

the intervals between two stratifications the discharge is very likely carried as through the dark space at the negative electrode, while in the stratifications recombination of the decomposed atoms takes place.

An interesting law has been proved by Hittorf and E. Wiedemann in the case of the unstratified discharge. Hittorf shows that the fall of potential is the same in the positive part for the same tube whatever the current. This means that the energy dissipated is proportional to the current, and not to the square of the current as in a liquid. In the latter form the proposition had previously been proved by E. Wiedemann, who has shown that the total quantity of heat generated is proportional to the total quantity of electricity which has passed through the tube, whether in a few strong sparks or many weaker ones.

These experiments seem to point to the fact that once the original velocity of the particles at the regular pole has been reduced the velocity becomes independent of the strength of the current, that is to say, that in the positive part of the current greater intensity only means a greater number of particles taking place in the discharge.

The paper also contains spectroscopic evidence as to the state of dissociation in a vacuum tube, especially in the negative glow.

The question as to how the electricity passes from the electrode to the gas is not discussed, nor is it possible at present to decide, should the theory prove true, whether the polarity of the atoms in the molecule depends on the way in which these are combined, or whether that atom takes positive polarity which happens to be nearest the negative electrode as the molecule approaches it.

In conclusion some novel influence of the magnet on the negative glow is described, and it is shown that two different effects have to be clearly distinguished. The first is an effect of the magnet on the discharge when that discharge is established, and has been sufficiently well investigated. But the second effect depends on the question from what part of the negative electrode the discharge sets out. With respect to this question we meet with many contradictory and inaccurate statements. If at any place the magnet tends to throw the glow together the temperature will be raised, and owing to this fact the current will be strengthened, which again raises the temperature. It may thus happen that a slight cause can induce the current to pass almost exclusively from one part of the negative electrode. For a detailed description the reader is referred to the paper itself and the illustrations accompanying it.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

MR. ANDREW GRAY, M.A., assistant to Sir William Thomson in the Natural Philosophy department of the University of Glasgow, has been appointed to the Chair of Physics in North Wales University College. Dr. J. J. Dobbie, M.A., formerly "Clark" Fellow in Natural Science, has been elected to the Chair of Chemistry and Geology.

THE following is a list of prizes, scholarships, associateships, &c., awarded at the Normal School of Science and Royal School of Mines, South Kensington, June 1884:—First Year Scholarships: Albert G. Hadcock; Fred. Carrodus; William C. Rowden; Thomas Rose. Second Year Scholarships:—George Gibbens; Isaac T. Walls. "Edward Forbes" Medal and prize of books for biology, Thomas Johnson; "Murchison" Medal and prize of books for geology, Martin F. Woodward; "Tyndall" prize of books for physics, course I, Isaac T. Walls; "De la Beche" Medal for mining, Herbert W. Hughes; "Bessemer" Medal, with prize of books from Prof. Chandler Roberts for metallurgy, (1) Percy Bosworth-Smith, (2) William F. Grace; "Hodgkinson" prizes for chemistry, (1st, books, &c.) George T. Holloway; (2nd) Stephen J. Elliott and William P. Wynne. Associateships in Normal School of Science: chemistry, 1st class, George T. Holloway, William P. Wynne, and Elizabeth Healey; physics, 1st class, Benjamin Illingworth and Alfred Howard; biology, 2nd class, and geology 2nd class, Joseph Lomas. Associateships in Royal School of Mines: mining, 1st class, Herbert W. Hughes; mining, 2nd class, and metallurgy, 1st class, George H. Schröder; metallurgy, 1st class, Percy Bosworth-Smith, Alfred Sutton, Henry G. Graves, and Harry J. Chaney; metallurgy, 2nd class, William F. Fremersdorf and Erskine H. B. Stephenson.

SCIENTIFIC SERIALS

American Journal of Science, June.—On the tendency of rivers flowing to the north or to the south to encroach on their east or west banks respectively, by G. K. Gilbert. The author, after further study, here finally adopts the view that this tendency is sufficiently accounted for by terrestrial rotation.—Examination of Mr. Alfred R. Wallace's "Modification of the Physical Theory of Secular Changes of Climate," part ii., geological and palæontological facts in relation to Mr. Wallace's modification of the theory, by Dr. James Croll.—Description of a new fossil marsupial from the Miocene deposits of Chalk Bluffs, Colorado, by W. B. Scott. This opossum, which the author names *Didelphys pygmaea*, is intermediate in size between the *D. murina* and *D. elegans* of South America. It establishes the fact that the small insectivorous opossums now characteristic of South America existed in Miocene times in North America, and is additional evidence that the latter continent is the source from which the former received the greater part of its fauna.—On a method of obtaining autographic records of the free vibrations of a tuning-fork, and on the autographic recording of beats (five illustrations), by Alfred G. Compton.—Notes on the volcanic rocks of the Great Basin, stretching for over 400 miles from the Sierra Nevada eastwards to the western base of the Wahsatch Range, by Arnold Hague and Joseph P. Iddings. In this region the association of andesites and trachytes, or trachytes and rhyolites, is unknown, and the authors infer that trachytes occupy a far more restricted position among volcanic rocks than has hitherto been generally supposed. They also consider that the geological independence of rhyolite and trachyte is now clearly established.—Transition from the copper-bearing series to the Potsdam in the St. Croix River Basin, Wisconsin, by L. C. Wooster.—On the expression of electrical resistance in terms of a velocity, by Francis E. Nipher.—Lateral astronomical refraction, by J. M. Schaeberle. The author proposes a simple remedy for the errors in astronomical observations arising from the assumption that all atmospheric layers of the same density over any given locality are parallel to the horizon.—Description of a remarkable variety of kaolinite from the National Belle Mine, Red Mountain, Ouray County, Colorado (three illustrations), by Richard C. Hills.—The influence of convection on glaciation, by Geo. F. Becker.—Description of a new *Dinichthys* (*D. minor*) from the Portage Group of Western New York (two illustrations), by Eugene K. S. Ringueberg. This specimen differs in several important respects from the two Ohio species *D. Herzeri* and *D. Terrelli*, Newb.—Mineralogical notes on allanite, apatite, and tysonite (two illustrations), by Edward S. Dana.

Revue d'Anthropologie, tome vii. fasc. 2, Paris, 1884.—On the weight of the cerebellum and the hemispheres according to Broca's mode of registration, by Dr. Philippe Rey, who has been commissioned by M. Topinard to continue the comparative tables and determinations which had already served as the basis of the memoir drawn up by the latter on the weight of the brain. Bicêtre, Saint-Antoine, La Pitié, and La Salpêtrière are the sources whence Dr. Rey has derived the requisite data for his work, and his conclusions must therefore be regarded as having more of a special than a general interest, since they are exclusively based on observations of the particular classes of persons confined in these institutions.—Study of primitive peoples, as the Kaffirs, and more especially the Zulus, by Élie Reclus. This paper presents little interest or novelty for English readers, as it consists almost entirely of extracts from English travellers and missionaries, and neither opens up new sources of information nor throws any novel light on the ethnography of the nations of whom it principally treats.—On the Kalmuks, by M. Deniker. In this second part of his memoir the author, after completing his description of the anatomical and physiological characters of the Kalmuk race, which he shows to be generally brachycephalic, supplies much important information regarding their present social and political condition under the influence of Russian domination. It would appear that the people have considerable mental capacity, various young Kalmuks having taken good places in the examinations of the University of Astrakan, and officiating creditably as medical practitioners, and as directors of the hospitals which the Russians are establishing for the benefit of the tribes. The change from a nomadic to a stationary life seems, however, to have been productive of decided injury, the census of 1869 showing a diminution of 22 per cent. in the population since 1862. According to the author, this diminution principally affects females, while this census presents, moreover, the singular