posure to the strong sunlight of last summer and the winds of the present winter, so that many more are almost certain to require removal during the next year or two.

During the period of time covered by this, report the herbarium has increased from 159,046 unmounted specimens, constituting the Engelmann and Bernhardi herbaria, to 258,629 mounted specimens, protected by impregnation with corrosive sublimate. The library, which at first contained considerably less than 5,000 volumes and pamphlets, has increased to 23,257, valued at nearly $40,000.

Notwithstanding the provision of safe and, for the time being, ample quarters for the library and herbarium in the reconstructed city residence, it has not yet been found practicable to remove the numerous wood specimens, and other unattractive but necessary and valuable material, from the old museum building, so as to free the latter for other uses; nor has it proved possible to spare funds for the purchase of material and the salary of an assistant who should be charged with the installation and maintenance of a museum illustrating some branch of pure or applied botany, such as might be accommodated in this small building were it empty.

Aside from an increase in the plant-houses, and the accumulation of books, living and preserved specimens of plants and their parts, and a small collection of insects, no considerable facilities for research have been acquired at the Garden thus far, the instrumental equipment of the School of Botany being found available for all necessary use by the few Garden employees and pupils, and, as yet, no properly equipped permanent laboratory rooms have been provided, adequate temporary provision being made in the herbarium building and the plant-houses for such work as has been undertaken. While in some respects much remains to be done, such facilities as have been secured thus far have been placed at the disposal of investigators, of whom one or more have occupied tables at the Garden for a period of from one month to a year, each season for several years past, three such investigators having been accommodated at the Garden during the current autumn and winter. By direction of the Board, a general announcement is made, by a widely distributed circular, in the early part of each year, that such facilities as the Garden possesses, or can readily acquire for any worthy piece of investigation, are freely placed at the disposal of competent investigators.

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*THE GANODONTA OR PRIMITIVE EDENTATES WITH ENAMELLED TEETH.*

THE discovery of the forefoot of *Psittacotherium* in the upper division of the Puerco beds (New Mexico) is one of the most fortunate accidents in the recent history of paleontology, because of its remarkable likeness to the foot of the sloth. This likeness at once suggested to Dr. J. L. Wortman the relationship of *Psittacotherium* to the Gravigrada, or great Ground Sloths. Upon his return to the American museum from the field the entire collection was placed in his hands, and it soon appeared that a series of animals which had been referred to the Creodonta, to the Tillodontia and to other orders formed in reality a part of a genetic series pointing conclusively toward the modern sloths, especially towards *Megalonyx*. The evidence is summed up in Dr. Wortman's recent paper, as follows:

*(1) In the skull there is great similarity in form; the muzzle is short, the sagittal crest is low, and the occipital plane slopes forwards as in Mylodon, Megatherium and Megalonyx. (2) The lower jaw is short, deep and robust, with a greatly enlarged coronoid, a prominent angle, and a

*'The Ganodonta, and their relationship to the Edentata.' Bull. Am. Mus. Nat. Hist., March 22, 1897.

position of the condyle high above the tooth line. (3) The incisors are reduced to a single pair in the lower jaw of *Calamodon*, and are probably completely absent in *Stylinodon*. (4) The posterior portion of the tooth line below passes well behind the anterior border of the coronoid. (5) The canines in all are enlarged, and in *Calamodon* and *Stylinodon* grew from persistent pulps, as in Megalonyx. (6) All the molars and premolars in *Stylinodon* are greatly elongated, of persistent growth, and the enamel is confined to narrow vertical bands. (7) There is a thick deposit of cementum on the dentine in those situations in which the enamel disappears. (8) The cervical vertebræ strongly resemble those of the Gravigrada. (9) There were well developed clavicles present. (10) The humerus bears a striking resemblance in all of its essential features to those of *Mylodon*, *Megalonyx* and *Megatherium*. (11) The ulna and radius are also similar. (12) The manus is almost identical with that of the ground sloths. (13) The humerus and ulna and radius have no medullary cavities; and (14) the femur has all the characteristic features of the Gravigrada. (15) The lumbar vertebral formula was the same as in the Edentata. (16) The pelvis is decidedly Edentate and (17) the caudals bear a striking resemblance to those of the Ground Sloths."

It follows, or at least is extremely probable, that not only the Gravigrada, but all the South American Edentates had their origin in North America. Thus a group which has been traditionally assigned to South America now appears to have taken its origin in the north, for the sloths first appear in the Santa Cruz beds of Patagonia, which are not older than the North American White River beds or Oligocene, whereas in North America they are found immediately over the Cretaceous. The importance of this discovery can hardly be exaggerated, both because of its bearing upon phylogeny, and upon geographical distribution. It appears certain that there was an early land connection between North and South America, and it is in the highest degree improbable that the sloths found their way to South America by way of Asia and Antarctica, as Lydekker has suggested. This early land connection enables us to connect the South American Ungulates, especially the Litopterna, with the American Condylarthra, as Cope and others have suggested, so that it will throw renewed life into the study of the genetic relations of these northern and southern faunas. Another important result is, that the Edentates are proved to be of tritubercular origin, thus reinforcing the evidence of a trituberculate stem form of all the mammalia.

H. F. O.

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## *CURRENT NOTES ON METEOROLOGY.*

### THE EXPLORATION OF THE AIR.

In *Appalachia*, Vol. VIII., No. 1, pp. 179–189, Mr. A. L. Rotch has a paper on 'The Exploration of the Free Air,' in which he gives a general outline of the way in which this work is being done, by means of mountain stations, balloons, cloud measurements and kites. The following facts are of general interest: The first summit station in the world was established on Mt. Washington, N. H. (6,280 ft.), in 1870. The Pikes Peak station (14,134 ft.), now closed, was for many years the highest in the world, but at present the highest station is that of the Harvard College Observatory on the summit of the volcano El Misti, in Peru (19,200 ft.). On Mont Blanc there is a station at the Rochers des Bosses (14,320 ft.), operated during the summer, and on the summit (15,780 ft.), the latter still being idle. The Sonnblick (10,170 ft) in the Austrian Alps; the Saentis (8,200 ft) in Switzerland; Monte Cimone (7,100 ft.) in the Apennines, near Lucca, and Ben Nevis (4,400 ft.) in Scot-