dium thiocarbonate. When treated with chlorin the chlorids of sulfur and silicon are formed and this reaction is used by the authors to detect thiosilicates in natural and artificial silicates. Thus they find 0.007 per cent. of SiS_2 in Vesuvius lava, up to 0.1 per cent. in different blast furnace slags, and 0.174 per cent. in ultramarine. They suggest that the sulfur in many sulfur springs may be due to the decomposition of thiosilicates.

The last *Chemical News* contains the translation of a paper on krypton, communicated to the Berlin Academy by Professor Ludenburg and Professor Kruegel, of Breslau. Availing themselves of the possibility of obtaining larger quantities of liquid air, they examined the residue of 850 liters. These liters of this liquid residue gave 2300 liters of gas which was freed from oxygen and nitrogen. The final residue of 3.5 liters of gas was condensed in liquid air and then fractioned. The earlier fractions were chiefly argon, though even the second of the six fractions showed clearly the green krypton line. After the fifth fraction was boiled off there remained a crystalline residue melting at about $-147°$. The gas in this fraction proved to be nearly pure krypton, though some argon lines were present in the spectrum. Ramsay had suggested for krypton the density of 80–82, but two determinations with Ladenburg's krypton gave 58.67 and 58.81, using about 16 c.c. of the gas which had been crystallized. The authors suggest for the inert gases a position before Group I. as follows: Helium = 4 before lithium, neon = 20 before sodium, argon = 39 before potassium, and finally krypton = 59 before copper. The authors are continuing their researches which promise interesting results.

J. L. H.

CURRENT NOTES ON PHYSIOGRAPHY.

THE DIVERSION OF THE YELLOWSTONE.

The questions raised by the unequal development of different parts of the Yellowstone drainage system within the National Park, as shown upon the topographic maps of the U. S. Geological Survey (see Science, V., 1897., 577), are answered by J. P. Goode in an article on 'The Piracy of the Yellowstone' (*Journ. Geol.*, vii, 1899, 261–271). It is there explained that the postglacial discharge of Yellowstone lake, when it stood about 200 feet higher than to-day, was orignally southwestward through a deep notch between Overlook and Channel mountains to the head of Snake river. The lower part of the canyon by which the lake is now discharged northward was then like its several neighbors in the rhyolite plateau, occupied by an active stream whose length was increasing by headward erosion. More favored than its fellows, this stream happened to gnaw through the divide that previously enclosed the lake basin and thus the waters of the lake were diverted to a northward discharge. The canyon was rapidly deepened, and the former outlet to the Snake river was abandoned. To-day the floor of the old outlet is poorly drained; puny streams start on its marshy course and flow to the opposite oceans. The falls in the new canyon are ascribed to the resistance of an undecomposed portion of rhyolite, on which the erosion of the river is retarded.

This essay does not explain the origin of the deep channel by which the lake was discharged to Snake river. The mountains in which the channel was cut seem to have been originally much higher than the divide through which the Yellowstone canyon has recently been eroded. On this point we may have fuller details in the expected Survey monograph on the Yellowstone Park.

MILL ON SOUTHWEST SUSSEX.

Dr. H. R. Mill, librarian of the Royal Geographical Society of London, proposed several years ago that a detailed geographical description should be prepared for the sheets of the one-inch English ordnance survey (see Science, III., 1896, 799). He has now made a first contribution to the scheme in 'A Fragment of the Geography of England: Southwest Sussex' (*Geogr. Journ.*, xv, 1900, 205–227, 353–373), a compendious account of the various features of that interesting district. The essay and its illustrations are excellent in many respects, and called forth deserved praise when presented at a meeting of the Society; but the pages that are concerned with physiography leave something to be desired, inasmuch as they do not cover their subject broadly or uniformly. The

'fragment' includes a part of the South Downs, a monoclinal ridge of chalk that forms the southern enclosure of the denuded area of the Weald. The ridge is trenched by the consequent valley of the Arun, an excellent example of its class; yet the Arun is merely said to be 'a typical river of the Weald,' leaving the uninformed reader entirely in the dark as to the features that it typifies, although a paragraph is allowed to the no more important matter of a comparison of Selsey bill, with two other salients of the south coast. The beautiful meanders of the Arun in its transverse valley through the Downs are passed over without explanation and without reference to similar features elsewhere, although the square cross-roads of Chichester are interestingly explained as of Roman origin, and the mean values of hours of sunshine and of atmospheric pressure are properly stated in relation to the values that obtain in other parts of Britain. As to the origin of the Arun valley, we find only the skeptical statement that it "might possibly be explained by supposing that the river * * * course was determined by the original dip slope of the Wealden Dome." Cocking pass, a notch in the Downs west of the Arun gorge in all probability marks the former path of a consequent stream whose head-waters have been diverted to the Arun system by the subsequent Rother, yet no mention is made even of the possibility of such a change, although space is found for Reid's venturesome theory that the dry valleys of the Downs were formed during 'the end of the glacial period,' when the usually pervious chalk 'was frozen into hard and impervious rock in which the torrents resulting from the melting of the higher snow cut out the valleys'; no consideration being here given to the work of ordinary subaërial erosion on the chalk during a preglacial time that was long enough to witness the excavation of the interior lowland of the Weald.

Dr. Mill's paper contains a large amount of well chosen and well presented material. It will probably be taken as a model upon which later essays will be framed. It is therefore all the more to be regretted that physiographic description was not more fully and systematically supplemented by explanation, and that the many local types of land and water forms were not presented as members of their class, rather than as (apparently) isolated examples.

THE PESCADORES ISLANDS.

The Pescadores or Hoko islands, lying between Formosa (Taiwan) and the Chinese coast, are described by Koto (Notes on the Geology of the dependent isles of Taiwan, *Journ. Coll. Sci., Imp. Univ., Tokyo*, xiii, 1899, pt. 1) as the ragged remnants of a series of nearly horizontal basalt sheets with intercalated strata of supposed Tertiary age. The islands and islets, 57 in number (besides countless reefs and ledges), are low and tabular or mesa-like, with deep weathered soil on the uplands. Their original area has been much lessened erosion, especially by the attack of the waves, as the uplands descend to the irregular shore line in steep slopes, broken at different levels by the edges of thin basalt sheets. The surface is barren and desolate, 'a quasi-desert, and not an oasis, amidst the green island-world of southeastern Asia,' a condition that is attributed to the savage violence of the wind, which blows from the northeast during three quarters of the year. The rains of the southwest winds in summer sink into the ground, forming few streams; erosion at present is chiefly performed by the winds and waves. Fringing and barrier coral reefs grow nearly all around the island upon the basaltic shelf.

W. M. DAVIS.

CURRENT NOTES ON METEOROLOGY.

CLIMATE OF SAN FRANCISCO.

UNDER the direction of the present Local Forecast Official of the Weather Bureau, at San Francisco, Mr. A. G. McAdie, special attention is being paid to studies of local climates in California. The *Monthly Review of Climate and Crops: California Section*, has thus lately contained reports upon the climates of Eureka, Fresno, Los Angeles, Sacramento, San Bernardino, San Diego, San Francisco, Stockton and Visalia. Now there has been issued *The Climate of San Francisco, Cal.*, as Bulletin No. 28, of the Weather Bureau, prepared by A. G. McAdie and G. H. Willson. The records which have been studied go back, in the case of the monthly and