together and fitting the various forms into the single uniform environment where they now occur.

Again take the case of the flying squirrels (*Glaucomys*, etc.): presumably they arose in a region where there were many arboreal squirrels, descendent from those which did the most jumping, rather than isolated, and as a response to some peculiar environment which made it imperative for squirrels to fly.

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THE AMERICAN MUSEUM
OF NATURAL HISTORY

WEIGHT AND HUMIDITY

THE article entitled "Weight and Temperature" by Dr. P. G. Nutting, which appeared in SCIENCE of December 30, 1927, states that "a consistent difference of 1.2 mg. was found" between the weight of a lump of gold and the weight of the same lump after it had been rolled into a sheet, and that this difference was "probably due to adsorbed moisture." As there is considerable lack of agreement[1] in the literature regarding the influence of humidity upon weight, it seems desirable to publish the results of an investigation conducted some time ago on this subject.

Since the density of water vapor is less than that of air the hygroscopic condition of the atmosphere may be ascertained by comparing its density with that of dry air. If, therefore, a bulb containing dry air which is in communication with an open vessel containing the drying agent is counterpoised by a pointer, after the fashion of a micro-balance, it is possible to arrange the period of the instrument so that ample sensitiveness for hygrometric work may be assured. This method was tried, using a glass bulb. It was found, however, that the deflections of the instrument were much greater for certain changes in humidity than had been anticipated. An investigation was therefore started to determine whether or not the effect was due to the adsorption of water vapor. The materials used were glass, aluminium, hard rubber, bakelite and quartz. The glass was in the form of a bulb of surface area about 200 sq. cm., the aluminium, hard rubber and bakelite were in sheets of approximately 500 sq. cm. surface, while for the quartz a cup of surface area about 300 sq. cm. was used.

The object to be investigated was placed on the scale-pan of a highly sensitive Becker balance and counterpoised with standard weights. Inside of the balance case were placed two thermometers and two flat dishes which were filled with sulphuric acid of the proper density to assure certain relative humidities inside the balance case. Readings were taken every morning and the acid changed each time. Thus the weight of the object could be determined at relative humidities varying from 10 per cent. to 90 per cent. Care was taken to keep the temperature constant, and the balance was never allowed to oscillate nor was it ever disturbed in any way in the course of the investigation.

It was found that the glass bulb adsorbed 0.5 mg. after having been washed in boiling water and dried over a flame for one hour and 2.3 mg. after having been washed and then dried in air.[2] The quartz cup gained in excess of 1 mg. The gain in weight of the aluminium was about half as much per square centimeter as for quartz. Hard rubber and bakelite were found to be immensely more hygroscopic than these. *But in all cases the amount of water vapor adsorbed varied with the humidity.* Furthermore it was found that the water vapor is adsorbed much more quickly than it is given up. A dry object will adsorb its definite amount of water vapor in an atmosphere of a definite relative humidity in less than two hours; this same object may require a day to lose its water vapor if placed near concentrated sulphuric acid. It was obvious, then, that due to the adsorption of water vapor and this "hysteresis" effect neither the hygrometer mentioned above nor one based on the hygroscopicity of materials is feasible. A successful, continuously indicating, density-difference hygrometer which avoids these disturbing effects was later constructed.[3]

In conclusion we may say that the apparent weight of an object of relatively large surface varies appreciably with humidity and that this fact, as well as the "hysteresis" effect mentioned, should be taken into account in accurate weighings.

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LEPIDOPTERA OF NEW YORK

To users of the "List of the Insects of New York" (Cornell Memoir 101): I much regret that in the circumstances of the compilation of the Lepidoptera records of this list it was not possible to publish many of the authorities for collection or determination of the material gathered before 1916. These data are preserved, however, in our files at Cornell University.

I also regret, although I can not accept personal

[1] (a) Warburg and Ihmori, *Ann.*, 27, p. 481, 1886. (b) Trouton, *Proc. Roy. Soc.*, A, 79, p. 383. (c) Kuhn, *Deutsche Chemikerzeitung*, 34, p. 1097, 1910. (d) Scheringa, *Pharm. Weekblad*, 56, p. 94, 1919. (e) Metzger, *Glueckauf*, 60, pp. 39–44, 54–60, 94–97, 112–116, 1924.

[2] *Loc.* 1 (a).

[3] *J. Opt. Soc. Am. & Rev. Sc. Instr.*, 13, p. 717, 1926.