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.

source of sounds, under the heading, "Have Birds an Acute Sense of Sound Location?" He closes by saying that he would appreciate any direct observational data touching upon this subject. The following is an affirmative answer to his question:

On the morning of September 9, 1921, when in camp near Kneeland post office, Humboldt County, California, while I was seated among some rather tall bushes, watching for sparrows, a Sharp-shinned Hawk (*Accipiter velox*) flew on to a lower limb, some thirty or forty feet above the ground, of a dead fir tree about seventy yards away, alighting with its back toward me. While the bird was visible to me through the small openings among the branches of the bushes I must have been absolutely hidden from its view.

Just to see what the result would be I squeaked in imitation of a wounded bird when, to my great astonishment, the hawk wheeled as if on a pivot with remarkable rapidity and darted in a bee line over the tops of the bushes straight in my direction. When it reached the spot directly over my head, and not six feet above me, it evidently was aware that it had reached the center of the sound field for, not seeing anything there to account for the sound, it shot abruptly up into the air and lit on a limb of another dead fir so close to me that I shot it with my 32 caliber auxiliary barrel with a small charge of No. 12 shot.

The most curious part of this incident is that the hawk did not stop to listen and analyze or locate the sound, as might a jay for instance, but with the first squeak it turned quick as a flash, and darted with arrowlike speed for the spot from which the sound emanated; that is to say on the exact line (more correctly, vertical plane) between its perch and the spot, as the height of the bushes prevented it from aiming its flight quite low enough. It seemed to me that if my head had been high enough to be above the bushes it would have struck me.

This was the most remarkable exhibition of instantaneous precision in locating sound, not only as concerns direction but also as to rapidity of impulse, that it has been my good fortune to witness.

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[1] SCIENCE, New Series, Vol. LIII, No. 1375, May 6, 1921, p. 439.

SCIENTIFIC BOOKS

Déodat Dolomieu, membre de l'Institut National (1750-1801); sa correspondance, sa vie aventureuse, sa captivité, ses œuvres. ALFRED LACROIX. Ouvrage publié par l'Académie des Sciences avec le concours de l'Institut (Fondations Debrousse et Gas) Paris, Librarie Académique, Perrin et Cie, 1921, 2 vols, lxxx, 255, and 322 pp., port., 8vo. With line portrait frontispiece.

THE latest work of Professor Alfred Lacroix is a very important contribution to the history of the scientific men of France in the eighteenth century, perhaps all the more so that the name of Dolomieu is not well known in foreign lands.

The book has grown out of the researches made by Professor Lacroix in preparing the biographical sketch of Dolomieu which he read before the Académie des Sciences on December 2, 1918, and which has already been reviewed in SCIENCE. He found a number of Dolomieu's letters in the library of the Muséum d'Histoire Naturelle, and traced out many others in foreign libraries and in private hands. The author remarks that the chief value of those letters he has selected for publication is that they include a series, covering a period of some twenty years, written by Dolomieu to a small number of particular friends, so that they enable the reader to follow his life day by day in its more intimate details. The earliest in date of these letters were addressed by Dolomieu to his patron, Duke Alexander de la Rochefoucauld, member of the Académie des Sciences and colonel of the regiment "De la Sarre," who was destined to be assassinated in 1792, almost in Dolomieu's arms.

An interesting group of 47 letters are those written to the Sicilian naturalist Giseni; these treat at length of the important investigations of Dolomieu in the domain of volcanic formations. Other groups of letters are those sent to