therapeutics, both from the theoretical and practical sides, and it will show practitioners what can be accomplished by hypnotic suggestion.

ALTHOUGH a large amount of work has been published upon the physical properties of dilute solutions of single electrolytes, the experimental study of solutions of mixed electrolytes, notwithstanding its great interest from the point of view of the electrolytic theory of dissociation, has not been worked at so extensively. The theoretical discussion of such mixtures leads to a set of equations somewhat difficult to solve; but since Prof. MacGregor, of the Dalhousie College, Halifax, Nova Scotia, showed how to solve these equations by a simple graphical method, systematic researches have been carried on at this college on the properties of such mixed solutions of electrolytes. A recent paper, by Mr. J. Barnes, in the *Transactions* of the Nova Scotian Institute of Science, deals with the depression of the freezing point in salts containing a common ion; and the results show that in the case of mixtures of potassium chloride and sodium chloride, and of sodium chloride and hydrochloric acid, and of all three, it is possible, with the ionisation coefficients obtained by Prof. MacGregor's method, and on the assumption that the molecular depression of an electrolyte in a mixture is the same as it would be in a simple solution of the same total concentration, to predict the depression of the freezing point within the limits of the error involved in observation and calculation.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*, ♂) from India, presented by Lady Malcolm, of Poltalloch; a White-crested Tiger Bittern (*Tigrisoma leucolophum*) from West Africa, presented by Mr. W. F. Marshal; four Chaplin Crows (*Corvus capellanus*) from Southern Persia, presented by Mr. B. T. Ffinch; a Cinereous Vulture (*Vultur monachus*), European, presented by Mr. W. E. Found; a Common Boa (*Boa constrictor*) from South America, presented by Mr. F. H. Preston; two Egyptian Foxes (*Canis niloticus*) from North Africa, two Prevost's Squirrels (*Sciurus prevosti*) from Malacca, a Ring-tailed Coati (*Nasua rufa*) from South America, two Porto Rico Pigeons (*Columba squamosa*) from the West Indies, a Sclater's Cassowary (*Casuarius sclateri*), two Red-sided Eclectus (*Eclectus pectoralis*) from New Guinea, four Loggerhead Turtles (*Thassochelys caretta*) from Tropical seas, twelve Elegant Terrapins (*Chrysemys scripta elegans*), seventeen Lesueur's Terrapins (*Malacoclemmys lesueuri*) from North America, twelve Adorned Terrapins (*Chrysemys ornata*) from Central America, seven Reeves's Terrapins (*Damonia reevesi*) from China, deposited; five Hairy Armadillos (*Dasypus villosus*) from La Plata, four Common Indian Starlings (*Sturnus menzbieri*), a Bengal Fox (*Canis bengalensis*) from India, two Meyer's Parrots (*Poeocephalus meyeri*) from South-east Africa, four Australian Sheldrakes (*Tadorna tadornoides*), five —— Wood Swallows (*Artamus sordidus*) from Australia, six Sulphury Tyrants (*Pitangus sulphuratus*), a Black-pointed Teguexin (*Tupinambis nigropunctatus*) from South America, purchased; a Crowned Lemur (*Lemur coronatus*), six Common Wolves (*Canis lupus*), a Llama (*Lama peruana*) born in the Gardens.

OUR ASTRONOMICAL COLUMN

UNPUBLISHED OBSERVATIONS AT RADCLIFFE OBSERVATORY, 1774–1838.—In a pamphlet containing a reprint of an article in *Monthly Notices*, vol. lx. pp. 265–293, Dr. A. A. Rambaut, Radcliffe observer at Oxford, calls attention to a very valuable collection of astronomical observations which are preserved at the Radcliffe Observatory, but have not been reduced or published. Two of the Oxford astronomers, Profs. Hornsby and Robertson, spent a large amount of labour in reducing Bradley's observations made at Greenwich from 1750–1762, and further continued his work by themselves maintaining a systematic and regular series of observations for sixty-five years, from 1774–1838. These were all made with the instruments supplied by Bird to the Radcliffe Observatory at its installation, consisting of two quadrants each of 8-feet radius, a transit instrument of 8-feet focal length, and a zenith sector of 12-feet focus. The observations have all been methodically copied in a similar form to their printed edition of Bradley's observations, and contain altogether about 130,000 transits and 60,000 zenith distances. Dr. Rambaut states that his staff at present could not undertake the reductions; but, in order to show the extreme importance of the data available, he has made a selection of them, giving the probable errors compared with other observers.

The planets and sun have received considerable attention, there being about 8000 observations of the sun alone, a number little less than that on which Leverrier's tables were founded, and, moreover, covering the period when the corrections to the mean longitude of the sun, as deduced at Greenwich, Paris and Königsberg, are most discordant.

The working list of stars includes about 4870 of those observed by Flamsteed and Bradley, so that direct comparisons could be made in the reductions. Their great value would be specially apparent in the question of proper motions, filling up as they do the long gaps between Bradley and Piazzi, or Bradley and Pond. Specimens of Dr. Rambaut's reductions are given in the paper to show the high degree of accuracy attained by the observations.

MAXIMUM DURATION FOR A TOTAL SOLAR ECLIPSE.—Mr. C. T. Whitmell, president of the Leeds Astronomical Society, recently read a paper showing the results of calculations he had made in the endeavour to ascertain what is the maximum duration possible for a total solar eclipse (*Monthly Notices*, R.A.S., vol. lx. pp. 435–441). After considering the several effects of the varying distances of sun and moon from the earth in determining size of umbra and velocity of shadow, he cites the following five conditions as required for maximum duration of totality:—

(1) The new moon, at or very near a node, must also be at the most favourable perigee possible; (2) the sun must be at apogee; (3) during totality, which should be observed at local noon, the moon's shadow should run along a parallel of latitude, in order that the diurnal movement of the observer may be for the time parallel to the motion of the moon, thereby producing its full effect in detaining him within the umbra; (4) the sun and moon should be in the zenith, so that the umbra may be as large as possible; (5) the observer should be on the equator, so that his linear velocity may be as great as possible.

Of these, owing to the sun and moon *not* moving in the plane of the celestial equator, it is impossible that (4) and (5) can be simultaneously fulfilled; (5) is more favourable than (4).

Taking the moon's horizontal parallax as 61′ 22″,
" " earth's radius as 3963 miles,
" " moon's " 1081·5 miles,

and using the present accepted *eclipse* values of the diameters of the sun and moon, the maximum totality will occur near the middle of July, at noon, in geocentric north latitude about 4° 52′, and will last about 7m. 40s., the sun being at apogee with a parallax of 8″·70. This is on the assumption that the declinations of the two bodies are considered practically constant during totality. The author gives the following list of long duration eclipses, calculated by Mr. Crommelin from Oppolzer's data:—

Date	Duration at noon	Position of noon point	
		Longitude	Latitude
	h. m.	°	°
1901 May 18 ...	6 41·6 ...	97 E. ...	2 S.
1919 May 29 ...	7 5·9 ...	18 W. ...	4 N.
1937 June 8 ...	7 19·9 ...	131 W. ...	10 N.
1955 June 20 ...	7 24·5 ...	117 E. ...	15 N.
1973 June 30 ...	7 19·6 ...	6 E. ...	19 N.
1991 July 11 ...	7 10·7 ...	105 W. ...	22 N.