THE volume of *Mitteilungen* of the Berne Scientific Society for 1910 contains an interesting attempt by P. Gruner to render the principle of relativity intelligible to the less mathematical reader. The twenty-one pages of "elementary" presentation still offer a formidable array of complex arguments, many of which are by no means easy to follow. Gruner imagines the inhabitants of earth and Mars as engaged in an attempt to unify and connect their respective time and space scales without the aid of astronomical observations of any other bodies, but with the free use of wireless telegraphy for mutual communications. He shows how, owing to relative motion, the scales must differ, and deduces Einstein's transforming equations in a simple manner. The scheme and argument could, no doubt, be still further simplified, and the simpler the better. Even this simplification tends to bring out the essential weakness of the theory, which assumes that successive light waves from a moving source are not concentric, and at the same time postulates, on the basis of Michelson's experiment, that this eccentricity cannot be discovered. Everything would be so much simpler if the speed of the body were added to the speed of the light it emitted, a supposition which, indeed, does not appear to contradict any astronomical observations.

ALTHOUGH the "exploring electrode" method of determining the distribution of electrical potential in the kathode dark space of a vacuum tube through which an electric discharge is passing has been suspected for some time, and has recently been superseded by the measurement of the deflection of a beam of kathode rays shot transversely through the discharge, it is important that the reason for the divergent results obtained by the former method should be ascertained. Prof. Wehnelt shows in a paper in the *Verhandlungen der Deutschen Physikalischen Geselischaft* for July 30 that any small obstruction placed in the kathode dark space acquires a positive charge, and its potential is therefore higher than that of the point at which it is placed. Between the kathode and the obstruction the rise of potential is linear, but between the obstruction and the kathode glow it is curved, showing that electric charges are present in this portion of the discharge.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR SEPTEMBER:—

Sept. 2. 22h. 0m. Saturn stationary.
4. 4h. 37m. Uranus in conjunction with the Moon (Uranus 4° 35′ N.).
9. 3h. 0m. Mercury in inferior conjunction with the Sun.
13. 1h. 48m. Saturn in conjunction with the Moon (Saturn 4° 22′ S.).
14. 0h. 39m. Mars in conjunction with the Moon (Mars 4° 32′ S.).
15. 0h. 0m. Venus in inferior conjunction with the Sun.
17. 9h. 28m. Neptune in conjunction with the Moon (Neptune 5° 46′ S.).
20. 23h. 11m. Venus in conjunction with the Moon (Venus 13° 14′ S.).
23. 16h. 18m. Sun enters sign of Libra.
25. 2h. 0m. Mercury at greatest elongation W. of the Sun (17° 52′).
,, 12h. 0m. Mercury in perihelion.
,, 16h. 5m. Jupiter in conjunction with the Moon (Jupiter 2° 11′ N.).

BROOKS'S COMET, 1911*c*.—During several of the clear evenings which obtained at the latter end of last week, Brooks's comet was faintly visible to the naked eye of an observer who knew where to look for it. Ordinary opera-glasses showed it as a distinct nebulosity, and in the field of a 3¼-inch refractor it was a really brilliant object, some 5′ or 6′ in diameter, having a distinct nucleus. On Sunday night, at Gunnersbury, Mr. W. E. Rolston found the comet, as seen with opera-glasses, to be no less conspicuous than ω^1 Cygni (mag. 5·6), which it immediately preceded.

ENCKE'S COMET, 1911*d*.—Observations of Encke's comet, made by Dr. Gonnessiat at the Algiers Observatory, are recorded in No. 4518 of the *Astronomische Nachrichten*. On August 1, under excellent atmospheric conditions, the comet was seen before ninth-magnitude stars which were rising at the same time, and if seen in a dark sky would probably have equalled in brightness stars of the seventh or eighth magnitude.

Dr. Backlund briefly discusses the recent observations, and gives an ephemeris extending to September 21. At present the comet is apparently about 2° south-east of ν Leonis, and is travelling south of, and almost parallel to, the ecliptic, down through Virgo towards Libra; on September 14 it will be some 5° south of Spica.

THE ASPECT OF NOVA LACERTÆ.—On a photograph taken with fifty minutes' exposure on August 11, Herr Kostinsky found that the image of Nova Lacertæ was surrounded by a well-defined luminous aureole (black on the negative) similar to that which surrounded the images of Nova Persei in 1901. This aureole is not to be seen on similar negatives secured in January and February; therefore Herr Kostinsky deduces it may be taken as an indication that the nova has now become a gaseous nebula in the spectrum of which only bright radiations of hydrogen and the nebula lines are represented. The photographic magnitude of the nova on August 11 was about 10·5 (*Astronomische Nachrichten*, No. 4518).

KIESS'S COMET, 1911*b*.—An improved set of elements and an ephemeris are given for comet 1911*b*, by Dr. Kobold, in No. 4518 of the *Astronomische Nachrichten*. The comet reached its most southerly point on August 24, and is now travelling northwards slowly. For the next fortnight its apparent path lies through the constellation Telescopium. This comet was discovered independently by Herr Raimond Moravansky in Moravia on August 5, and the observation sent to Kiel; but this was nearly a month later than the discovery by Mr. Kiess.

THE EARLY VISIBILITY OF THE NEW MOON.—From calculations based on the data given by Mr. Horner for his remarkably early detection of the new moon, on February 10, 1910, Mr. Whitmell finds, after correcting for parallax, &c., that the difference in altitude between sun and moon at the moment of observation was only 3° 16′, the moon being 1° 46′ above, and the sun 1° 30′ below, the horizon. The corrected azimuth difference was only 9° 8′, and the moon's age sixteen hours, so that this observation is probably unique in its detection of the crescent so soon after "new moon" (*The Observatory*, No. 438).

VARIABLE STARS.—Observers of variable stars will find part ii., vol. lv., of the Annals of the Harvard College Observatory, prepared by Miss Cannon, useful. It contains a table in which are set out the maxima and minima of a large number of variable stars. For each variable the elements and the dates of observed maxima and minima are tabulated, with a special column showing the differences between the observed and calculated dates.

In No. 4515 of the *Astronomische Nachrichten* Herr Max Mündler publishes the results of a number of observations of variable stars made by him, with a 6-inch comet seeker, at Mundenheim during 1909–10.

WATER SUPPLY IN THE UNITED STATES.

TO its excellent series of pamphlets on water supply the United States Geological Survey has just added three papers, one (No. 270) descriptive of the hydrographical features of the Great Basin, an immense tract of country 208,000 square miles in area (just as large as Germany), and extending over parts of the States of Utah, Nevada, Idaho, Oregon, and California; the other two, practical manuals entitled, respectively, "Underground Waters" (Paper No. 258) and "Well-Drilling Methods" (Paper No. 257).

Of the first pamphlet, it is only necessary to remark that it follows on the same lines as those adopted for similar reports, recently reviewed in these columns, on other of the dozen districts into which the United States

has been divided by the Geological Survey for the purpose of hydrographical research, and that it is equally excellent in compilation and treatment.

The two papers on well waters contain much useful information on the means of finding and securing for domestic consumption a satisfactory supply of water from underground sources. The pamphlet on well-drilling is especially practical in its description of the outfit and appliances required for the purpose, and of the methods to be followed according to the exigencies of particular localities, exigencies which, it is to be observed, are frequently of an exceptional nature. The literature on the subject of well-sinking is by no means extensive, and Mr. Bowman has exploited a field of his own, comprising those features of American practice which are associated with pioneer work in districts where many of the ordinary resources of highly developed communities are not readily available. The scope of the manual is not limited to water wells—all classes of borings for oil, gas, and water are treated, though naturally the hydraulic aspect of the subject is that which receives most prominent consideration. The interaction of borings undertaken for different ends is noted, and the flooding of oil wells by carelessly constructed and abandoned water shafts is made the subject of very necessary advice and caution. The text is freely, yet judiciously, illustrated by diagrams and photographs; and though one of the former, otherwise complete, rather amusingly indicates a platform carrying a couple of men in mid-air without any visible means of support, yet where misconception is unlikely it would be ungracious to cavil at so slight a defect. The manual is one deserving of cordial commendation.

MAGNETIC OBSERVATIONS.

THE magnetic observations made during 1910 at the Khedivial Observatory, Helwan, are included in a small pamphlet of seven pages, which gives for each month and the year the mean values of the magnetic elements, the diurnal variations in declination, horizontal force and vertical force, and particulars of the ranges of these elements on the eight most disturbed days of the year. In the diurnal variation tables values are given for both midnights, the aperiodic element not being eliminated. This is rather unusual. These tables go to 0·1′ in declination and to 1 γ (1×10^{-5} C.G.S.) in the force components. As the days tabulated in the month average twenty-eight, the expediency of going to 0·01′ and to 0·1 γ seems worthy of consideration, especially as the diurnal ranges are small. Disturbances at Helwan, at least in 1910, seem to rule small. The largest ranges in the selected disturbed days were only 13′ in declination, 187 γ in horizontal force, and 58 γ in vertical force. So far as internal evidence enables one to judge, its magnetic work does increasing credit to the Egyptian Survey Department, and it is to be hoped that it will continue to be prosecuted under favourable conditions.

In Blatt 3 of the Royal Observatory of Wilhelmshaven the assistant director, Prof. Bidlingmaier, continues the discussion of the magnetic disturbance character of the year 1910, initiated in Blatt 1 and 2, already noticed (March 16, p. 90). His method, it will be remembered, extends to individual hours the international scheme which assigns a magnetic character to individual days. Dr. Bidlingmaier's original view seems to have been that the disturbance character of a magnetic element might be based on the extent of its departure at the hour concerned from the corresponding mean monthly value on quiet days. He now regards this view as unsatisfactory, owing to its disregarding the influence of previous disturbance and making no allowance for Chree's discovery that the regular diurnal inequality varies according to the magnetic character of the day. His present estimate of hourly disturbance character seems based on the size of the maximum departure of the element during the hour from its mean value for the hour. He arrives at a numerical estimate of what he terms "Erdmagnetische Aktivitat" for the months of 1910, and compares it with Wolfer's sun-spot frequency. The hourly character of the first six months of 1911 is shown graphically in the manner applied in Blatt 1 and 2 to 1910.

The results of observations made at the U.S. Coast and Geodetic Survey's magnetic observatories at Cheltenham (Maryland), Sitka (Alaska), and Honolulu during 1907 and 1908 are published in volumes similar to those of previous biennial periods. Besides hourly readings and diurnal inequalities for the two years in question, the Cheltenham volume gives particulars of the mean annual values of the elements since the observatory began operations in 1901. A list is given of the fifty-eight principal magnetic disturbances of 1907 and 1908, with the times of their beginning and ending, and the curves obtained on nineteen of these occasions are reproduced, the times shown being G.M.T. The time scale adopted, 15 mm. to the hour, is more open than in previous years. The largest storms of the period were those of September 11 and 28, 1908. A list of earthquakes recorded by a Bosch-Omori seismograph is also given. The Sitka volume contains the usual tables of hourly readings and diurnal inequalities, and mean monthly values for the two years. A list is given of the sixty-two principal magnetic storms of the period, and the curves for sixteen of these are reproduced on a scale of 15 mm. to the hour. Sitka is a highly disturbed station, and during the principal storms there is at times considerable loss of trace; also the traces from the several elements being on one sheet—the usual practice with Eschenhagen magnetographs—there is a good deal of intercrossing of the traces. During the early part of 1908 there was also some loss of trace owing to defects in the driving clock, and a new one had to be substituted. Particulars are also given of the earthquake records obtained with a Bosch-Omori seismograph. Besides the ordinary tables of hourly readings, diurnal inequalities, &c., the Honolulu volume contains a list of the principal magnetic storms of the two years, and reproduces the curves for a number of these. Honolulu is a relatively quiet station, and loss of trace seems rare. The volume also contains a register of earthquakes recorded by a Milne seismograph.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE death is announced of Prof. J. P. Schweitzer, professor of chemistry in the University of Missouri from 1872 until 1910, when he became professor emeritus. Prof. Schweitzer was born in Berlin in 1840, and went to the United States in 1865. He was known for his work in analytical and agricultural chemistry.

MR. F. PULLINGER, chief inspector of the Technological Branch of the Board of Education; Mr. W. R. Davies, assistant secretary of the Technological Branch of the Board of Education; Prof. John Perry, F.R.S., professor of mechanics and mathematics in the Imperial College of Science and Technology; and Mr. W. Gannon, principal of the Woolwich Polytechnic, have been appointed members, for a period of three years, of the Examinations Board of its Department of Technology by the City and Guilds of London Institute. They succeed Mr. C. A. Buckmaster, Prof. W. Gowland, F.R.S., Mr. J. H. Reynolds, and Prof. W. Ripper, whose terms of office have expired.

IT is announced in *The Pioneer Mail* of August 4 that Rao Saheb Vasanji Trikamji has generously placed at the disposal of the Governor of Bombay a sum of two and a quarter lakhs of rupees for the foundation of a scientific library in connection with the institute of science now being erected in Bombay. The conditions attached to this donation are that the science institute library shall be called Vasanaji Trikamji Mulji Library. A marble bust of Vasanji Trikamji Mulji and two marble tablets mentioning the amount of the donation and other particulars are to be placed in suitable positions. The Governor has publicly thanked Rao Saheb Vasanji Trikamji for his benefaction, which will enable provision to be made for the formation of an adequate scientific library in Bombay in connection with the institute of science.

WITH the adoption of the Budget for 1909–10, a system of automatic increases in salaries was inaugurated at the University of California. We learn from *Science* that an instructor's salary is to be increased automatically 20*l.* per year from 200*l.* to 300*l.*, and the salaries of assistant professors 20*l.* a year from 320*l.* up to 400*l.* The automatic