

make the correction *now* at a time when we are trying to break away from the old order, attempting to introduce rational units in place of the old arbitrary ones. It is somewhat embarrassing for one who has advocated the introduction of absolute units to acknowledge the validity of the criticism of chemist, physicist and engineer; but fortunately the corrections can be made readily by changing the millibar of the aerologist to kilobar. In the conversion tables which are in course of preparation, this will be done.

Briefly, the term "barad" was proposed by a committee of the British Association for the Advancement of Science, 1888, as a suitable term for the unit of pressure, one dyne per square centimeter. Some years later Ostwald advocated the use of one million of these units as the standard, but gave the standard no name. The term *bar* was proposed by Richards in 1903 for the small unit of pressure, one dyne per square centimeter; and *megabar* for a C.G.S. atmosphere. So far as I can ascertain this is the first case in which a clear-cut definition of an absolute atmosphere has been used in actual investigation. He has consistently used this unit megabar as the basis of his work ever since. Richards's atmosphere is 0.987 of the ordinary sea-level atmosphere or 1.020 kilograms per square centimeter; and under the new order agrees with the standard level of Köppen, the million-dyne level at about 106 meters elevation.

It seems almost unnecessary to argue that the smaller bar should be the basic unit and not some multiple. And again it is doubtful if bar is the best designation for the pressure of an absolute atmosphere. Megabar is not altogether inappropriate and has priority of usage especially in the literature of chemistry. A megabar in the aerologist's notation would be the pressure of a million atmospheres, a magnitude not often dealt with. On the other hand, we often need to refer to pressures smaller than the millibar of the aerologist. The bar of the chemist and physicist is conveniently divisible down to its millibar, *i. e.*, a thousandth of a dyne per square centimeter.

The following table contrasts the two sys-

tems. At Dr. Richards's suggestion it is restricted to those terms most likely to be used.

Chemist's and Physicist's (to Former Aerolo- gist's (to be Used Hereafter) Abandoned)		Remarks
.....	1 megabar	One million atmospheres, far beyond our present possibilities of direct measurement.
1 megabar	1 bar	The absolute atmosphere; equal to 750.1 mm. mercury or .987 usual sea-level atmosphere. One megadyne per square centimeter acting through one cubic centimeter does one megerg of work.
1 kilobar	1 millibar	One kilodyne per square centimeter.
1 bar?	One dyne per square centimeter acting through one cubic centimeter does one erg of work.

There would be no objection to giving the term megabar or absolute atmosphere some convenient nickname such as "aer" if megabar is too ponderous. It has been suggested by Professor Richards that for historical reasons the pressure of 10,000,000 dynes (ten absolute atmospheres) might be named after some pioneer in meteorology, as Guericke or Torricelli, after the analogy of the "watt," "joule," "ampere," etc., but this need not be insisted on at present.

ALEXANDER MCADIE

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February 28, 1914

ACADEMIC ELECTIONS

TO THE EDITOR OF SCIENCE: In connection with the table of percentages accompanying my article on "Academic Student Elections," in SCIENCE for January 16, a correspondent has called my attention to some inaccuracies in copying percentages from Professor Ferry's tables, on which the article was based. With one exception they do not seem very important. This exception is in connection with the work in biology at Bowdoin College. The entry was from the wrong column of Professor Ferry's extended table, and to Bowdoin was assigned the lowest record in this subject. A

considerably lower record, more than a third lower, belonged to another institution.

It seems only fair to Bowdoin College, and especially to its professor of biology, to publish this correction of an unfortunate oversight.

W. LeCONTE STEVENS

LEXINGTON, VA.,

January 31, 1914

SCIENTIFIC BOOKS

Chippewa Music. II. By FRANCES DENSMORE. Smithsonian Institution. Bureau of American Ethnology. Bulletin 53. 1913. Pp. 314. 51 illustrations. 180 songs. 14 tables giving "melodic analysis of 340 songs." 7 tables of "rhythmic analysis" and a table giving "comparison of metric unit of voice and drum."

Bulletin 53 together with bulletin 47 (1910) are devoted to Miss Densmore's study of Chippewa music begun in 1907 and brought to a close in the present volume. In this bulletin the author presents the results of six years of labor, gathering songs from the Chippewa in their native environment and making careful studies of the songs themselves. By these means she has sought to answer three questions: What do the Chippewas sing? How do they sing? Why do they sing? The answers to the first two are presented in a clear, painstaking manner and in such form as to make them conveniently serviceable for comparative study. The third question is concerned with the psychological aspects of Indian song and consequently its answer could not easily be formulated in the same manner as those relating to the other two questions, nevertheless the author has recorded her observations on this point among the Chippewa. Truthfulness and earnestness of purpose characterize this book as well as an appreciation of the people from whom the material was secured. The work has a special value to the student of musical development and presents points of interest to the ethnologist. The Bureau of American Ethnology is to be congratulated upon its entrance into an important field and particularly upon its selection of so able and scholarly an investigator

as Miss Densmore to conduct this difficult line of research.

An ample index adds to the usefulness and pleasure of the book. ALICE C. FLETCHER

Fosseis Devonianos Do Paraná. Pelo Dr. JOHN M. CLARKE. Monographias do Serviço Geologico E Mineralogico do Brasil. Vol. I., Rio de Janeiro. 1913. Pp. xx + 353; pl. I.-XXVII.

A monograph upon the Devonian of the state of Paraná, Brazil, which has been published recently by the Geological Survey of that country, constitutes a notable contribution to our knowledge of the geology of South America. The author of the work is Dr. John M. Clarke, the accomplished state geologist of New York. Long an investigator of the Devonian of that state, he has recently issued a number of monographs upon strata of the same age in both North and South America, including works upon the Lower Devonian of the Gaspé region, Canada, and upon the Devonian of the State of Pará, Brazil. To these he has now added this important monograph upon the Devonian of Paraná.

The volume consists of two parts. The first part comprises a discussion of the character and significance of the Devonian faunas of the region studied, while the second is devoted to a description of the species, with critical comments upon their relations to those of other areas.

The Devonian of America presents two broadly conceived types: a northern or boreal, confined chiefly to North America and the region north of the Amazon, and a southern or austral type. Dr. Clarke shows that the Devonian sediments found in South America, from central Brazil southward, contain an austral fauna. The latter, which differs from the boreal fauna in many respects, is a unit throughout its range, having definite and recognizable characteristics wherever found.

While the work before us is entitled a discussion of the Devonian Fossils of Paraná it is in reality a monograph upon the austral Devonian of the whole of South America. The author gives a critical discussion of the