard Observatory, Cambridge; and Dr. Arnold Hague, U. S. Geological Survey, were elected members.

WM. H. HALE.