level by wave action during tertiary times and not during the period of much lower sea level of pleistocene times. Finally from the evidence of submerged caves (Sayles, *loc. cit.*) and from peat bogs[4] it is clear that sea level in Bermuda must at one time have stood at least 60 to 100 feet lower than at present, and possibly considerably more, while from raised beaches (Sayles, *loc. cit.*) it appears to have stood at one time at least 25 feet higher than at present.

Practically all the rocks now above sea level in Bermuda are eolianites formed, together with alternating soil layers, during the glacial and interglacial periods. There is a small amount of marine limestone which, from its coarse particle size and the nature of its fossils, seems to have been consolidated from either beach sand or a very shallow water deposit.

During dredging operations for the new American air base at Bermuda, large amounts of rock have been brought up from 30 to 50 feet below sea level in Castle Harbor. These appear to fall into the following categories: deepest of all is a reddish-brown clay, quite unlike anything previously known from Bermuda, and Dr. E. S. Larsen, who has examined it, states that it probably was derived from the weathering of volcanic rocks. It contains no fossils except foraminifera, and from its very fine texture would seem to have been deposited in fairly deep water, probably after reworking. Above this is calcareous rock, also of extremely fine texture, and characterized by the very abundant coral *Cladocera arbuscula* Le Seur, many other fossils also being present. Above this again is a rock of similar fine texture but characterized by the coral *Occulina,* which, while abundant in shallow water, extends deeper than most of the typical reef corals. Reef corals such as *Meandra, Montastraea, Porites* and *Siderastrea* are rare or absent in these two rocks.

Above these fine texture rocks is a much coarser calcareous sandstone such as might be formed from the deposits in the shallow areas inside the present reefs, and containing most of the modern reef corals, but not *Cladocera.* Finally above these is unconsolidated sand, whose fauna resembles in most respects that of the present day. With the exception of small local patches of peat, which indicate temporary mangrove swamp conditions, the scarcity of purely littoral species is striking.

The above is a summary of the observations which we have made to date, and which it is hoped will be considerably expanded when Dr. Frederick Foreman, who is working on the minerals from these formations, completes his investigations. The sequence of rocks and their fauna suggests a progression from fairly deep to shallow water conditions. As this range of probably several hundred feet is represented by only 30 to 50 feet of deposits, the change was presumably due to either a rise of the land or a drop in sea level. Since these deposits, except for the recent loose sand, are all below the land eolianites, they are presumably preglacial. Also, in glacial times the sea level was lower, and not higher than at present. According to Daly[5] in late Tertiary times sea level was probably 85 to 170 feet higher than it is now, and this would be quite sufficient to account for the observed sequence of fauna in the rocks.

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[4] A. S. Knox, *Jour. Geol.*, 48: 7, 767–780, 1940.

[5] R. A. Daly, *Bull. Geol. Soc. Amer.*, 40: 721–734, 1929.

A GROUND SLOTH IN ALASKA[1]

Childs Frick, honorary curator of the American Museum of Natural History, has kindly permitted me to examine and report upon a phalangeal element of an extinct megalonychid ground sloth from the Quaternary of Alaska. The specimen, No. F.A.M. 30844, a first or proximal phalanx, possibly of the fourth digit, manus, is larger than the corresponding bone in *Nothrotherium* and represents apparently a species of *Megalonyx.* Curiously enough, it is the only ground sloth material thus far recorded from the frozen muck of Alaska. This is all the more remarkable in view of the fact that during thirteen seasons of work since 1929 the Childs Frick Expeditions in cooperation with the University of Alaska have conducted intensive paleontological explorations in this northern region. The present specimen, found by Otto Wm. Geist during the field season of 1941, adds another large mammal to the extinct pre-tundra fauna known from Alaska.

The site of discovery of the *Megalonyx* phalanx occurs on Cripple Creek, approximately fifteen miles southwest of Fairbanks. Associated fossil mammals from this region[2] include the woolly mammoth (*Mammonteus primigenius*), mastodon (*Mammut americanum*), horse (*Equus alaskae*), bison (*Bison crassicornis*), ovibovids (*Symbos tyrrelli* and *Boötherium sargenti*), camel (*Camelops*), saiga antelope (*Saiga ricei*), as well as large carnivores like the great cat (*Panthera atrox*), short-face bear (*Arctotherium yukonensis*) and dire wolf (*Aenocyon dirus*).

The genus *Megalonyx* is associated with the Pleistocene forest faunas of the more southerly regions of North America. Remains of this mammal were first described by Thomas Jefferson from a limestone cave in western Virginia. Since then these ground sloths have been encountered at a number of Pleistocene localities in North America from southern Nuevo

[1] Contribution No. 335, California Institute of Technology.

[2] C. Frick, *Nat. Hist.*, 30: 69–80, 1930. Illustrated.

Leon, Mexico, to eastern Washington. The occurrence in Alaska extends the geographic range of *Megalonyx* considerably to the north of its previously known distribution.

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A VESTIGE OF BABYLONIAN INFLUENCE IN THERMOMETRY

It is well known that our common measures of time and angles—in terms of degrees, hours, minutes and seconds—are derived from the ancient Sumerians of the Mesopotamian valley who made use of a sexagesimal system of numeration. It is less manifest, but nevertheless also true, that the common measure of temperature in terms of degrees Fahrenheit is likewise a product of Sumerian or Babylonian influence.

Galileo's application of the telescope to astronomical observation had an immediate and profound effect on science. On the other hand, his invention of the thermometer apparently failed at first to impress either Galileo himself or his successors in science. This fact undoubtedly is to be ascribed to the lack at that time of a standard and universally reproducible scale. The Florentine academicians and their associates subdivided the interval between the extreme cold of winter and the greatest heat of summer into an arbitrary number of equal parts—sometimes fifty; or again one or more hundreds; or occasionally 360, to correspond to the Babylonian "degree" measure of the circle. Such thermometric scales competed during the seventeenth century with others, notably those based on the medieval division into eight degrees of heat and cold. During this period there was no one scale which conventionally was preferred either as to fixed points or as to subdivisions.

Very early in the eighteenth century Roemer carried out investigations in thermometry in which he chose the boiling point of water as his higher fiducial point and the temperature of a mixture of ice and salt as the point of extreme cold. It then remained for him to subdivide the interval between these points in some suitable manner. Numerous suggestions already had been made by others, but Roemer's choice in all probability was determined by the fact that he was interested primarily in astronomy. In this field Babylonian tradition, continued in Greek, Arabic and Latin treatises, had dictated the sexagesimal subdivision. In view of this situation it seems natural that Roemer should have adopted sixty divisions for his thermometer. (Indeed, in this respect there was precedent for his action; almost a century earlier Telioux, a Roman engineer, had superimposed the sexagesimal subdivision upon a primary scale of eight degrees.) Roemer consequently designated his lowest and highest temperatures as 0 and 60, respectively. He noted that on this basis water froze at about $7\frac{1}{2}$ or 8 degrees, and that normal body temperature was approximately $22\frac{1}{2}$ degrees; and Roemer checked the calibration of his thermometers through the use of these intermediate or secondary fixed points.

The scale of Roemer never secured wide recognition, but it formed the basis of another one which did. Fahrenheit in 1708 visited Copenhagen and there found Roemer calibrating thermometers. As a result he was led to adopt the same fundamental principles in his own work, with but minor changes. He chose the same minimum point as Roemer; but inasmuch as Fahrenheit was a maker of scientific instruments whose attention had been directed to thermometry through meteorology, he preferred to take body temperature as his upper limit. Then too he found Roemer's sexagesimal subdivision too gross, so that Fahrenheit subdivided each of its sixty subdivisions into four parts. The freezing point of water thus became 4×8 or 32, and body temperature $4 \times 22\frac{1}{2}$ or 90. Later he changed the scale slightly so that normal body temperature should correspond to 96 instead of 90. On this modified scale he found incidentally that water boiled at 212 rather than 240. "Fahrenheit" thermometers to-day are calibrated more accurately on the basis of the freezing and boiling points of water, so that Fahrenheit's upper fixed point, body temperature, is now only an incidental intermediate point, at 98.6. Such successive modifications have served to conceal the sexagesimal subdivision in which our common or Fahrenheit measure of temperature originated. A recognition of this Babylonian basis will make clear that the figures 32 and 212 are not simply the result of an eccentric or capricious arbitrariness but represent vestiges of an ancient scale of numeration. However, the decimal system (represented by the Centigrade thermometer) appears to be in a fairer way to efface this remnant of Babylonian influence in thermometry than to displace it in the older fields of angle and time measure.

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IMMUNITY AND RESISTANCE

It is my earnest hope that Dr. Rivers's statement,[1] "Immunity is resistance to infection or injury . . . ," will help to arouse extremely high resistance to the synonymous use of the words "immunity" and "resistance." They have been used interchangeably by other writers, especially in medical publications, but that does not prove that it is desirable or proper usage. Each can serve us most satisfactorily if used to convey the idea indicated by its derivation. The word "immune" means free or exempt from any certain thing. The word "resistant" correctly used means that the object, either living or dead, offers appreciable oppo-

[1] Thomas M. Rivers, Science, 85: 107, 1942.