shortly afterwards taken over by the Government, and two gardens established, a "European" and a "Tropical." But it was only within about the last thirty years that a serious attempt was made, under Sir J. B. Grant, to make the Gardens of economic value to the Colony, during which time much has been done to determine what foreign importations are most suitable to the climate. There are now six larger or smaller Gardens, viz. the Parade, King's House, Hope, Hill, Castleton, and Bath Gardens, varying greatly in their climatal conditions. Mr. Fawcett estimates that the native flora of the island includes about 450 ferns, and 2180 species of flowering plants.

ATTENTION has been previously called in our columns to Prof. Felix Plateau's observations of the way in which flowers attract insects (*Bulletin de l'Académie Royale de Belgique*), from which he inferred that the presence or absence of brightly-coloured corollas possessed little or no influence on their insect visitors. These researches are concluded in the current number of the *Bulletin* (iii. 34). Repeated experiments on seventeen species of plants, all genuinely anemophilous, prove that it is sufficient to place on the greenish or brownish inconspicuous flowers some artificial nectar, represented by honey, in order to attract numerous insects. Moreover, it appears (both from the author's personal observations and from previous writings) that insect visits, often frequent, have been observed on ninety-one forms of entomophilous plants having flowers devoid of conspicuous colour, viz. forty-one with green, thirty-eight with greenish, and twelve with brown or brownish flowers. The author has verified the coloration for seventy-two of these plants, and has himself observed the visits of insects to sixty-three, or more than two-thirds of them. Prof. Plateau concludes that insects are little affected by the presence or absence of brilliantly coloured floral organs; what they seek is the pollen or nectar, and in finding these their sense of vision is merely accessory; while, on the other hand, they are guided with certainty by some other sense, which can only be that of smell.

AN important series of investigations has recently been published in the *Annales de l'Institut Pasteur*, by Dr. Paul Remlinger, on the artificial communication of typhoid fever by the alimentary tract. Hitherto it has been customary to infect animals with the typhoid bacillus by introducing this organism into the peritoneum, but in consequence of the attention which has lately been directed to the danger of typhoid being disseminated through the direct watering of vegetables with sewage, Dr. Remlinger experimented on the possibility of infecting rabbits and rats with typhoid by feeding them on vegetables soaked with typhoid bacilli. These experiments showed that it was possible to induce typhoid fever in rats and rabbits by this means, and Chantemesse has not only confirmed Remlinger's results, but states that he has succeeded in infecting monkeys with typhoid in a similar manner. The following experiment gives some idea of the results obtained by Remlinger in this interesting inquiry. A rabbit commenced to eat typhoid-soaked vegetables on August 30; two days later its temperature rose and later on it became thin and apathetic, and on September 7 the supply of typhoid bacilli was stopped; on September 15 symptoms of diarrhœa made their appearance, and blood taken from the animal gave a positive reaction with the sero-typhoid test; a few days later the temperature became normal, and the animal gradually recovered, but on September 30 its blood still gave a positive reaction with the above test. Experimental typhoid induced in this manner in rats resembled very closely the symptoms observed in the case of rabbits. It is, however, necessary in order successfully to infect animals with typhoid by this means, to make them frequently swallow large quantities of the bacilli.

THE number of *Isis* (Dresden) for the first half of 1897 contains a paper, by Dr. P. Menzel, on the "Tertiary Flora of the 'Jesuitengraben' at Kundratitz," a very rich layer, from which a number of new species are described. A plate accompanies the paper.

THE Report of the Director of the Botanical Survey of India for 1896–97 includes reports from all the Directors of Departments except that of Southern India. The results will shortly be dealt with of the botanical exploration, by Lieut. Pottinger, of a portion of the valley of the Irrawaddy, a country hitherto absolutely unknown. A synopsis is given of the flora of Western India as far as the Tiliaceæ.

THE Tuesday evening science lectures at the Royal Victoria Hall, Waterloo Road, during January, will be as follows:—January 4, "Coal," by Mr. W. F. Rudler; January 11, "Diamonds," by Prof. H. A. Miers, F.R.S.; January 18, "Through the New Gold Fields of Alaska to Bering Strait," by Mr. H. de Windt; January 25, "Mars as a World," by Mr. R. A. Gregory.

PHILIP'S revolving planisphere is well known to be a very handy and serviceable means for finding the constellations visible at any time. A more substantial form of the contrivance, with an adjustable calendar combined, has just been published by Messrs. George Philip and Son. The arrangement is made so that it will stand alone, or it may be hung from a wall. It is thus a suitable ornament for the astronomer's desk, or for the observatory.

THE additions to the Zoological Society's Gardens during the past week include a Mandrill (*Cynocephalus mormon*, ♂), a Mona Monkey (*Cercopithecus mona*, ♂), two Green Monkeys (*Cercopithecus callitrichus*, ♂ ♂), a —— Hawk Eagle (*Spizaetus* ——), seven African Walking Fish (*Periopthalmus koelreuteri*) from West Africa, presented by Dr. H. O. Forbes; a Sykess Monkey (*Cercopithecus albigularis*, ♂) from West Africa, pressented by Mr. Henry Curnow; a Binturong (*Arctictis binturong*) from Malacca, presented by Mr. W. W. Skeat; a Blotched Genet (*Genetta tigrina*) from South Africa, presented by Mr. J. E. Matcham; a Ruddy Ichneumon (*Herpestes smithi*) from India, presented by Colonel F. Morison; two Grey Struthideas (*Struthidia cinerea*) from Australia, presented by Mr. R. Phillipps; a Crimson-eared Waxbill (*Estrelda phœnicotis*) from West Africa, presented by Miss Aves; a Thar (*Capra jemlaica*, ♂) from the Himalayas, six White Pelicans (*Pelecanus onocrotalus*) from Egypt, deposited; three Coscoroba Swans (*Coscoroba candida*) from Antarctic America, a Macqueen's Bustard (*Houbra macqueeni*) from Western Asia, purchased.

OUR ASTRONOMICAL COLUMN.

NEW DOUBLE STARS.—The discovery of new double stars at the Royal Observatory, Cape of Good Hope, by Mr. R. T. A. Innes, is proceeding apace, and Dr. Gill publishes in *Astr. Nach.*, 3462, a fourth list of such objects. The number of stars given is twenty-nine, making the total now discovered 259. The distances of the components range in this last list from 0″·5 to 5″.

NEW VARIABLE STARS.—More than once in this column it has been shown that useful astronomical work can be done with instruments of only moderate size, backed up by steady observation; but no one has done more to emphasise this fact than Dr. Anderson, of Edinburgh, first with his discovery of Nova Aurigæ, and later by a close scrutiny of stars to detect any variability. From observations made with his 2¼-inch refractor, he points out in *Astr. Nach.*, 3461, that a star in Aquila, not mentioned in the Bonn *Durchmusterung*, but whose position (possibly wrong to the extent of 1′) is R.A. 19h. 31m. 10s. Decl. + 11° 23′, has proved to be variable

Again, in *Astr. Nach.*, 3463, he gives notice of two new variables—probably of short period—B.D. + 67°·1124 in Draco, and B.D. + 30°·1329 in Gemini, with respective positions: R.A. 19h. 9m. 54s., Decl. + 67° 2′·4, and R.A. 6h. 37m. 50s., Decl. + 30° 25′.

All the positions are given for the epoch 1855.

VARIATIONS IN THE SPECTRUM OF NEBULA IN ORION.—Often has severe criticism put scientific facts on a firmer basis, and such might be said to be the case with Dr. Scheiner's doubts concerning Prof. Campbell's observed variations in the spectrum of different regions in the Orion nebula, made in 1893. To test the accuracy of some specific observations, Prof. Campbell has called in the assistance of three of his colleagues (Prof. Schaeberle amongst them), and, with the aid of the 36-inch refractor and an efficient spectroscope, different regions of the nebula have been examined to observe the behaviour of the three principal nebular lines.

The mode of making the observations was to use a coarse micrometer wire, occulting each of the lines in turn, so as to determine the relative brightness of the remaining two, when all three are observable.

The following are the results, which in the main all the observers are agreed upon:—Central part of nebula (Trapezium region): the three nebular lines all conspicuous, the line λ 5007 being the brightest, whilst the lines λ 4959 and λ 4861 are nearly of the same intensity as each other.

In the region surrounding the star Bond, No. 734, the line λ 4861 was the only one visible, the other two lines having disappeared; whilst in the region south-west of the Trapezium all three are visible, but the line λ 4861 is still the brightest.

No doubt photographs will be secured whilst Orion is well situated, and so further establish these observations made visually.

WINNECKE'S PERIODIC COMET.—One is reminded on reading the life-work of the late Dr. Winnecke, in the last number of NATURE, that had he lived a few weeks longer he would probably have seen another return of the periodic comet which bears his name, for it is due at perihelion on March 20, 1898, but of course will be better situated for observation some time before this. The elements and ephemeris as given by Mr. C. Hillebrand in *Astr. Nach.*, 3447, are as follows:—

Elements.

	26 October. 1897.	15 March, 1898.	
M =	325° 24′ 26″·7	359° 3′ 52″·0	
π =	274 14 33·3	274 14 39·0	1900
Ω =	100 53 34·3	100 53 11·5	1900
i =	16 59 34·4	16 59 33·8	1900
φ =	45 37 35·6	45 37 14·7	
μ =	608″·3483	608″·5559	

Ephemeris.

1897-98.	R.A. h. m. s.	Decl. ° ′	log *r*.	log Δ.	1 : *r*²Δ².
Dec. 21	14 38 14	− 1 6·6	0·19028	0·28225	0·113
25	51 6	2 2·3	17921	26885	127
29	15 4 28	2 58·6	16788	25550	142
Jan. 2	18 24	3 55·3	15629	24228	160
6	32 53	4 52·3	14446	22929	179
10	15 47 58	5 49·3	13242	21659	200
14	16 3 40	6 46·1	12016	20432	224
18	20 0	7 42·1	10773	19259	251
22	36 59	8 37·0	09518	18151	280
26	16 54 36	9 30·3	08256	17122	311
30	17 12 49	10 21·3	06993	16184	344
Feb. 3	17 31 41	− 11 9·0	0·05738	0·15349	0·379

The best time for making a search will be early in the morning, shortly before sunrise, from about now till early in February. The comet is never visible to the naked eye, and will at first be faint with the aid of a telescope; its apparent path is in a south-easterly direction through Virgo, Libra, Scorpio, Sagittarius, and Capricorn.

KEKULÉ MEMORIAL LECTURE.

AT an extra meeting of the Chemical Society, held on Wednesday, December 15, Prof. F. R. Japp, F.R.S., delivered a memorial lecture in honour of the eminent German chemist, Friedrich August Kekulé, whose death occurred in July 1896. The lecturer said that Kekulé's supreme merit lay in his contributions to theoretical chemistry. His greatest achievements in this department were the doctrine of the linking of atoms in terms of their valency, and, growing out of this, the theory of the structure of organic molecules, both in open-chain and in closed-chain compounds. These were not recondite theories, hidden away in the depths of the science; they were organic chemistry itself, and were learnt by students on their first introduction to the subject. Kekulé acknowledged that his theories were based on Gerhardt's type theory, on Williamson's theory of polyvalent compound radicles and multiple types, and on Odling's theory of mixed types, which was a deduction from Williamson's theory. Less consciously, perhaps, his opinions were influenced by E. Frankland's theory of the valency of elementary atoms, and by Kolbe's speculations on the constitution of organic compounds. Kekulé developed these ideas, which he found scattered throughout the writings of his predecessors, added to them, and welded the whole into the coherent system which formed our present theory of the structure of organic compounds. In Kekulé's model of the carbon atom "the four units of affinity," to quote his own words, "radiate from the sphere representing the atom so that they end in the faces of a tetrahedron." This model was destined to play an important part in the development of theoretical chemistry; it was the foundation of stereochemistry. Kekulé's benzene theory was the crowning achievement, in his hands, of the doctrine of the linking of atoms; it was the most brilliant piece of scientific prediction to be found in the entire range of organic chemistry. What Kekulé wrote in 1865 had since been verified in every essential particular. Not only had the various substitution derivatives been discovered in the number and with the properties required by the theory, but various observations which appeared to contradict this theory had been proved erroneous. Moreover, the theory had shown itself to be capable of boundless development, and there seemed to be no limit to the fruitfulness of Kekulé's conception of closed chains or cycloids. The extensions of the idea, of which extensions Erlenmeyer's naphthalene formula and Dewar's formulæ for pyridine and quinoline were among the earliest instances, had gone on increasing in a rapid geometrical ratio, until, at the present day, the literature dealing with cycloids, although of so recent growth, was more than twice as voluminous as that of the paraffinoids. But even in the undeveloped state of the subject prior to Kekulé's theory, the facts were apparently so intricate and so unconnected that few chemists could claim to have mastered them. The theory appeared; the previously unmarshalled facts fell into their proper places; and not only this, but it was possible to say whether, in any given section of the subject, the facts were complete or only fragmentary. The debt which both chemical science and chemical industry owed to Kekulé's benzene theory was incalculable. As regards the former, three-fourths of modern organic chemistry was, directly or indirectly, the product of this theory; and as to the latter, the industries of the coal-tar colours and the artificial therapeutic agents, in their present form and extension, would be inconceivable without the inspiration and guidance of Kekulé's fertile idea. By the accuracy of his predictions he had done more to inspire a belief in the utility of legitimate hypotheses in chemistry, and had therefore done more for the deductive side of the science than almost any other investigator. His work stood pre-eminent as an example of the power of ideas.

RECENT RESEARCHES ON TERRESTRIAL MAGNETISM.[1]

II.

UP to this point we have regarded the system of magnetic forces in play upon the surface of the earth as constant. I have already hinted that this is not the case, and that the difficulties of our investigation are immensely increased by the fact that all the phenomena with which we deal are in a state of flux. Nothing is fixed from year to year, from day to day, from hour to hour. It is hardly too much to say that at times almost every minute brings with it changes which it is the business of the magnetician to investigate and explain. For the moment, however, I wish to fix attention only upon the secular change to which I have already referred. Not only does the angle which the magnet makes with the geographical meridian vary, but the dip also increases and diminishes in turn.

[1] The "Rede Lecture" delivered in the Senate House, Cambridge, on June 9, by Prof. A. W. Rücker, F.R.S. (Continued from p. 163.)