

School of Pedagogy of the University of Buffalo, has been appointed professor of the theory and practice of teaching at the Teachers' College, New York. The study of education and the professional training of teachers will be abandoned at Buffalo at the end of the present year, special measures having been taken to enable the students of Professor McMurtry to continue their work under him at Columbia University. Dr. W. B. Elkin, lecturer in philosophy at Cornell University, has been appointed to an instructorship in the theory and practice of teaching.

MR. H. BAGNALL POULTON, M.A., F.R.S., Hope professor of zoology at Oxford University, has been elected to a Fellowship in Jesus College, under the statute providing for the election of 'any person of eminence in literature, science or art whose presence on the governing body would, in the judgment of the Principal and Fellows, be beneficial to the college.

MR. FRANK CLOWES has accepted the position of chief chemist to the London County Council, and has been made emeritus professor of chemistry of University College, Nottingham.

M. LE CHATELIER has been appointed to the chair of mineralogical chemistry in the College de France, vacant by the death of M. Schützenberger, and Professor G. M. Searle has been appointed Director of the Vatican Observatory at Rome in the place of Father Denza. Dr. Straubel has been promoted to an assistant professorship of physics at the University of Jena, and Dr. Brendel, docent in astronomy, to an assistant professorship in the University of Greifswald.

DISCUSSION AND CORRESPONDENCE.

A NOTE ON THE SOUTH AMERICAN COASTAL CLOUD.

TO THE EDITOR OF SCIENCE: The following brief notes on the coastal cloud of the west coast of South America may be considered as supplementary to the notes on clouds printed in SCIENCE for August 27th last.

One of the most interesting features in the meteorology of the desert region which extends roughly from lat. 3° S. to 30° S., along the

west coast of South America, is the almost constant presence of a bank of clouds over the coast range of hills and the strip of land immediately adjacent to the ocean. On the writer's voyage up this coast from Valparaiso to Panama, accomplished at intervals during the months from August to January, it was noted that the southern limit of this coastal cloud coincides very nearly with the southern limit of the rainless belt, and that its northern limit may be taken as defined by the latitude at which the zone of heavy rainfall in Ecuador begins and the desert strip ends.

The height of the base of the cloud, which seemed usually to be a low *strato-cumulus*, was determined in a few cases by means of aneroid barometers and found to be between 2,000 and 3,000 feet above sea-level. The vertical thickness of the cloud was found, by reference to the heights of the coast range of hills, to be less than 1,000 feet. As to the width of the cloud, from its seaward to its landward side, a few crossings by railroad from the ocean to the interior country showed an inland extension of roughly between ten and twenty miles. This distance probably depends partly upon the trend of the coast range of hills and partly upon the topography of the region. The extension of the coastal cloud to seaward apparently also varies considerably. Sometimes the shore-line itself was found to mark the limits of the cloud as sharply as if they were drawn with a ruler, and at other times the cloud was noticed extending as far as ten or even fifteen miles off shore.

A study of the growth of the cloud, and of its relations to the clear sky on the seaward and landward sides, would be very interesting. For instance, on December 16th, last, at 8 a. m., when the writer was in Mollendo, there was a very sharp dividing line between the low gray coastal cloud over the land and the blue sky, with a few *cirro-cumulus* clouds dotted over it, over the ocean. Later in the morning the coastal cloud extended itself seaward and the sharp line of division was lost. The contrast between the region along the coast covered by this cloud belt and the country inland, beyond the reach of the cloud, is usually very striking. But it is interesting to note that, if a sufficient

distance from the sea and a sufficient altitude are reached, another region of cloud is encountered, so that there are two cloudy zones, separated by a zone over which the sky is pre-vaillingly clear. This contrast was well seen by the writer at the beginning of the cloudy season in December, on trips between Mollendo, on the coast, and Arequipa, 80 miles inland in a direct line, 7,550 feet above sea-level. The same three zones were passed through on a trip up the Oroya Railway, from Callao, at sea-level, to Oroya, 12,178 feet above the sea.

As to the cause of the coastal cloud, that would seem to be found in the prevalence of cool southerly and southwesterly winds—the spiral outflow on the eastern side of the South Pacific anticyclone—blowing along shore or obliquely on shore along the whole desert strip of the Pacific coast of South America. These northward blowing and hence warming winds flow from a cool ocean surface on to a warmer land. They, therefore, becoming warmed, are increasing their capacity for water vapor, and instead of being rain-bearing, as might be expected in the case of on-shore winds which are forced to ascend by the topographic conditions, they are hostile to the production of rain. It is true, to be sure, that the adiabatic cooling due to their enforced ascent over the low coastal hills is sufficient to produce cloudiness, but it does not seem sufficient, in most cases, to produce precipitation. North of Paita, where the cold ocean current and the southerly winds turn off to the westward, the barren strip comes to a sudden end, and the coastal cloud, so far as could be determined by the observations of only one voyage, comes to an end also.

That the range of hills along the coast plays an important part in the production of the coastal cloud was shown by the fact that where the immediate seacoast is low, as, *e. g.*, at and for a short distance north of Pisco, there the coastal cloud was absent.

R. DEC. WARD.

COLON, COLOMBIA, January 12, 1898.

NEWCOMB'S PHILOSOPHY OF HYPER-SPACE.

THERE is in Professor Newcomb's beautiful address (*SCIENCE*, January 7, 1898) a marked naïveté. He says: "Certain fundamental

axioms are derived from experience, not alone individual experience, perhaps, but the experience of the race." On the contrary, the hereditary geometry, the Euclidean, is underivable from real experience alone and cannot be even proved by experience. Its adequacy as a subjective form for experience has not yet been disproved, but might in future be disproved. It can never be proved.

The realities which with the aid of our subjective space form we understand under motion and position, may, with the coming of more accurate experience, refuse to fit in that form. Our mathematical reason may decide that they would be fitted better by a non-Euclidean space form. But we are, and shall be, helpless to get such a space form from any experience whatever.

Space is presupposed in all human notions of motion or position. We may drop out such specifications from our space form as render it specifically Euclidean, but we cannot replace them by non-Euclidean. Euclidean space is a creation of that part of mind which has worked and works yet unconsciously.

It is not the shape of the straight lines which makes the angle-sum of a rectilineal triangle a straight angle. With straight lines of precisely such shape, but in a non-Euclidean space, this sum may be greater or less. In non-Euclidean spaces, if one edge of a flat ruler is a straight line the other edge is a curve, if the ruler be everywhere equally broad. In any sense in which it can be properly said that we live in space, it is probable that we really live in such a space. What becomes of the dogma that fundamental axioms are derived from experience alone?

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SCIENTIFIC LITERATURE.

Trailé des variations du système musculaire de l'homme, et leur signification au point de vue de l'anthropologie zoologique. Par Le DR. A.-F. LE DOUBLE, Professeur de l'anatomie à l'École de Médecine de Tours, avec une préface de M. E.-J. Marey. En deux volumes. Paris, Schleicher Frères. 1897.

During the last twenty years large numbers of scattered observations on muscular anoma-