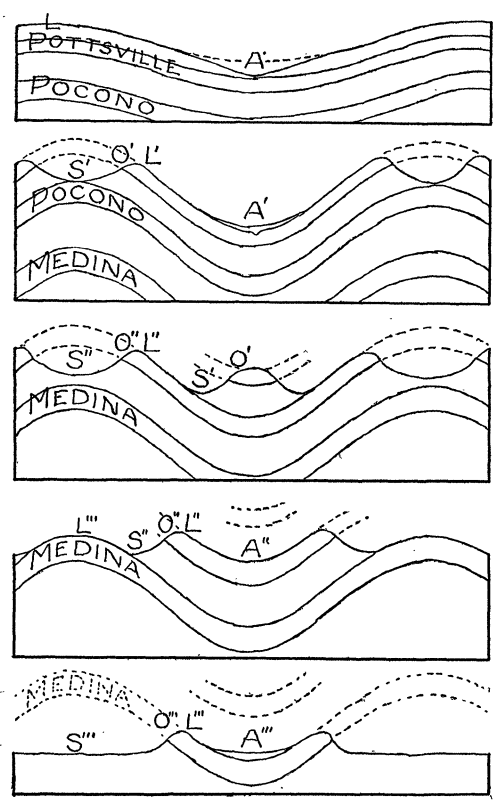
logical map might well serve as a guide to the observant traveler in this most picturesque district.

REVERSION IN RIVER DEVELOPMENT.

IN the Seven-mountain district of Pennsylvania, the anticlines and synclines of the corrugated Medina sandstone, pitching gently eastward, form an extraordinary series of zigzag ridges. Streams rise in the apex of the synclinical reentrants and flow eastward with the pitch of each synclinical axis toward the Susquehanna; and these axial streams receive branches that descend the dip-slope of the linear monoclinal



ridges which diverge from each synclinal apex. Such a scheme of drainage has usually been called consequent; yet when it is remembered that the present relief has been developed by the removal of a great series of strong and weak strata it appears that the existing streams are not the persistent successors of the original consequents, but that they have reverted to ancestral conditions after having passed through a systematic series of metamorphoses, as indicated in the accompanying diagrams. The first section represents initial conditions. An original consequent stream (A') flows along the pitch of a synclinical axis of Pottsville conglomerate and is fed by lateral consequents ($L'A'$) from the slopes of the enclosing anticlines. Section 2 represents a later time when longitudinal subsequents have been developed along the anticlinal axes of the weak Mauch Chunk shales, thus shortening the laterals of the original system ($L'A'$) by favoring the growth of obsequents ($O'S'$). In section 3 the new subsequents have shifted down the dip of their determining formation, thereby developing a new lot of apparently consequent laterals ($L''S''$), and the initial trough has been reversed into a narrow synclinal ridge, crowned by a remnant of Pottsville conglomerate. The original axial consequent (A') has vanished and an anticlinal subsequent of the second order (S'') has appeared. With still further erosion, as permitted by successive uplifts, the two first-order longitudinal subsequents (S', sect. 3) coalesce by continued monoclinal shifting, and thus form a new axial stream (A'', sect. 4) with appropriate laterals ($L''A''$) in the trough of the Pocono syncline. By yet another series of analogous changes ending in the fifth section, a third-order axial stream will be developed (A''') fed by a series of third-order laterals ($L'''A'''$) on the Medina syncline, such as at present exist. Although these streams closely imitate the ancestral consequents of the first section ($A', L'A'$), it is evident that the imitation is due to reversion and not to the persistence of a fixed type. Streams of this kind might be called reversional consequents, renewed consequents, reconsequents, or simply resequents.

W. M. DAVIS.

CURRENT NOTES ON METEOROLOGY.

QUARTERLY JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY.

THE January *Quarterly Journal of the Royal Meteorological Society* contains several articles of general interest. Dr. Nils Ekholm contributes a paper 'On the Variations of the Climate of the Geological and Historical Past and their

Causes,' which was presented at the recent Jubilee meeting of the Society. The subject is treated at considerable length under the following heads: (1) The general causes of changes of temperature. (2) Geological chronology. The probable age of the earth. (3) The radiation of the sun nearly constant during geological ages. The temperature of the earth's surface explained by the equilibrium between insolation and radiation from the earth into space. (4) Variations in the quantity of carbonic acid of the atmosphere the principal cause of the great climatic variations during geological ages. (5) The secular cooling of the earth is the principal cause of the variations of the quantity of carbonic acid in the atmosphere. Modifying influences. (6) Variations of the obliquity of the ecliptic and their influence on the climate. (7) Climatic variations during historical times, particularly in northwestern Europe. Conclusions. Probable variations of climate in the future. R. H. Curtis considers 'An Improved Mounting for the Lens and Bowl of the Campbell-Stokes Sunshine Recorder,' by means of which the glass ball can be quickly and accurately placed centrally in the bowl, where it is secured by clamping screws. W. H. Dines contributes a paper on the 'Weekly Death Rate and Temperature Curves, 1890–1899,' which contains diagrams showing the death rate of the thirty-three great towns of England, and also curves of the temperature at Greenwich. The author is of opinion that from the health point of view the English climate is one of the best in the world. A pleasanter climate may easily be found, but the majority of health resorts to which Englishmen go in the winter have a higher death rate than London has at the same season, and a far higher rate than any of the country districts of the British Isles. A paper by H. Mellish discusses 'The Seasonal Rainfall of the British Isles.' The rainfall returns from 210 stations are analyzed for the twenty-five years, 1866–1890, and the percentage of the mean annual rainfall for each season is determined.

THE OLD YUMA TRAIL.

A striking account of the history of 'The Old Yuma Trail' is given by McGee in the *National Geographic Magazine* for March. The part played by the arid climate of the region is touched upon here and there, and the terrible loss of life along the Trail during the 'gold-fever renaissance' is thus described: "Many of the travelers were fresh from humid lands, knew naught of the deceptive mirage or the ever-hovering thirst-craze of the desert, and pressed out on the sand wastes without needful preparation. The roll will never be written in full, since most of the unfortunates left no records, scores leaving no sign save some bleaching bones; but observers estimate that there were 400 victims of thirst between Altar and Yuma within eight years, an estimate which so conservative a traveler as Capt. Gaillard thought fair, after he had 'counted sixty-five graves in a single day's ride of a little over 30 miles.'"

HANN'S LEHRBUCH DER METEOROLOGIE.

Public announcement is made of Dr. Hann's forthcoming 'Lehrbuch der Meteorologie,' a book upon which, as was known to his friends, the eminent meteorologist has been at work for some time. The volume is to be published by Tauchnitz, of Leipzig, and may now be subscribed for. It is to come out in eight successive instalments, costing 3 Marks each. Dr. Hann is so well known to scientific men the world over, through his admirable 'Handbuch der Klimatologie' and his many other shorter publications, that his new book, which is already assured a hearty welcome and a large sale, will be awaited with the greatest interest.

NOTES.

The *National Geographic Magazine* for March contains a paper on 'The Sea Fogs of San Francisco,' which is an abstract of an article by A. G. McAdie in the *Monthly Weather Review* for last November. Five excellent half-tones accompany the paper.

The *Bulletin of the American Geographical Society*, No. I., 1901, pp. 42–46, contains a paper by W. H. Alexander, Observer of the Weather Bureau, on 'St. Christopher, West Indies,' in which there are some statements concerning the climate.

The full discussion of 'The Eclipse Cyclone and the Diurnal Cyclone,' by H. H. Clayton,

to which reference was made in these notes in SCIENCE for March 1, has appeared in Part I., Vol. XLIII., of the Annals of the Harvard College Observatory (pp. 33, pls. IV.).

R. DEC. WARD.

SCIENCE AND INDUSTRIAL COMPETITION.

Two small but very significant publications, recently issued from the press, will interest every intelligent citizen, and should particularly interest the man of science, the practitioner in applied science and, perhaps most of all, the always rare but always influential statesman.* The one is a reprint of letters to the London *Times*, the 'Thunderer,' from an able and distinguished British engineer traveling in the United States and reporting to that paper upon the aspects of 'American Engineering Competition'; the other is a series of addresses and magazine articles by Professor John Perry, the able and original electrician and engineer, upon methods of teaching the sciences. There is possibly an important connection between the two seemingly diverse subjects.

The one describes the latest and best, as well as the most important, of American methods and apparatus of industrial production. The universal adoption of scientific methods; the extensive employment of the product of inventive genius; the utilization of applied science in any and every possible way in the promotion of the arts; the adoption of scientific methods of organization, of administration and of maintenance of the great systems of industry, of production, transportation and distribution; the universal faith in and practice of systematic and scientific processes of ore-production and transportation, of trans-shipment, of reduction; the manufacture of iron and steel, 'manufacturing' all articles made of iron or steel rather than simply 'making' in older way; the part taken by automatic machines in the rapid transformation of the older into the newer system, with resulting increase of product per man, and of wages, and yet with decreasing costs and prices: all these elements of industrial progress are discussed. The other sharply arraigns the English educator for his utter neglect of the applied sciences and for his indifference to their utilization in the life and work of the English people, and attributes the later relative retrograde movement of Great Britain in part, at least, to this neglect of science and to the greater activity and the statesmanlike policies and methods of education of Germany and the United States.

The one traces in a most admirably complete, yet condensed and succinct, way the great movements in the fundamental industries of the United States during the past decades and up to its recent astounding development of a foreign trade. It closes a most intensely interesting and instructive and suggestive discussion by two chapters on the labor question, which this author seems to think a much more important element in the relative decadence of Great Britain as a manufacturing nation than even that neglect of science which has awakened Professor Perry's most serious apprehensions. In the other book, that distinguished electrician criticises, not the science-teacher so much, nor even the leaders in the industrial systems of his country, but the members of his own profession who, as he thinks, are themselves indifferent to the progress of science and to its utilization for the benefit of their country and profession. He criticises the methods usual in teaching mathematics, that ultimate basis of all engineering, and discusses in his characteristically original and forceful manner the defect of technical education in England and the defects of such as is attempted. Outside the work of the Science and Art Department at Kensington, he finds apparently little to approve. For that department he has cordial words of praise. His discussion may be taken as an important supplement to John Scott Russell's famous work.*

After reading these two little volumes one can hardly fail, however, to come to the conclusion that, while it is true that the American producer just now bursting into the field of

* 'American Engineering Competition,' being a series of articles resulting from the investigations made by the *Times*, London; N. Y. and Lond. Harper & Brothers, MDCCCCI. 8vo., p. 139. $1.00. 'England's Neglect of Science,' by Professor John Perry, M. E., etc., London. T. Fisher Unwin, 1900. 8vo., p. 113. $1.00.

* 'Systematic Technical Education,' London, 1869.