direct system can hope, besides the ordinary improvements, for the perfection of some converter for direct currents; above all, for storage-batteries. If storage-batteries are successfully developed, the alternating system has nothing to offer that the direct system does not possess, while the advantages of the latter will be overwhelming. As we have already pointed out, however, a combination of the two systems would undoubtedly be best at the present moment.

ELECTRIC MOTORS FOR MINING-WORK. — Some contracts have just been completed by the Sprague Electric Motor Company that are being watched with interest by mine-owners. The most important order is for motors to be used on a circuit of about eighteen miles in length, for pumping, hoisting, etc. The river whose bed it is desired to work for gold, curves in a horseshoe shape; and a tunnel has been cut across the narrow part of the shoe, diverting the river from its bed. A turbine in the tunnel drives the generating-dynamo, while the motors are distributed along the bed of the river. Some of the other contracts are for running hoisting apparatus by motors, the power being obtained from streams distant two or three miles. There is no application of electricity with a wider field than the distribution of power, and nowhere can power be more successfully distributed by electricity than in mining-work.

FARBARKY AND SCHENCK ACCUMULATORS. — Among the numerous modifications of the Faure-Sellon-Volckmar accumulators, one of the most successful is the battery designed by Farbarky and Schenck. Originally the usual 'grid' form of support plate was used, the improvement consisting in mixing coke or other porous substance with the active material to give a better circulation of the electrolyte in the plate. Recently a change has been made in the shape of the holes in which the active material is contained. With the square hole completely filled with peroxide, there is no allowance made for its slow expansion, and the result is the 'growing' of the positive plate, with, under certain conditions, a falling-out of the plugs. In the new Farbarky-Schenck plate the solid bars are circular in form, intersecting, and leaving between the larger openings smaller, narrow slits, that allow the peroxide in the main openings to expand without causing more than a slight local strain. While it seems possible that this form of plate is an improvement on the ordinary type, yet it is hard to believe that plates made by pasting red lead or litharge into holes in lead frames can form the final type of storage-cell. In England, Germany, Austria, and this country, the Faure plan of using salts of lead mechanically applied to the support is almost universally used. In France, on the other hand, some modification of the Planté plate is usually employed, the endeavor being to form active coatings on the lead supports by the employment of an electric current, either forming the peroxide from the material of the support, or depositing it from the solution employed. At present the Faure plan is most generally used, but it is probable that the final lead storage-cell will be made by some modification of the Planté system.

THE SCHANSCHEIFF PRIMARY BATTERY. — This battery has zinc and carbon electrodes in a solution of basic sulphate of mercury and bisulphate of mercury in water. The cell has been tested by Sir W. Thomson, Mr. Preece, and others, and has been highly commended by them. The liquid can be quickly renewed when exhausted; the expense is not great; and for certain classes of work, such as mine-lamps, the lighting of trains, etc., it is said to possess advantages in weight and economy over secondary batteries.

BOOK-REVIEWS.

The Long White Mountain; or, A Journey in Manchuria. By H. E. M. JAMES. London and New York, Longmans, Green, & Co. 8°. $6.

WE have reported several times on the interesting journey of Messrs. James, Younghusband, and Fulford in the south-eastern portions of Manchuria. A full account of this journey has now been published. The special value of the book lies in the full and concise description of the history, the inhabitants, and the religion of the province, and particularly its administration, produce, and trade. In the southern provinces the Chinese form of administration has now almost entirely superseded the Manchu, while in the province of Kirin both Chinese civil officials and Manchu military commandants are found. In the northern provinces, where Chinese immigrants are not so numerous as in southern Manchuria, the Manchu military officers still bear sway. In the region of the Long White Mountain no officials of any kind are found, but the inhabitants have formed themselves into guilds, — a very effective means of keeping their district free from brigands, which infest almost the whole province of Manchuria. The towns and villages are protected from their ravages by walls. In discussing the taxation, the author mentions the general corruption of the authorities, and gives his opinion on the opium trade. He shows that opium is grown in many parts of Manchuria, even close by the highways, although its cultivation is prohibited by law. Therefore he thinks that the raid upon the Indian opium trade is out of place, as China can supply her want of opium herself. This chapter of the book is one of the best, as the author, who is a member of the Civil Service of India, has evidently a thorough knowledge of the trade and commerce and of the production of eastern Asia. In the description of his travels, which occupies the second half of the book, particular attention is paid to the produce of each part of the province, to the methods and facilities of trade, and to the dues collected from it. He describes the roads, which are for the most part practicable only in winter, when the swamps and bogs are frozen. Even the military roads are in a poor condition. The most interesting part of the journey was that in the Ch'ang-pai-shan, the Long White Mountain, which was known from descriptions of Chinese travellers and the Jesuits, who visited it in the beginning of last century. The mountains were said to attain a height of twelve thousand feet or more, but the measurements of Younghusband show that it is only eight thousand feet high. The sources of all important rivers of Manchuria are situated in these mountains; and it must be regretted that the travellers, on account of a scarcity of supplies, were unable to make a more accurate survey of this region. The description of the inhabitants, who have formed a small republic of their own, is very interesting. We described some of the observations made by the travellers in this region in No. 245 of *Science*, according to a lecture delivered by James before the Royal Geographical Society. In the present volume he details his experiences more fully, and his report is full of interesting facts. After leaving the Long White Mountain, the travellers turned northward, and visited Tsitsihar and many other places, their travels practically covering the whole region east of the line from the Gulf of Liao-Tung to Tsitsihar. The book, which is accompanied by a good map and numerous illustrations, forms a very valuable contribution to our knowledge of the present state of affairs in Manchuria, the author giving a vivid picture of all he has seen and heard during his interesting journey.

A Manual of Analytical Chemistry, Qualitative and Quantitative, Inorganic and Organic. By JOHN MUTER. 3d ed. Philadelphia, Blakiston. $2.

THE object of this work has been to produce a manual, short and easily understood, taking the student from the simplest to the most complex matters of qualitative analysis, and also dealing with quantitative work sufficiently to give him a fair insight into all branches of this department. It is adapted for students who desire to prepare for pharmaceutical, medical, or general university examinations in practical chemistry. The present edition has been considerably condensed in bulk, though a large amount of additional matter has been introduced. Muter's analytical chemistry has always been a popular manual with teachers and students, and the improvements in this edition will make it still more acceptable.

The Urine. Memoranda, Chemical and Microscopical, for Laboratory Use. By J. W. HOLLAND. Philadelphia, Blakiston. 12°. 50 cents.

THIS manual deserves to be generally adopted in medical schools and by physicians. It contains the latest and best tests, and is well illustrated. In addition to the tests recommended, which are both chemical and microscopical, Dr. Holland gives, under the heading 'Import,' the bearing which the result of these tests has upon the diagnosis and treatment of the patient. For instance, after describing the various tests which may be employed for the detec-