Treatment of infected soils with formalin 1 : 50 has been found efficient in checking the disease, but from the point of cheapness and efficiency steam-heating is recommended. Certain secondary effects, such as the killing of weed seeds and the destruction of insect pests in the soil, and greatly increased size and vigour of plants grown in treated soils, were also noted.

IN a recent Bulletin of the U.S. Weather Bureau the Rev. M. Saderra Masó describes an interesting series of earthquakes which occurred in the sub-province of Benguet (Luzon) in August and September, 1913. They were very numerous (about 350 occurring in little more than a month), as a rule of slight intensity, and, even with the strongest, of very small disturbed area. It is probable that they originated at a very slight depth. As the earthquakes occurred at the close of the rainy season, in a limestone district in which the annual rainfall is about 160 inches, and in which there are frequent subsidences of the ground, the author concludes that the earthquakes are neither tectonic nor volcanic in their origin, but probably due to underground rock-falls and secondary faults.

THE Meteorological Office of Canada has recently issued an interesting monograph, "Canadian Weather Forecasting," as an addendum to "Gales from the Great Lakes to the Maritime Provinces," covering the years 1905–12, prepared by Mr. B. C. Webber, under the superintendence of the director of the Meteorological Service. In a preceding monograph for the period 1874–1904 Mr. Webber suggested some aids to assist the forecast officials, and these have now been supplemented, and the tables show, in addition, the percentages of low-pressure areas causing storms in various months and districts and the directions in which the depressions moved, together with other useful information. November is the most stormy month on the Great Lakes during the season of navigation, but January and February are the stormiest in the Gulf of St. Lawrence and the Maritime Provinces; March is not an unusually stormy month. Within the eight years in question the area of the Canadian weather map has been much enlarged, and knowledge of movements of high- and low-pressure areas has been enhanced by the introduction of a daily meteorological chart of the northern hemisphere since January 1, 1912. It is, however, reluctantly admitted that the advancement of weather forecasting has been more or less disappointing. The author considers that the study of the upper air and of solar physics will eventually undoubtedly assist in solving some of the vexed problems which confront the meteorologist.

THE necessity of bringing modern mathematical concepts within the range of study of comparatively elementary students has led Mr. C. Elliott, of King Edward VII. School, Sheffield, to produce a book of 116 pages, entitled "Models to Illustrate the Foundations of Mathematics" (Edinburgh: Lindsay and Co., 1914, price 2*s.* 6*d.*). It consists of four chapters dealing respectively with the meaning of correspondences, multiplexes, spaces defined as ordered multiplexes, correspondence of operands to functions, and multiple correspondence. Although a selection of classificatory models was exhibited at the 1912 Mathematical Congress, the use of the term "models" in the title of this book may perhaps be rather misleading, for it consists mainly of definitions and explanations, and the nearest approach to models generally consists in mere references to illustrations of classes, like and unlike things, correspondences, and so forth, where these can be exemplified by objects of everyday life. The question as to how far the subject can be understood and appreciated by schoolboys is a very interesting one.

THE first of a series of illustrated articles descriptive of a 300,000-h.p. hydro-electric plant on the Mississippi appears in the *Engineer* for May 1. These works are situated at Keokuk, on the Iowa side of the river, about 130 miles north of the mouth of the Missouri River, and 137 miles from the city of St. Louis. One purpose of the power development is to deliver current in large quantities to distant points by transmission lines up to 200 miles in length, and in August last the supply of current to St. Louis was commenced. The electric light and tramway company of St. Louis has contracted to take 60,000 h.p. for a term of ninety-nine years. The works comprise three main sections. First, a dam 4700 ft. long, extending from the east bank at Hamilton to within a thousand feet of the west bank at Keokuk. Secondly, a power-house, extending downstream from the end of the dam for a length of 1700 ft. Thirdly, a dam extending from the lower end of the power-house to the west bank, forming the fore-bay and having a large single-lift lock for navigation. The total length of monolithic concrete construction is more than two miles. The working head of water available for the machines ranges from 23 to 40 ft.

OUR ASTRONOMICAL COLUMN.

MAY METEORS.—It is hoped that favourable conditions will be experienced for the observation of Coronid meteors in May. Mr. W. F. Denning directs attention to this shower in *Astronomische Nachrichten*, No. 4726. In recent years he found the chief radiant point to be about 246°+30° near ζ Coronæ, and a few degrees west of ρ Herculis. According to his observations in 1903 and 1911, the meteors were white, swift, and usually trainless. The most suitable time for their observation is between May 18 and 26, and the absence of the moon will render the observation more easy.

COMET 1914*a* (KRITZINGER).—The following is the continuation of the ephemeris of comet 1914*a* (Kritzinger) which was given in this column last week, the information being gathered from Prof. H. Kobold's communication to the *Astronomische Nachrichten*, No. 4729:—

12*h.* *M.T. Berlin.*

	R.A. (true) h. m. s.	Dec. (true) ° ′ ″	Mag.
May 7 ...	18 46 9	... +23 29·0	
8 ...	50 57	... 24 25·9	... 8·5
9 ...	55 45	... 25 21·9	
10 ...	19 0 34	... 26 16·7	
11 ...	5 24	... 27 10·4	
12 ...	10 14	... 28 2·8	... 8·4
13 ...	15 4	... 28 53·9	
14 ...	19 19 54	... +29 43·6	

The comet is situated near the boundaries of the four constellations, Hercules, Vulpes, Cygnus, and Lyra.

A CONVENIENT COMPARISON SPECTRUM.—For the study of both terrestrial and celestial spectra, it is useful for many purposes to photograph a comparison spectrum alongside the spectrum under investigation. The spectrum of iron is most generally used as the lines are well distrubuted along the spectrum, are sharp, and their wave-lengths are accurately determined. The iron, however, may not be pure, so several strange lines may appear in the spectrum, and these have to be investigated. Dr. Joseph Lunt, in searching for a convenient means of obtaining the spectrum of cyanogen has incidentally found that the spectrum of lead pencils gives an extremely fine set of lines, very sharp, well distributed along the spectrum, exhibits a remarkable constancy of spectroscopic composition, and consists of lines which are almost without exception present in the solar spectrum, the wavelengths of which have been well determined. The account of this investigation on the spectra of graphites and lead pencils is given in vol. x. of the Annals of the Cape Observatory, part iv., and should be read by all those who work with the spectroscope. A plate reproduces the lead pencil spectrum from λ 4071·91 to λ4742·98. The sharp metallic lines are for the most part due to iron, titanium, vanadium, chromium, and the alkaline earths, barium, strontium, and calcium, while the spectrum shows also the presence of the rarer elements, gallium, scandium, and yttrium, as well as silicon, magnesium, and manganese. The carrier of a lead pencil thus possesses a small portion of the very rare elements gallium and scandium.

REPORT OF HARVARD COLLEGE OBSERVATORY.—The report of the director of the Astronomical Observatory of Harvard College for the year ending September, 1913, gives one a good idea of the great field of work projected and of the large amount of work accomplished during the past months. It is hoped that means will be found to concede to the director's wishes stated in this report by increasing the income of the observatory, for the situation is not very satisfactory when, as Prof. Pickering states, "during the last twenty years the income of the University has more than doubled, while that of the observatory has diminished rather than increased." The report shows, in the first instance, the progress made in the Henry Draper memorial department, the revised Draper Catalogue being the principal work. More than half the sky has been covered, and 100,155 stellar spectra have already been classified. The 11-in. Draper telescope, in the hands of Prof. W. H. Pickering, has produced valuable results, among which may be mentioned the periodic changes in form of the discs of Jupiter's satellites. The work of the Boyden department at the Arequipa Station, of the Blue Hill Meteorological department (recently transferred to Harvard University), etc., are all briefly summarised, and indicate the wide range of activities.

THE SCHILOWSKY GYROSCOPIC TWO-WHEELED MOTOR-CAR.

A LARGE two-wheeled motor-car, constructed from the design of Dr. Schilowsky, a Russian Doctor of Laws, by the Wolseley Tool and Motor Company, Ltd., was given a trial run in London last week. The car is a six-seated car, and it carried six people as it slowly made a circuit of Regent's Park. The gyroscopic mechanism is placed in the cupboard under the middle four seats. This consists of a heavy gyrostat rotating at the moderate speed of 1100 revolutions a minute, and driven by an electric motor of $1\frac{1}{2}$ horse-power. The axis is vertical, and it is mounted in a ring supported on transverse trunnions, so that it may tilt in a fore and aft plane. As the car is necessarily unstable on its two wheels, the gyrostatic ring must also be carried unstably for it to have corrective influence. If, as a ship, the car could have been carried stably, then the gyrostatic ring would also have to be stably mounted. If one is stable and the other unstable then the gyrostat operates in the opposite sense to that intended.

The unstably mounted gyrostat will not maintain the car in its upright position for long, as the precessional oscillations increase in amplitude. Dr. Schilowsky counteracts this by an ingenious piece of mechanism. Driven by worm-gearing from the gyrostat axle are two spur wheels, each just out of gear with a segmental rack, but capable of being brought into gear by a heavy pendulum which feels any tilting of the car away from the dynamical vertical. This is only allowed to engage at such times as the gyrostat ring is approaching the neutral position. During this time the engagement causes a hurrying of the precession and a consequent steadying of the motion. At the moment the neutral position is reached the pinion and rack are disconnected by a snap mechanism reminding one of that used for closing the valves of a Corliss engine. One pendulum controls the engagement when the gyrostatic ring is approaching the neutral position from one side, while the other effects the control on the other side of the neutral position. Either alone might be used, but the two alternate with one another and maintain a more continuous control. It is a curious fact that the controlling mechanism is more easily adjusted so as to maintain the equilibrium of the car when it is turning in the opposite direction to the rotation of the wheel. For turning in the same direction more exact adjustment is necessary. A working model railway on this system has been presented by Dr. Schilowsky to the South Kensington Museum, where it may be seen by anyone interested.

The car weighed three tons, having been designed for running on a rail, while the engine was one of the maker's standard 16-h.p. engines. This was insufficient in power to drive the heavy car, as well as the motor of the flywheel, more than about four miles an hour. At this speed and at rest or moving backwards the car maintained its position with passengers jumping on or off. When a new load was applied to one side the car moved almost imperceptibly so as to raise it and maintain the centre of gravity over the line of support as has already been made familiar by Mr. Brennan with his monorail.

It will be interesting to see how the car behaves when a more powerful engine is fitted and higher speeds are possible. The inventor is, of course, aware of the very great couple, ordinarily resisted by the four-wheel support of the motor-car when ordinary curves and speeds are negotiated together, which he will have to contend with in like circumstances. The demonstration in the Regent's Park did not show that the gyrostatic control then existing would be sufficient for this, but it did show, and that perfectly, that the first step has been successfully accomplished. It may be worth while to add that the bicycle balance is not used, the gyrostatic control being independent of speed or direction of motion.

C. V. BOYS.