

stitution of felspar, or if, indeed, its true nature can be represented by such formulæ, is a question which Kolbe leaves untouched, for the simple reason that the necessary experimental foundation from which alone valid arguments can be drawn, is entirely wanting.

Professor Kolbe concludes this remarkable paper by defining what should be the future aim of the student in Mineralogical Chemistry. He must not now rest content with a mere quantitative analysis, or with the empirical deduction of rational formulæ from the results of such analysis. Such a process can never fully elucidate the chemical constitution of inorganic compounds. This can only be accomplished by a careful and systematic study of the decomposition, syntheses, and substitutions; in other words, by the application of methods of research similar to those which have yielded such splendid results in Organic Chemistry. T. E. THORPE

NEW OBSERVATORY IN THE SOUTHERN HEMISPHERE

THE following statement with regard to the Cordova Observatory, to the foundation of which we have before referred, is extracted from the last number of Silliman's *American Journal of Science and Arts*.

"The Argentine Congress voted to establish a national observatory at Cordova, at the instance of President Sarmiento, and through the exertions of the present Minister of Public Instruction, Dr. Avellaneda, who invited me to organise and take charge of it, knowing my desire to extend the catalogue of the southern heavens beyond the limit of 30° to which the zones of Argelander extend. Bessel went through the region from 45° N. to 15° S. with systematic zone observations at Königsberg, which have since been reduced and published in two catalogues by Weisse of Cracow. Argelander carried the same systematic scrutiny with the Meridian Circle, from Bessel's Northern limit to the pole, and afterwards from Bessel's Southern limit to 30° S.

"Since then Gilliss has observed a series of zones for 30° around the south pole; but the reduction of these, although very far advanced, was not completed at the time of his death, and the MS. is now stored somewhere in Washington. Let us hope that it may at some time be recovered, the work completed and given to the world.

"My hope and aim is to begin a few degrees north of Argelander's southern limit, say at 26° or 27° , and to carry southward a system of zone observations to some declination beyond Gilliss's northern limit, thus rendering comparisons easy with both these other labours, and permitting the easy determination of the corrections needful for reducing positions of any one of the three series to corresponding ones for the other. It is of course impossible to arrange in advance the details of such an undertaking, but my expectation is to go over the region in question in zones 2° wide (except in the vicinity of the Milky Way where the width would be but one-half as great), up to a declination of about 55° , after which the width would be gradually increased as the declinations became greater. Within these zones all stars seen as bright as the 9th magnitude would be observed, so far as possible, moving the telescope in altitude when no bright star is in the field until some one becomes visible, according to the well known method of zone-observations.

"For reducing the observations, differential methods will probably be employed, inasmuch as the time now assigned for my absence from home would be inadequate for proper discussion of the correction required for nice determinations of an absolute character. Still, it is my present purpose, so far as possible, to make such subsidiary determinations as might hereafter be needed in any attempt at computing the observations absolutely. But as I hardly venture to anticipate any opportunity of making a thorough determination of the constants of refraction, or of the

errors of graduation, it seems best to arrange for a differential computation at least at first.

"It is improbable that a sufficient number of well-determined stars will be found available even for this differential reduction, and the necessity may thus be entailed of determining the comparison-stars myself, this determination, however, itself depending upon standard star places. So far as possible I propose employing those heretofore determined by me, and published by the Coast Survey, which form the basis of the star places of the American Nautical Almanac.

"With these observations of position it is my hope to combine others of a physical character to some extent; but in the presence of a plan implying so much labour and effort, it would be unwise to rely upon the possibility of accomplishing much more than the zone-work.

"The meteorological relations of the place are very peculiar, but I dare not undertake any connected series of observations bearing upon these, without self-registering apparatus, which is beyond my means.

"Cordova is one of the oldest cities, and contains the oldest university, of the Western hemisphere. It is situated in $31\frac{1}{2}^{\circ}$ S. latitude, on the boundary of the Pampa, where the land begins to rise toward the group of mountains known as the Sierra de Cordova. It is connected with Rosario, on the Parana, by the Central Argentine Railway, which has probably been already opened to travel through its entire length of about 250 miles, although information to that effect has not yet reached this country.

"The two largest instruments will be a Repsold meridian-circle of 54 inches focal length and $4\frac{1}{2}$ inches aperture, and an equatorial by Alvan Clark and Sons, provided with the 11-inch object-glass, by Fitz, lately in the possession of W. Rutherford, who has supplied its place by one of 13 inches. A photometer by Ausfeld of Gotha, according to Zöllner's latest form, has been constructed under the supervision of Prof. Zöllner himself; a spectroscope will be furnished by Merz of Munich, and a clock by Tiede of Berlin.

"The Scientific institutions of the U.S. have afforded the expedition every possible assistance. The Coast Survey lends a circuit-breaking clock, a chronograph, and a portable transit; the Smithsonian Institution lends a zenith telescope; the American Academy of Arts and Sciences of Boston (probably) a photometer and spectroscope; the Washington Observatory and the Nautical Almanac have greatly aided the undertaking by gifts of books and by a manuscript copy of Gilliss's catalogue of Standard Stars; and from the astronomers of England, Germany, and Russia important assistance has been freely and effectively contributed, in the order and supervision of instruments and apparatus, and by the gift of books, as well as by important and valuable suggestions.

"Four assistants will accompany me, Messrs. Miles Rock, John M. Thome, Clarence L. Hathaway, and William M. Davis, jun. We hope to reach Buenos Ayres not later than the middle of August.

"The building is now under construction in Boston. The means available proved inadequate for its construction according to the original plan, which was in the form of a cross, with four square rooms about its centre, and turrets at its four extremities. One half of it will be first erected, and it is hoped that the remaining portion will speedily be added." B. A. GOULD

SCIENTIFIC SERIALS

THE greater part of the *Revue des Cours Scientifiques* for July 23, is occupied by the commencement of a very able paper read before the Anthropological Society of Paris by Prof. Broca, on the Transformation of Species. Commencing with the pre-Darwinian theories of transformation of Blainville and Lamarck, he then proceeds to give a *résumé* of the theory of Darwin, and