Mr. Huxley slowly and deliberately rose. A slight tall figure, stern and pale, very quiet and very grave, he stood before us and spoke those tremendous words—words which no one seems sure of now, nor, I think, could remember just after they were spoken, for their meaning took away our breath, though it left us in no doubt as to what it was. He was not ashamed of having a monkey for his ancestor; but he would be ashamed to be connected with a man who used great gifts to obscure the truth. No one doubted his meaning, and the effect was tremendous. One lady fainted and had to be carried out; I, for one, jumped out of my seat.

Almost 64 years have elapsed since this repartee. In this interval evolution has become more firmly entrenched in observation, while the opposition seems not to have altered noticeably. One may venture to wonder why Mr. Bryan denies that only his grandmother was a monkey; surely he had at least two grandparents!

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SCIENTIFIC BOOKS

Weather Proverbs and Paradoxes. By W. J. HUMPHREYS. Baltimore, Williams and Wilkins, 1923, pp. viii, 125.

HERE is a volume written by a well-known scholar, dealing with an exceedingly complex subject, explaining the principal phenomena of meteorology in words of one syllable, so to speak, yet without ever using language merely to catch attention. The treatment is elementary, but everywhere clear, dignified and accurate.

The exposition consists of two parts. In the first eighty pages the author explains some of what he calls reasonable and sound proverbs. The remainder of the book is devoted to a number of meteorological principles which are rather strikingly presented as paradoxes, and are explained with a clarity that comes only from a profound understanding of the facts.

At the very start, the reader's curiosity is aroused to learn the source of all these proverbs. Some are quoted from certain authors; some are placed between inverted commas without any name; all the others, most of them in metric form, are presumably expressions of the author. Under the head of "Sky Colors" is an exquisite account of the significance of the red and gray skies of both morning and evening. Incidentally, this section includes very briefly the story of Lord Rayleigh's dynamics of the blue sky and the subject of cloud formation.

The section on tides impresses a layman as being a little farfetched. The tide is a synonym of regularity. Here, however, the word is used to indicate "irregular tides," which would appear to be tides only in the sense that any *seiche* in a lake is a tide.

The first paradox which reads, "Air pushed north blows east," offers opportunity for explaining, in a most interesting style, the phenomenon of deflection to the right—the fact that any steady wind always blows along the direction of the isobar and not at right angles to it. Another paradox, "To cool air, heat it" serves as text for a discussion of convective equilibrium. In the same manner the existence of that remarkable isothermal region which is only six miles away from any one of us at any time is set forth so simply as to fall well within the comprehension of a first year student in physics.

The curiosity of any intelligent lad is certain to be aroused by the second half of this book; while the first half is more likely to interest the lad's father, who is probably more weather wise. Joseph Henry said that his interest in physics was first awakened by reading Gregory's "Popular lectures on experimental philosophy," (London: 1808), which begins by asking questions such as these:

> You throw a stone, or shoot an arrow into the air; why does it not go forward in the line or direction that you give it? Why does it stop at a certain distance and then return to you? . . . On the contrary, why does flame or smoke always mount upward, though no force is used to send them in that direction? And why should not the flame of a candle drop toward the floor when you reverse it, or hold it downward, instead of turning up and ascending into the air? . . . Again you look into a clear well of water and see your own face and figure as if painted there. Why is this? You are told that it is done by reflection of light. But what is reflection of light?

Dr. Humphreys' volume raises dozens of just such queries: they are answered in delightful English and can not fail to stimulate the curiosity of many readers. It is gratifying to notice that the historical development of the various sciences is attracting more and more interest. One can only wish that the author had seen fit to include some remarks concerning the personal history of the men who have established these principles—the knights-errant of meteorology—

> The dead but sceptered sovereigns who still rule
> Our spirits from their urns.

The book is excellently produced, and is made especially attractive by numerous full page illustrations.

HENRY CREW

CRETACEOUS FISHES OF BRAZIL

UNDER the title of "Peixes Cretaceos do Ceara e Piauhy," Dr. David Starr Jordan has written an elaborate account of Cretaceous fishes from the famous locality of Barro do Jardin, from which

Agassiz[1] based his first account of Brazilian Cretaceous fishes in 1841.

This memoir, published by the Brazilian government, and in press since 1910, is based on various specimens obtained by Dr. John C. Branner together with all the material contained in the Museo Nacional at Rio de Janeiro, the latter sent by courtesy of the Brazilian ichthyologist, Dr. Alipio de Miranda Ribeiro.

The volume constitutes a quarto of 97 pages, very fully illustrated, and is the most important contribution to the knowledge of fossil fishes of Brazil. The text is in parallel columns of English and Portuguese, the latter the translation of Dr. Ribeiro.

An analytical key to the fossil fishes reported upon is given at the beginning. Descriptions of genera and species follow, with generic and specific synonymies. Pertinent remarks are made upon related species, living and extinct, as well as upon other specimens known to the author by descriptions or pictures. The completeness and general condition of the specimens at hand is well described.

The 16 plates contain 50 separate figures. Among them are restorations of *Rhacolepis buccalis, Calamopleurus brama* and *Vinctifer comptoni,* showing approximately the general appearance of these forms in life.

Most of these fishes are preserved under peculiar circumstances. It is evident that on a flat beach of very fine silt these fishes, most of them of large size, came in with the tide and were left stranded. Rolling about in the silt they became encrusted in it, and in the hot sunshine this crust became firm. The next tide covered them further until finally each fish was the center of an elongate concretion. Breaking this, the form of the fish, usually petrified, and with the scales intact, was preserved. In one species, *Calamopleurus brama,* even the dark spots along the rows of scales and the eyeballs themselves are preserved after being hermetically sealed up since the Cretaceous Age.

In one specimen (*Cladocyclus gardneri*) there is preserved the very long and narrow epipleural attachment or "occipital brush," looking like the fin of a flying fish (though the bones are neither divided nor jointed). This is three times as long as the head, and seems to grow from the side of the occiput, extending backward along the side, under the scales, and crossing the interspinal bones. Traces of this structure are found in other genera, and in some living fishes, but in no known group does it have the expansion seen in *Cladocyclus.*

Eleven species are fully described and figured. *Vinctifer comptoni, Lepidotus temnurus, Tharrias araripis, Tharrhias (Cearana) rochei, Brannerion vestitum, Calamopleurus brama, Rhacolepis buccalis, Anaedopogon tenuidens, Enneles andax, Ennelichthys derbyi* and *Cladocyclus gardneri.*

EDWIN CHAPIN STARKS
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[1] On the fossil fishes found by Mr. Gardner in the Province of Ceara in the north of Brazil, 1841.

SPECIAL ARTICLES

EXPERIMENTS WITH RATS ON THE INHERITANCE OF TRAINING

SUCCESSIVE generations of white rats were trained in a circular maze of the type described by Watson.[1] Beginning at the age of 49 days each rat was fed daily in the inner compartment of the maze shut off from the alleys. At 56 days the training was started. By the opening of a door in the entrance chamber the rat was introduced to the outer alley of the maze. The following results are based upon stop-watch records of the time required to reach the food in the center, and upon the camera lucida tracings of the course taken in each trial. Curves based upon time and the length of course in successive trials show that in general the learning is very rapid at first and that the habit is practically established by the 6th–9th trial; after this only slight improvement is shown (MacDowell).[2]

The rats employed belong to four strains, A, B, C and L; the first three are inbred descendants from three litters born in the Standard Stock of the Wistar Institute; the fourth, strain L, consists of rats in the third and fourth generation of brother by sister matings of a stock raised at this laboratory.

The following table is based on the number of trials before and including the first two successive trials in less than 20 seconds. The averages are first presented according to strains and families; the number of animals in each case is given within brackets. Each average includes sibs, or sibs and double first cousins from the same single pair of grandparents. Averages on the same horizontal line represent successive inbred generations within the same family. All matings throughout are between brothers and sisters. The sub-families *b* in strains A, C, and L are given separately because their parents were treated with alcohol. In strains A and C these parents were trained, but obviously their records can not be included with the averages of their sibs given in the first column of the corresponding *a* families. In strain L the treated animals were not trained. The results are further summarized by (1) combining all the rats in the strains in which two generations were trained, and (2) combining all the rats in strains

[1] Watson, J. B., 1914, *J. Animal Behav.,* Vol. 4, pp. 56–59.

[2] MacDowell, E. C., 1923, *J. Exp. Zool.,* Vol. 37, pp. 417–456.