A RECENT number of the *Electro-Chemist and Metallurgist* contains an able article by Mr. W. C. D. Whetham on the present position of the theory of electrolysis. The investigations which led up to the theory of electrolytic dissociation and the modern convective views of electrolysis are traced, and it is clearly shown that a vast number of important observations are easily explained by the modern views. As the author points out, experiments on the comparison of the electrical and the osmotic values of ionisation are of little use from the point of view of the controversialist seeking arguments for or against the ionic dissociation theory. The deviations between the two values are, however, in most cases easily explainable by a consideration of the interionic forces, which probably exert an effect even at dilutions at which the intermolecular forces are negligible, and, further, of the complex ions which are so often formed in solution.

THE additions to the Zoological Society's Gardens during the past week include a Red-fronted Gazelle (*Gazella rufifrons*) from Senegal, presented by Lieut. F. P. Crozier; two Common Mynahs (*Acridotheres tristis*) from India, presented by Mr. H. Munt; a Hawk-billed Turtle (*Chelone imbricata*) from tropical seas, a Testaceous Snake (*Zamenis flagelliformis*) from South United States, deposited.

OUR ASTRONOMICAL COLUMN.

BRIGHT METEORS.—An exceedingly bright meteor was observed by Mr. W. Moss at South Kensington at about 11.15 p.m. on Saturday. Although not looking in the direction of its path, Mr. Moss's attention was directed to the meteor by its remarkable brightness, which he estimated as exceeding that of Jupiter. The part of the path that he observed was about 5° long, and commenced at a point near to the equator, and about 8° E. of δ Orionis. The same object was independently observed by Mr. Mills, who describes it as the brightest he has yet seen, and states that it first appeared about 5° due east of γ Orionis, and, travelling in a south-easterly direction, appeared to burst when approximately 8° or 10° to the N.E. of Rigel.

Several meteors, six of which were probably Leonids, were observed by Mr. W. E. Rolston at South Kensington during an intermittent watch which lasted from 10 p.m. on Saturday until 4.30 a.m. on Sunday. The brightest of the six was one which appeared at about 3.15 on Sunday morning in R.A. 7h. 10m. Dec. +6°, and disappeared at R.A. 6h. 30m., Dec. +5°, leaving behind it a green broken trail which lasted for about two seconds. The same observer also saw more than 50 Leonids during a watch from 2.15 to 3.45 on Monday morning. These meteors presented the characteristics of the November shower inasmuch as they were exceedingly swift and left broken trails of a reddish hue.

Mr. A. M. Davies, writing from Amersham, Bucks, states that about 10.45 p.m. on November 14 he saw a brilliant meteor with a train move westwards in an almost horizontal path at about the altitude of η Ursæ Majoris.

SEARCH-EPHEMERIS FOR FAYE'S COMET.—Herr E. Strömgren publishes a further portion of his ephemeris for Faye's comet in No. 3913 of the *Astronomische Nachrichten*. This ephemeris takes the time of perihelion passage as June 3·64, and is given below:—

Ephemeris 12*h*. (*M.T. Berlin*).

1903	α	δ	log *r*	log Δ
	h. m. s.	° ′		
Nov. 15	9 42 59	+1 45·0	0·3565	0·3288
,, 19	9 46 23	+1 11·5		
,, 23	9 49 25	+0 39·5	0·3655	0·3180
,, 27	9 52 3	+0 9·3		
Dec. 1	9 54 16	−0 19·0	0·3743	0·3067
,, 5	9 56 5	−0 45·1		
,, 9	9 57 29	−1 8·8	0·3830	0·2952
,, 13	9 58 26	−1 30·1		
,, 17	9 58 57	−1 48·7	0·3916	0·2840
,, 21	9 59 1	−2 4·3		
,, 25	9 58 38	−2 16·9	0·4000	0·2736

THE SECULAR VARIATION OF STARLIGHT.—In a research on the secular variation of starlight, that is, the minute yet regular variations in magnitudes which take centuries to become evident, Mr. J. E. Gore has compared the present magnitudes of a number of stars with their respective magnitudes as recorded by Al-Sufi and Ptolemy. Recognising the important bearing of these variations on the theory of stellar evolution, he selected a number of stars having spectra of the first and second types for the comparison, and has published the details of his research in the November number of the *Observatory*, giving in each case the type of spectrum, the recently estimated magnitude, and the magnitude as recorded by Al-Sufi and Ptolemy, together with remarks on the validity of the latter. Mr. Gore has prepared two lists, one of which contains the data concerning 26 stars which are apparently decreasing in magnitude; the other deals with 20 stars which show an apparent increase. He points out in his remarks that in many cases the stars which are decreasing in magnitude have spectra of Pickering's "A" type, which, according to Sir Norman Lockyer's classification, would place them amongst those which are decreasing in temperature, and therefore, presumably, in magnitude; a well-known example of this agreement occurs in the case of β Leonis, which, according to Sir Norman Lockyer, must be placed on the *descending* side of his temperature curve, and, according to Mr. Gore's result, has decreased in magnitude from 1·0 in Al-Sufi's time to 2·2 at the present day.

SOLAR OBSERVATIONS AT LYONS OBSERVATORY DURING 1902.—In his annual report for 1902, M. J. Guillaume, director of the Lyons Observatory, states that the solar surface was observed on 236 days during the year, and was reported as being free from spots on 161 days. Thirty-three groups of spots were observed, their mean latitude being 21°·0, an increase of 5°·3 over last year's value. According to the Lyons observations the last sun-spot minimum took place at the end of 1901.

The observations of faculæ show an increase in the number of groups, and the area covered by them, over the two preceding years; they also indicate that the mean latitudes of spots and faculæ do not show a parallel variation, and from this, and the differences exhibited in their persistence and activity, M. Guillaume arrives at the conclusion that it is really the faculæ which indicate the regions of principal activity, the spots being only of secondary importance in this matter. This conclusion is supported by the various tables which accompany the report in the November issue of the *Bulletin* de la Société de France.

METEOROLOGICAL OBSERVATIONS WITH KITES AT SEA.

THE following extracts from a communication to our contemporary *Science* by Mr. A. L. Rotch indicate the rapid progress which is being made in the exploration of the upper air by means of kites from ships, and a scheme for further investigation.

The first to repeat the pioneer experiments of the late Mr. Sweetland and the writer during their voyage across the North Atlantic in 1901 were Messrs. Berson and Elias, of the Prussian Meteorological Institute, who, last August, made a voyage from Germany to Spitzbergen and back, achieving satisfactory results with their kites. Meanwhile Prof. Köppen, of the Deutsche Seewarte, carried out analogous experiments on the Baltic Sea. About the same time, Mr. Dines, aided by grants from the Royal Meteorological Society and the British Association, employed a small steamer for kite-flying off the west coast of Scotland, in connection with a fixed station on land.

Meteorological kites have recently been flown from steamboats on Lake Constance by Count von Zeppelin and Prof. Hergesell on some of the term-days of the international balloon ascensions. Similar experiments upon the smaller lakes of Prussia and Russia have also shown that kites may be rendered nearly independent of the wind even in the interior of the continents.

A most remarkable campaign has been conducted by M. Teisserenc de Bort, who, with the aid of Scandinavian colleagues, established last summer a kite-flying station in Jutland, Denmark, where aërial soundings were made day and night, wind permitting, during nine months. After the termination of this work the apparatus was transferred to a Danish gunboat, and on a cruise in the Baltic Sea the following extraordinary results were obtained on five consecutive days:—April 22, at an altitude of 9450 feet a temperature of +14°·8 F. was found; April 23, at 13,500 feet, the temperature was 9°·1; April 24, at 4660 feet, 38°·3. On April 25 an altitude of 19,360 feet, which is probably the greatest height ever reached by a kite, was exceeded, and an instrument on the lower portion of the wire, at a height of 7415 feet, recorded 24°·4. In this flight the total length of the wire was 38,000 feet, and the upper 4000 feet, with the highest registering instrument, broke away, but were recovered. On the morning of April 26 an altitude of 8140 feet, with a temperature of 15°·2, was obtained, and in the afternoon 13,320 feet, with a temperature of 3°·2. Since the gunboat steamed only nine and a half knots, the kites could not be flown when there was a complete absence of wind.

These various experiments amply prove the practicability of the writer's project to investigate the atmospheric strata lying above the doldrums and trade-winds, by means of kites flown from a specially chartered steamship. This plan received the approval of the International Aëronautical Congress at Berlin last year, and an application for a grant to aid its execution is now before the trustees of the Carnegie Institution. On the vessel which the Baltimore Geographical Society sent last month to the Bahamas, Dr. Fassig, of the Weather Bureau, expected to fly kites, but, owing to the substitution of a schooner for a steamer, this could not well be done, and therefore the kites were probably flown only at Nassau. These observations might serve as a starting-point for the work of the expedition proposed by the writer, which would proceed across the equator and be capable of sounding the atmosphere to the height of four miles, notwithstanding the fact that winds either too light or too strong for the kites may be encountered when the steamer is stationary.

THE COUNTY TECHNICAL LABORATORIES, CHELMSFORD.

ESSEX is one of the counties which, since the passing of the Local Taxation (Customs and Excise) Act of 1890, has devoted the whole of the funds thus provided to the purposes of higher education. At first almost the entire grant was distributed among some forty local technical instruction committees for the purpose of lectures and classes in the areas under their supervision, but by degrees the greater part has been diverted to the erection, equipment, or support of secondary and technical schools in the more important centres.

In 1892, when Sir Henry Roscoe and Prof. Meldola were members of the Essex Technical Instruction Committee, the site of an old grammar school in the centre of Chelmsford—the county town—was purchased, and part of the old school buildings were fitted up at a cost of about 300*l.* as the county laboratories for teaching biology and chemistry, the two sciences which are of greatest importance to the principal industries of the county, viz. agriculture, horticulture, dairying and fisheries. In the temporary accommodation thus provided most of the work of the past ten years has been carried on, and readers of NATURE have from time to time had an opportunity of judging its character.

From the commencement until he was appointed agricultural biologist to the Irish Board of Agriculture in the spring of 1902, the committee had the advantage of the services of Mr. David Houston as staff-teacher of biology. Mr. Houston's influence was directed towards basing the teaching of science on practical laboratory work. It thus comes about that the institution has always been known as, and still remains, the Laboratories for Technical Instruction of the County of Essex. Moreover, the subcommittee, which now has the supervision of the laboratories, a committee which, with the single exception of the chairman, entirely consists of Essex farmers, adopted plans for the new buildings, opened by the President of the Board of Agriculture on October 30, which mainly consist of laboratories and work-rooms, and include only one lecture-room in the whole institution.

The part of the old site on which the new buildings are placed is within a stone's throw of the market-place and corn exchange, and the intention is to provide, not merely a technical school for the younger men, but also a centre at which farmers and others can readily obtain scientific and practical information respecting farming and the allied industries. Thus the principal room, near the entrance on the ground floor, is the large agricultural room, provided with demonstration and work tables for the agricultural instruction of students, and also containing an agricultural museum and reference library, together with diagram frames for displaying the most recent results of agricultural experiments. The room will be kept supplied with the agricultural papers, and will serve for the meetings of farmers which are held from time to time on market days to discuss agricultural problems.

On the same floor are the rooms for the head of the chemical and agricultural department, the work-room of the assistant who has the management of the field experiments, a small physical room with dark room for optical and photographic work, the common rooms for men and women students, and one of the biological laboratories.

On the first floor is a chemical laboratory capable of accommodating twenty students at a time; each working bench is provided with drawers and lockers for four sets of students, so that eighty students can be taught in a term. All the students' benches face the demonstration table, and thus the teaching can be carried on by revision, demonstration or experimental work without the students leaving their benches. Adjoining are the balance room and store room, the latter in direct communication with the chemical lecture room, and a private laboratory for the analysis of soils, manures, feeding-stuffs, milk, &c., for farmers, a department of the work which is found to be a most potent means for spreading information.

On the same floor are some of the rooms of the biological department, but shut off from the chemical department and reached by a separate staircase. Thus horticultural students, for whom the biological staff is responsible, are kept separate from the agricultural students, for whom the chemical staff is responsible. The common room for all the male students stands between the two departments. This system of separate staircases has the additional advantage of saving room, for a striking feature of the general plan is that there is only one corridor in the whole building. The biological department includes two large laboratories, each provided with a preparation or private work-room, a lecturer's private room, a store room, and museum galleries. The two laboratories each accommodate twenty students, and, as in the chemical laboratory, the working tables all face the demonstration table and black board.

A cool, lofty and well-lighted basement serves admirably for the dairy. The accommodation includes a milk receiving room, which it is proposed to equip with separator, pasteuriser, and steam apparatus for cleaning milk churns, &c., the dairy proper, with butter churns for twelve students, a cheese-making room, a cheese-ripening room and store. A top floor of six rooms is at present used as a part of the County Education Offices, but these are to be diverted to teaching purposes at the end of two years, when it is expected that the teaching or experimental work of the laboratories will demand increased space. The whole building is lit with electricity. The electric current is also used for motive power where required, and adapted to electrolytic purposes in the chemical and physical laboratories.

Within three-quarters of a mile of the laboratories is the school garden, which has already been planted about five years. It is three acres in extent, and is provided with a students' potting shed and glass houses, and consists partly of botanical plots and partly of fruit, vegetable and flower borders for the practical instruction of gardening students in each branch of horticulture. There is no farm in connection with the laboratories; the agricultural students make excursions to well-managed farms in the neighbour-