are beneath the car, out of sight, and are geared by a system of spur-gears to the axle of the car-wheels. Each motor is swung in a cradle one end of which pivots on the car-axle, — the axle passing through bearings in the cradle, — while the other end is fastened to the car-frames by heavy spiral springs above and below. These springs are for the purpose of avoiding any sudden strains. Between the gear on the motor shaft and that on the car-axle is an intermediate gearing which is fitted on its axle with rubber cushions to give additional relief from shocks. The whole gear system works easily, and makes very little noise. The switches for controlling the current are on both platforms, the car running in either direction. The coils of the field-magnets of the motors are divided into a number of sections, and the switch makes different arrangements of these coils, putting them all in series (when the current is least) or in parallel (when the current is greatest), or using different combinations for intermediate powers. The cars are under perfect control: they start easily, and can be backed instantly in case of emergency. Brakes are used both for the wheels and on the track, the ordinary wheel-brake not being sufficient for some of the steep grades that occur. Power is supplied from a central station in about the middle of the line. There are six dynamos, giving 500 volts and 80 ampères each. The line was opened for traffic with ten cars running. They were crowded with passengers during the day; and the heavy travel, together with the inexperience of the drivers, was a severe test for the system. There were a few small troubles, but these were soon rectified; and, on the whole, the day's work seemed to prove the system a success.

BOOK-REVIEWS.

Political Economy. By FRANCIS A. WALKER. 2d ed. New York, Holt. 8°.

IT would be superfluous to commend to American readers any economic writing by President Walker. His clear style, vigorous thought, and terse expression have long since placed him in the front rank of economic thinkers, whether American or European. His wide experience and his philosophic insight raise him far above those scribblers of ephemeral pamphlets who are crying now for socialism, now for co-operation, now for *laissez faire*, and all under the name of 'political economy.' President Walker sees very clearly that economics, if it is a science at all, is only to be studied in the ever-varying phenomena of human nature, and he would be the last to attempt to regulate or produce either character or productivity by statute.

The present volume is the best adapted to the present needs of students in the United States, of any that have come from the press. Not only are the general topics of political economy treated fully and with ample illustration, but a concluding part (and a generous one) is given to the discussion of present problems under the head of 'Some Applications of Economic Principles.' We do not follow President Walker in his virtual indorsement of the Ricardian theory of rent, or of Malthusianism; for, despite what he says, both doctrines appear to us to be mere approximations, and not certainties. It is the assumption of their certainty, and the basing of elaborate deductions upon them, which have made so many of the theoretical conclusions of political economy so absurdly at variance with facts. On the wages question President Walker is particularly strong and clear, and his conclusions incontestable. It is interesting to see a professed economist write of the system of protection as the author does. His fellow-economists are given to abuse and the hurling of epithets as soon as the subject is mentioned; but President Walker, in a fairer spirit, writes, "If the protectionist can show that restraints imposed by law upon the industrial action of his countrymen, or the men of any country he chooses to take for the purposes of the debate, have the effect not, indeed, to generate productive force, but to direct the productive force generated by human wants, setting in motion labor with a better actual result than under the rule of freedom, he will make his case. But this is to be proved, not taken for granted; and it is only to be proved by sound and serious argument, not by strenuous exertion and senseless clamor" (pp. 508, 509). This is a position which all rational men can accept; and it is infinitely removed from the line of argument, or rather of invective, pursued by Professors Sumner and Perry. President Walker's argument in Paragraph 615, we do not, however, quite understand; for it seems to imply that the advocates of protection insist on that as a universal fiscal policy with a view to making industrial entities correspond to political ones. As we read their arguments, on the other hand, no such claim is made. It is only asserted that protection is best for the United States at this time. At all events, a free-trade argument on the basis indicated by the writer would be both valuable and interesting.

We cannot refrain from expressing the wish that this book may find its way into more of our colleges, for it is worthy of them.

Nuttall's Standard Dictionary of the English Language. New edition, revised by Rev. James Wood. New York, Warne & Co. 8°. $1.50.

GREAT improvements have been made of late years in concise and handy dictionaries. Those formerly in use contained but a small proportion of the words in the language, and many of the definitions were nothing but synonymous terms; so that, for every purpose of real scholarship, reference had to be made to a large dictionary. But now we have several dictionaries of convenient size and low price, which really serve their intended purpose, and one of the best of these is that now before us. We have not examined the work in detail; but such examination as we have been able to give it shows it to be worthy of the popularity it has already attained. The definitions — always the main point in a dictionary — are up to the level of those in other English dictionaries, and the various meanings of the same word are distinguished with much fulness and accuracy. Illustrative examples from authors are not given, as the smallness of the book forbids it; but there are some pictorial illustrations, though not so many as in some other dictionaries of a similar character. The orthography is that usually employed in England, including the *u* in such words as 'honour.' The pronunciation is indicated by respelling, with only a slight use of diacritical marks, — a method which, for young people and for many older ones, has certain advantages. The present revised edition contains many new words of science and literature, and indicates in a brief way the derivation of the more important words when this is not obvious. At the end of the volume are the usual vocabularies of proper names, and a brief list of proverbs and quotations from foreign languages, with their meaning in English. The type employed in the book is necessarily small, though not so small as in some other concise dictionaries, and it is new and clear. The book is a medium octavo of eight hundred pages, and will be useful to all who wish for a dictionary of this character.

Hand-Book of Volapük. By CHARLES E. SPRAGUE. New York, The Office Co. 12°. $2.

Volapük. By KLAS AUGUST LINDERFELT. Milwaukee, Casper. 16°. 50 cents.

THE bibliography of Volapük now comprises about a hundred books, but, probably for reasons well presented by Professor Bell in *Science* of Jan. 27, very few of these works are in English. The above are two out of the first half-dozen books on the subject in the English language, though many periodicals in this country have given considerable space, especially during the past few months, to Volapükian literature. Mr. Sprague, who appears to be at the head of the movement in this country, gives, in the introduction to his hand-book, a brief history of the new language and of its rapid progress in Europe. He states that it was invented and first published in 1879 by Johann Martin Schleyer, a German priest, whose object was, "first, to produce a language capable of expressing thought with the greatest clearness and accuracy; second, to make its acquisition as easy as possible to the greatest number." He sought to accomplish these ends "by observing the processes of the many languages with which he was acquainted; following them as models wherever they were clear, accurate, and simple, but avoiding their faults, obscurities, and difficulties." The result of his labors is a language whose "rules have the advantage of being absolute, and unburdened with exceptions," as Professor Bell puts it. A clear and attractive exposition of the new language, in small compass, is given by Mr. Sprague, who modestly claims that the most obvious application of it, in the immediate future at least, is for international correspondence, especially commercial correspond-

ence, which is numerically most important. Mr. Linderfelt's little volume presents the subject in an equally attractive though somewhat different manner, being based upon a German work by Professor Kirchhoff of the University of Halle. Each book contains a copious vocabulary, besides exercises in reading and translation.

Management of Accumulators. By Sir DAVID SALOMONS. 3d ed. New York, Van Nostrand. 16°.

IN the last few years it has been recognized that the treatment of secondary batteries has as much to do with their life and economy as the method of manufacture, especially in the 'grid' type of cell now generally used. No one has had more experience in the use of storage cells than Sir D. Salomons, and what he tells us is of great value to those who work with them.

The present edition of the 'Management of Accumulators' is much larger than the two previous editions, the principal increase being in the chapters on installation. The book is in no sense a treatise on accumulators: it gives but a bare and incomplete description of the chemical actions that take place, and does not attempt to describe any form of battery other than the grid type of the E. R. S. Company's pattern. Instead of this, it gives explicit directions for the care of batteries and the installation of an isolated lighting plant, and it gives estimates of the cost of installation under various conditions. The least satisfactory chapter — that on engines, dynamos, and electric motors — fortunately is the easiest dispensed with.

This book will be valuable to all those who have to do with storage batteries: it will possibly be out of date in a couple of years. The storage battery is being constantly changed and developed, but in the mean time it will have done a good work, and it is to be hoped, that, when the practice changes, Sir David will write a new book.

NOTES AND NEWS.

THE annual winter meeting of the Department of Superintendence of the National Educational Association was held in the hall of the Franklin School, Washington, D.C., on Tuesday, Wednesday, and Thursday of this week. An excellent programme had been prepared by President Dougherty, and the number of distinguished educators who delivered addresses was unusually large. The most important topics treated were, 'How and to What Extent can Manual Training be ingrafted on our System of Public Schools?' by Charles H. Ham of Chicago, Superintendent MacAlister of Philadelphia, Superintendent Marble of Worcester, President Nicholas Murray Butler of New York, Superintendent Powell of Washington, and Dr. Belfield of Chicago; 'How can the Qualifications of Teachers be determined?' by State Superintendents Draper of New York, Higbee of Pennsylvania, Finger of North Carolina, Kiehle of Minnesota, Easton of Louisiana. President Eliot of Harvard read a paper on the second day of the meeting.

— The October number of the *Monthly Weather Review* contains an interesting discussion by E. B. Garriott on the movements of high-barometer areas over the North Atlantic Ocean, founded on the daily weather-charts for 1885. In the *Weather Review* for July, 1887, it was shown that a cyclone's movement depends upon its position with reference to anticyclonic areas, and that during periods of high barometric pressure over mid-ocean north of the 40th parallel, storm areas do not follow the usual east-north-east course to European waters, but pursue a more northerly track, or disperse. In order to study the course of cyclones more closely than has been done heretofore, this investigation was carried on, and resulted in the discovery of the following facts. There exists almost continually an area of high barometric pressure south of the 40th parallel, and one of low barometric pressure farther north. Upon advancing from the American coast, areas of low barometer appear to move towards the region of low barometer, and areas of high pressure are apparently attracted to the region of maxima. The latter show a far greater degree of uniformity of movement than the cyclonic areas, their course and velocity being seldom influenced by the cyclonic areas that may precede or follow them. About ninety per cent of these anticyclones pursue a south-of-east course from the American coast, and, upon advancing to the vicinity of the 60th meridian, lose their individuality and become a part of the great anticyclonic system of that region. The average time occupied by the anticyclones of 1885 in advancing from the 90th meridian to the coast was about one and one-half days, this rate of progression being considerably greater than the average velocity of cyclonic areas over that region. As soon as an anticyclone is absorbed by the great anticyclonic system, the latter extends considerably westward, and therefore a cyclone closely following the passage of a high-barometer area takes an abnormal northerly course; and, on the other hand, the greater the period which exists between the advance of the areas from the coast-line, the greater will be the likelihood of the low-pressure area pursuing a normal path over the ocean. As in the normal movement of cyclonic and anticyclonic areas the latter more frequently closely follow and accelerate the forward motion of the former upon passing from the coast, they materially contribute to the greater rapidity of their advance over the ocean. The thorough study of the normal movements of anticyclonic areas over the continent and the western portion of the ocean, and of the relations which exist between high and low barometer areas attending their passage from the coast, will probably enable us to determine with a considerable degree of accuracy the course of cyclones across the Atlantic Ocean.

— It has been generally accepted that the translation of the name of 'Kongo' is 'the country of leopards,' the root *ko* meaning 'the country,' and *ngo* 'leopard.' J. Jankó, in the January number of *Petermann's Mitteilungen*, shows that this translation is not satisfactory, as, according to the rules of the Bantu language, these two words cannot be combined into the word 'Kongo.' He discusses the various forms of this word as found among the tribes of the Lower Kongo, — the Bakongo, who live on the river from its mouth to Stanley Pool; the Bateke, who occupy the regions between the Kuango and Kongo, and the Kongo and Alima; the Babuma, north-west of the last tribe; and the Bayanzi, between Leopold Lake and the Kongo. The Bakongo name of the river is 'Kongo,' that used by the Bateke is 'Songo,' and the Bayanzi say 'Rongo.' All these names are dialectic variations of the same word, the *k* of one dialect becoming *r* and *s* in the others. The meaning of the word in the Bayanzi dialect is 'spear,' and accordingly Jankó explains the name of Bakongo as 'the man with the spear;' the name of the river, as 'fast as a spear.' If this translation should be correct, it seems more probable that the name of the river was derived from that of the tribe. Jankó remarks incidentally that the root *ku* infers a motion, and that it is contained in the names of numerous rivers, such as Kuilu, Kunene, Kuango, Kuanza, which therefore must not be spelled Kwilu, Kwango, etc. It seems probable that the same root may be contained in the word 'Kongo,' and that the meaning 'spear,' which is, according to Jankó, confined to the Bayanzi, is also derived from this root.

— In controlling the movements of domestic animals by the voice, besides words of ordinary import, man uses a variety of peculiar terms, calls, and inarticulate sounds, — not to include whistling, — which vary in different localities. In driving yoked cattle and harnessed horses, teamsters cry 'get up,' 'click click' (tongue against teeth), 'gee,' 'haw,' 'whoa,' 'whoosh,' 'back,' etc., in English-speaking countries; 'arre,' 'arri,' 'jüh,' 'gio,' etc., in European countries. In the United States 'gee' directs the animals away from the driver, hence to the right; but in England the same term has the opposite effect, because the driver walks on the right-hand side of his team. In Virginia, mule-drivers gee the animals with the cry 'hep-yee-ee-a.' In Norfolk, England, 'whoosh-wo;' in France, 'hue' and 'huhaut;' in Germany, 'hott' and 'hotte;' in some parts of Russia 'haitä,' — serve the same purpose. To direct animals to the left, another series of terms is used. In calling cattle in the field, the following cries are used in the localities given: 'boss, boss,' 'sake, sake' (Connecticut); 'coo, coo' (Virginia); 'sook, sook,' also 'sookey' (Maryland); 'sookow' (Alabama); 'tloñ, tloñ' (Russia); and for calling horses, 'kope, kope,' (Maryland and Alabama); for calling sheep, 'konanny' (Maryland); for calling hogs, 'chee-oo-oo' (Virginia). Mr. H. Carrington Bolton is desirous of collecting words and expressions (oaths excepted) used in addressing domesticated ani-