

was the General Society of Mechanics and Tradesmen, to which the testator left \$1,800,000.

THE will of Cora M. Perkins gives her residuary estate to Columbia University, in addition to a direct bequest of \$30,000 for chemical research.

A REUTER dispatch from Brussels states that Louvain University has received a legacy of \$100,000 toward erecting a special building for cancer research.

DR. M. C. MERRILL, professor of horticulture at the Utah Agricultural College, has been appointed professor of horticulture and dean of the new College of Applied Arts at the Brigham Young University, Provo, Utah.

T. L. Patterson, Ph.D., formerly of the physiological department of the State University of Iowa College of Medicine, has been appointed professor and director of the department of physiology at the Detroit College of Medicine and Surgery.

DR. ALICE SULLIVAN has sufficiently recovered from her accident of last summer in the Colorado floods to assume her position as instructor in psychology at the University of Illinois.

DISCUSSION AND CORRESPONDENCE

KILOBAR, KILOCAL, KILOGRAD

IN a letter just received from The Meteorological Office, Professor Whipple very kindly informs me of the result of a question put to the Secretary of the Chemical Society regarding the attitude of British chemists regarding the *bar*.

While the opinion expressed is to be regarded as unofficial, Professor Philip says:

"Your letter in reference to the definition of the '*bar*' was considered by our Publication Committee. The general opinion is that very few English chemists use the '*bar*' as a unit of pressure on either basis. There was a feeling, however, that in view of the use of the '*bar*' in Langmuir's papers and other communications emanating from the same quarter (see

e. g. Dushman in the *General Electric Review*, 1920-1) English chemists would be more likely to use the '*bar*' in that sense than in the sense employed by meteorologists."

It will be recalled that meteorologists in 1913, quite unaware of the fact that the *bar* had been accurately defined by Professor T. W. Richards in 1903, and thinking they were coining a new word, adopted the *bar* as the unit of pressure but gave it the value of a *megabar*. My friendly correspondent, a meteorologist of prominence, adds: "This looks as if the confusion is likely to spread. We shall have a permanent ambiguity like those in the words *billion* and *calorie*."

To this, I have answered: There need be no confusion if meteorologists will simply write *kilobar*, where they now use *millibar*.

The practical unit of pressure is 1000 *bars*, the *bar* being the pressure expressed in terms of force which will give an acceleration of 1 centimeter per second per second to one gram of matter.

It is the natural basic unit, strictly C. G. S. and was in legitimate use by chemists and physicists 10 years previous to its appropriation by meteorologists.

With regard to the *calorie*, it will no longer be necessary to specify the *calorie* as the *gram calorie* or *therm*. The word *calorie* by itself will mean the amount of heat that will raise the temperature of a gram of pure water from 1000 to 1003.66 Kelvin-kilograds. The larger unit, much used by engineers, being the amount of heat required to raise the temperature of one kilogram of water, can be called the *kilocal*.

The scale of temperature which has been used without difficulty at Blue Hill Observatory for the last five years, makes the thermal coefficient of the expansion of a gas (air) at constant pressure .001 instead of .00366.

This is very easily accomplished by making zero on the scale, the absolute zero (-273.12° Ac) and making the freezing point of pure water at megabar pressure, 1000. There are numerous advantages in the use of the scale. When used in connection with kilobar pressure, values of temperature and pressure are

decimalized; and equations in thermodynamics require about half the old style multiplication and division.

It may be noted that, unlike the Fahrenheit and Centigrade which depend upon the boiling point of water, a variable quantity, depending upon pressure, and hence not the same from one day to another, or even from one place to another, the Kelvin-kilograd uses only the freezing point. The effect of change of pressure on the freezing point is so small compared with the boiling point that the correction is practically negligible.

ALEXANDER MCADIE

BLUE HILL OBSERVATORY,
JANUARY 30, 1922

THE GEOLOGY OF WESTERN VERMONT

In a paper entitled "Studies in the Geology of Western Vermont," published in the Twelfth Biennial Report of the Vermont State Geologist, pp. 114 to 279, the writer has described field relations among the lower and middle Ordovician strata along the eastern shore of Lake Champlain in the townships of Benson, Orwell and Shoreham which seem best explained as great dislocations in the forms of reverse faults and one or more low-angle thrusts by which certain massive dolomite and limestone strata of lower Ordovician age have been broken and moved westward for indeterminate distances over shales and interbedded black slates and limestones belonging to the same geological system, but undoubtedly younger in age.

Similar phenomena were described also for the lake region near Burlington, where, however, thrust phenomena had long been better known. In the northern areas, so far as studies had then been carried by the writer, the presence of lower Ordovician limestones on middle Ordovician slates seemed largely confined to the islands of the lake, while on the mainland of Vermont certain siliceous dolomites and quartzites belonging to the Cambrian system and to the lower Cambrian terrane were found reposing on black slates with interbedded limestone bands not very different from those found beneath the lower Ordovician limestones

on the islands and on the mainland farther south in Orwell and Benson.

In addition to the description of the more or less clearly defined deformations just referred to the writer offered field evidence in support of the view that similar dislocations may probably define the fundamental deformational features of the rocks within parts of the Taconic Range, and along the "Vermont Valley" and the western margin of the Green Mountain plateau contiguous thereto, although within the latter-mentioned areas the thrust relations have been much disguised by normal faulting.

In the summer of 1921 the writer continued his studies in western Vermont among the islands of Lake Champlain and along the mainland in Phillipsburg, Quebec, and in the Vermont towns of Highgate, Swanton, Sheldon, St. Albans, Georgia, Fairfield, Fairfax, Milton and Colchester. Although there are present in these areas certain differences in respect to deformation and erosion, with which in some degree apparently are to be correlated the former extent and present boundaries of the lake in its northern portions, and also certain geographical variations, chiefly in the rocks composing the lower Cambrian beds in northern Vermont, the major thrust relations are clearly defined. Many interesting structural details were noted.

It is purposed, at the first opportunity, to continue these later studies thus begun and to publish a second paper on the geology of western Vermont, dealing chiefly with deformational features among the islands of Lake Champlain and along the Vermont shore region of the lake as far south as Shoreham.¹

C. E. GORDON

AMHERST, MASS.,
NOVEMBER 1, 1921.

ACUTE SENSE OF SOUND LOCATION IN BIRDS

In a recent issue of *SCIENCE*,¹ Dr. A. G. Pohlman, of the St. Louis University School of Medicine, briefly discusses some matters pertaining to the ability of birds to locate the

¹ Published with the consent of the Vermont State Geologist.