

success. He does not use the plan of questioning to the excess characteristic of some other authors of recent textbooks of chemistry; and his book has some special features which make it worth adoption in elementary classes in schools and colleges. The intelligent order in which the subjects are dealt with, and the attention given to industrial processes, are particularly worthy of credit.

*Die Photographie im Dienste der Himmelskunde.* Von Dr. Karl Kostersitz. Pp. 53. (Wien: Carl Gerold's Sohn, 1900.)

THIS short monograph is a reprint of a lecture given by Dr. Kostersitz before the Vienna Photographic Society. The author describes in a somewhat general way the results that have been obtained by applying the camera to the end of a telescope and turning it towards the heavens. We are thus introduced to the appearance of the general features of the sun in and out of an eclipse, and a brief reference to the planets and asteroids as shown us by photography. Meteor photography is more fully described, and the author here gives two illustrations showing trails as photographed by him. The method of determining the relative brightness of stars by photographing them slightly out of focus is described, and a few words are written about the photography of the Milky Way. The illustrations, which are numerous and good, are chiefly from Scheiner's "Photographie der Gestirne," there being two excellent heliogravures showing the nebula of Orion and Barnard's Milky Way.

The last portion of the book is devoted to the publication of twelve replies that were received from different authorities in answer to a suggestion, proposed by the author, of erecting an observatory on the top of the "Schneeberg." These form interesting reading, although they hardly have any connection with the subject-matter of the book itself.

Although the monograph does not pretend to be complete, yet it gives the reader an idea of the important part played by photography in astronomy.

*Die Säkular-Verlegung der Magnetischen Axe der Erde.* Von W. van Bemmelen. (Observations made at the Royal Magnetical and Meteorological Observatory at Batavia.) Vol. xxii. Appendix i. Pp. 30.

THIS is an attempt to trace the position of the earth's magnetic axis during the last three centuries, on the supposition that a knowledge of magnetic declination is sufficient to determine the direction of its axis. Great circles drawn through different points, and coincident at these points with the magnetic meridians, would intersect in the poles of the magnetic axis, if the earth were a uniformly magnetised sphere. As this is not the case, the circles all pass through an arctic and an antarctic region instead of through two points, and Mr. van Bemmelen calculates by the method of least squares the point in each region which is nearest to the circles. The two points thus found he takes for the intersections of the magnetic axis with the earth's surface. The reader must be referred to the original for the clever manner in which the calculations are simplified and carried out. The method is first tested for the year 1885, when it is found that the magnetic axis, calculated in this fashion, agrees closely with that derived from the more rigorous analysis of Neumayer and Ad. Schmidt. It is then applied to the declination values for the years 1600, 1650, 1750, 1770 and 1842, and the author draws from the results thus obtained the conclusion that the magnetic axis does not revolve round the geographical axis, but that there seems to be a tendency to revolve round Nordenskjöld's aurora pole. A doubt must necessarily arise in the mind of the reader as to how far the older observations are sufficiently numerous and correct to allow any certain conclusions to be drawn from them. Any one looking at Neumayer's Atlas (Berghaus) of Terrestrial Magnetism

will be struck at once by the fact that the distribution of magnetic declination in the year 1600 is represented as being widely different from that of a uniformly magnetised sphere. We must conclude that either the observations were not sufficiently accurate to give us a correct picture, or that the earth differed much more from a uniformly magnetised sphere at that time than it does now. As v. Bemmelen has only tested his method at a time when the deviations from uniformity were small, there is considerable doubt whether equally good results would be obtained with irregular magnetisation. The work, meritorious and interesting as it is, cannot, therefore, be said to have led to any conclusion which can be accepted without further evidence.

*The Theory of Commutation.* By C. C. Hawkins. Pp. 81. (London: J. Tucker, no date.) Price 2s. 6d.

IN this pamphlet Mr. Hawkins enters into a complete mathematical investigation of the reactions occurring during the process of commutation in continuous current dynamos. The author first examines the case in which the contact resistance of the brushes is neglected, and then proceeds to give a complete solution of the equation for the current in the short-circuited coil, taking into account this resistance. This solution is due to Prof. Arnold and Dr. G. Mie, but our thanks are due to Mr. Hawkins for introducing it into England and for pointing out its practical bearings. Mr. Hawkins shows that the contact resistance is of the greatest importance in preventing sparking; the employment of carbon as the material of the brushes is consequently desirable, since the contact resistance of carbon is about fifteen times that of copper. Allowing for the fact that the surface needed to collect the same current must be about five times as great with carbon as with copper, the carbon brushes are still, approximately, three times as good as copper. The author also points out the other considerations affecting sparking, and goes fully into the question how it may be best avoided, both in dynamos and motors. The mathematical investigation is made clearer by the application of the results to a practical case, and by a careful explanation of the physical interpretation of the equations.

*Album of Papua. Types II. North New Guinea, Bismarck Archipelago, German Salomon Islands.* By Dr. A. B. Meyer and R. Parkinson. About 550 figures on 53 plates in heliotype. (Dresden: Stengel and Co., 1900.) Price 50s.

THROUGH the energy and skill of Mr. Parkinson, Dr. Meyer has been enabled to publish a second album of photographs illustrating Melanesian ethnology. The present album supplements the first one, which was published in 1894, and is now out of print. The photographs are well taken, and give us instructive glimpses of native life. The short explanation of each plate is printed in German and English, and these little accounts frequently contain notes of great interest, and there are helpful references to previous publications. There is a photograph (pl. xxiii. 2) of a girl playing the "pangolo." In his admirable memoir on "The Natural History of the Musical Bow," Mr. H. Balfour gives an account of the playing of this interesting musical instrument, which differs from that described by Meyer and Parkinson, the original account of the pangolo, by Dr. O. Finsch, being insufficient. Mr. Balfour evidently read into Finsch's figure more than it was intended to convey.

Albums such as these are of very great service to students at home, as good illustrations are much more readily grasped than are long verbal descriptions, and we hope that other albums will follow in due course. This is not the first time that Mr. Parkinson's labours in ethnology have been recognised in NATURE, and we only wish that some of our British residents and traders