

microscopic examination. The basin formation is considered by Mr. Hill to be of Pleistocene age, but somewhat more recent than the Llano Estacado.

In regard to the origin of the Texas sulphur beds, the most significant of the associated materials are the beds of gypsum which a few miles to the northeast are of commercial importance because of their great thickness and purity; the springs of sulphur water which are abundant along all the deeper drainage ways; and the ancient lake deposits which practically make the country. These deposits contain much organic matter along with calcareous and siliceous sediments.

The sulphur deposits of Sicily have probably received more careful study than any others, and they are generally thought to be derived from springs charged with calcium sulphide or sulphuretted hydrogen and carbonate of lime, resulting from the decomposition of gypsum in presence of organic matter. The decomposition products of the sulphur, in turn, acting upon calcareous matters, yield gypsum, thus completing the cycle.

Without enquiring into the origin of the great gypsum deposits of this section, I think we must consider the sulphur as one of its products, though due more immediately to the oxidation of sulphuretted hydrogen.

If these deposits were more accessible there could be no question as to their commercial importance. They are twenty miles from railroad lines, and in a country destitute of fuel and with scanty supply of surface waters. On the other hand, there would be no difficulty in the way of constructing a railroad or tramroad, which could be built out to the sulphur beds almost without grading, and that a supply of water could be had by artesian borings is as good as certain, for further down the basin near Pecos City abundance of water is obtained from

borings of 200 to 300 feet. The nearest source of fuel would probably be the Texas coal fields.

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CURRENT NOTES ON PHYSIOGRAPHY.

THE ADIRONDACK MOUNTAINS AND VALLEYS.

A FEW pages in the account of Essex county, N. Y., by Kemp (Rept. State Geol., N. Y., 1893, 438-441) describe the Adirondack ridges thereabouts as trending to the northeast, Lake Champlain rounding their ends in a series of bays. The longitudinal valleys are said to be chiefly due to faults, and the mountains are regarded as of the tilted-block type; the evidence of the faults being found in breccias and shear zones (as of Avalanche lake, Amer. Journ. Sci., Aug., 1892), and in the narrow 'passes' which are said to be evidently produced by fault scarps. Moreover, the ridges are commonly abrupt on one side and slope more gradually on the other, as in Knob mountain. A later report by the same author states that the relief of the region is not caused entirely by erosion, but that it is 'in a large part due to block faulting' (Bull. N. Y. State Museum, III., 1895, 328). It is further concluded that many of the valleys must have been outlined in pre-Cambrian times; for small areas of Potsdam sandstone occur in the depressions far within the mountains.

TOPOGRAPHIC FORMS PRODUCED BY FAULTING.

THE context of the above extracts seems to indicate that their author infers an ancient date for the faults mentioned, and a considerable amount of erosion subsequently in the excavation of the valleys; yet the hasty reader might gather the idea that the forms now visible were directly initiated by faulting of comparatively recent date. It is not decidedly stated whether the faults lately produced the ex-

isting relief, or whether the fault lines, as lines of weakness, have been eroded down into valleys, or whether the valleys have been lately (*i. e.*, in Tertiary time) eroded out of weak masses of rock that were long ago brought by faulting next to hard masses, or whether the valleys have lately been re-excavated in the Paleozoic rock-filling of ancient fault-block valleys; nor is the date of the faults explicitly stated. Here, as in many other cases, it is probably difficult to choose among these alternatives. Type examples of the various relations of form to faulting are, however, well known. Monoclinical ridges of strong relief, initiated by faulting and as yet hardly affected by erosion, are found in the tilted lava blocks of southern Oregon, described by Russell. The ranges of the Great basin are thought to be older fault blocks, more or less altered by erosion; but it is difficult to determine from the published descriptions by various observers all the elements of the problem; namely, the form that the region had before faulting, the form given by faulting (distinction being made between the uplifted back slope and the broken face of the faulted and tilted blocks), and finally the forms produced by erosion after faulting. Our Appalachian region offers plentiful examples of the complete extinction of the unequal relief initiated by ancient faults, as well as many other examples of notches and valleys whose erosion, in a new cycle after peneplanation, has been guided by fault lines or by the weaker parts of ancient faulted structures.

The well proved geological occurrence of a fault has been often taken as a sufficient explanation of form, without the aid of erosion. For example, Kjerulf regarded faults as the cause of the valleys and fiords of Norway; but it is probable that the faults there are for the most part of ancient date, while the valleys can hardly be older than Tertiary times. The zigzag escarp-

ments of the crystalline uplands east of Lake Vettern, in Sweden, imitate to perfection the forms that might be produced by recent faulting (see sheets 55, 56 of the Swedish topographical survey). Faults are numerous in the region, but it is probable that the inequalities here due to faulting were long ago worn out in the general denudation that produced the upland (once a lowland peneplain) of Scandinavia; and that the escarpments now visible were produced, after a general uplift of the region not longer ago than somewhere in Tertiary time, by the erosion of the weaker Paleozoic beds that had much earlier been faulted down next to the crystallines. How all this may be in the Adirondack region will perhaps be more fully determined by further observation.

THE BALTIC SEA.

PROF. RUDOLPH CREDNER, of the University of Greifswald, whose monograph on Rügen (*Forschungen z. deut. Landeskunde*, vii., 1893, 377-494) gives an interesting account of the interglacial deformation of that island, now extends his studies to the origin of the depression in which the Baltic lies. Placed between the oldland of Scandinavia and the younger deposits of the North German plain, the minor depressions contained within the general basin are ascribed to local faulting, more or less modified by later denudation, especially by glacial action. The observed faults on either side of the Baltic are taken to indicate that other faults occur beneath the waters of the sea. The outlines of the present shore result from broad oscillations of level, whereby the area of the sea has been significantly altered in comparatively recent times (*Hettner's Geogr. Zeitschr.*, i., 1895, 537-556).

The analogy, pointed out by Suess and others, between the Baltic and our Great Lakes appears to deserve greater emphasis

than is given to it by Credner. The Baltic and the lakes lie, as a whole, between an oldland and a series of less ancient strata, dipping away from it. The Gulf of Bothnia and Lake Superior are both within the limits of the oldland; the other basins are along the margin. In our Great Lakes, local faulting has not been noticed. As for the Swedish faults, most of them are too ancient to have any effect on existing topography, except as guides for modern erosive forces. Warping of a longitudinal depression, originally produced by ordinary denudation and modified by glacial erosion and deposition, appears to deserve greater importance than Credner allows it.

'SHUT-IN' VALLEYS.

THE St. François mountains of south-eastern Missouri consist of very ancient rock masses that have been more or less completely buried in Paleozoic strata, and that are now partly resurrected by the stripping of their cover. An expected feature of such mountains is the occasional occurrence of narrow superposed valleys, either still occupied or now deserted by their streams. A typical example of the latter kind is found in the notch that holds Devil's lake in the Baraboo ridge of Wisconsin, explained by the Geological Survey of that State as the former superposed course of the Wisconsin river. A report by Keyes on the Mine la Motte sheet of the Missouri geological atlas now announces the occurrence of several narrow valleys of this class still occupied as water courses, and so unlike the broader valleys up and down stream that they are locally known as 'shut-ins.' A good example is found two miles west of Fredericktown, where the Little François river passes through a narrow gorge in the porphyry mass of Buckner and Devon mountains between open limestone valleys up and down stream. Discordance of drainage with their sur-

roundings, as well as of structure, form and products, thus seems to characterize resurrected ancient mountains. Monadnocks, on the other hand, may be said never to be traversed by streams. W. M. DAVIS.

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CURRENT NOTES IN METEOROLOGY.

UNDER the heading Current Notes in Meteorology it is intended to publish, from week to week, or as opportunity may offer, short notes on recent publications of general interest and of importance in meteorology and climatology. Meteorology, although one of the newest of the sciences, is growing in importance every day, and its literature is rapidly increasing. To-day every scientific man needs some knowledge of what this literature is. Unfortunately, since the suspension of the *American Meteorological Journal*, in April of this year, there exists no representative independent meteorological publication in the United States. There is, therefore, at present no American journal to which one may turn for information regarding recent meteorological literature. It is the main purpose of these notes to supply this need, and to give the titles, together with a few words as to the contents, of such publications in meteorology and climatology as seem to warrant notice in a general scientific journal such as this is. Mention will also be made of meteorological phenomena of interest, accounts of which appear from time to time in records of travel, the *Monthly Weather Review* of our Weather Bureau, the bulletins of the various State Climate and Crop Services, etc. In this way it is hoped to furnish, in this column, a source of information on general meteorological and climatological matters that is at present lacking in the United States.

MAY 1st was the date set for the beginning of the International Cloud Year, in accordance with a resolution adopted by the