I used to take advantage of the fact and sweep so that the stars should enter from the favourable direction.

E. E. BARNARD.

Yerkes Observatory, Williams Bay, Wisconsin, U.S.A., April 15.

A Brilliant Meteor on April 23.

A MAGNIFICENT meteor was seen here by me at 9h. 8m. this evening. Starting from near β Leonis, the body travelled, nearly overhead, to near η Draconis. The head was yellowish and distinctly pear-shaped, pouring out behind it a shimmering tail of reddish material. The flight occupied some 5 sec. or more, for I had time to direct the attention of the Misses Baxandall—with whom I was talking—to it, and they then saw quite half the flight. The matter left behind was quite bright, tapering off for some 3°, and then quickly fading away. There was no sound and no violent disruption. The meteor, in flight, reminded me strongly of the photographs of Borrelly's comet published by the Lick observers in 1903. A marked feature was the leisurely flight and the appearance of matter being poured out from the receding head.

WILLIAM E. ROLSTON.

"Broadwater," Fulbrooke Road, Cambridge, April 23.

Spectacles for Use with Observing Instruments.

I DO not remember ever reading or seeing any article on how people who wear spectacles should look correctly through capped lenses of scientific instruments, such as telescopes, spectroscopes, microscopes, &c., nor what sort of spectacles weak-sighted people should use for that purpose, whether their long-sighted or reading spectacles, or whether special lenses should be obtained for that purpose. If the latter, a special form of lens cap might be made for the correct spectacle glass to fit into at the proper distance from the lens cap—when it is known what is the proper distance. At present this subject seems to be ignored, and it may be worth the attention of opticians to make rules and give hints or advice on the subject, so that people with deficient eyesight, especially the aged, may have more pleasure in their observations. Perhaps some of your readers may be able to give some useful hints as to what they find it best to do in the circumstances gained by many years of practical experience.

J. W. SCHOLES.

Grimscar, Huddersfield, April 21.

THE REPORT OF THE COMMISSION ON UNIVERSITY EDUCATION IN LONDON.

WHATEVER may be the ultimate result of the report of the Royal Commission on University Education in London, there can be no doubt that the Commissioners have performed, and performed admirably, a much-needed task. For success in any great enterprise it is essential that those who are engaged in it should have a clear mental vision of what they want. It need not be precise in detail, but it must be definite in outline.

The Commissioners have produced for the first time a faithful sketch of what the University of London may and should be. It is the conception of statesmen, and not merely of educationists interested chiefly in their own subjects, their own institutions or their own degrees. It is courageous, for the Commissioners do not hesitate to express their opinions even when they know that they must be opposed to sectional views and sectional interests. It is far-sighted, for it is linked with impending reforms in secondary education, and contemplates changes which are admitted to be temporary and preparatory only to further developments, such as the establishment of a south-eastern university outside the London area. It faces for the first time the question of the cost of a great metropolitan university. Whatever other purpose it may serve, it will for long be regarded as a self-consistent and well-conceived scheme which will serve as a standard with which other proposals must be compared. Those who object may at least be expected to state their objections in a specific form; to indicate whether those objections are to some general principle or to particular details; to make it clear what alternatives they suggest, and whether those alternatives would directly or indirectly modify the whole scheme, and, if not, how they can be incorporated into it.

In discussing the report in these pages it may be assumed that the readers of NATURE are generally acquainted with the past history of the University of London, and know that the development of the internal University under the constitution established thirteen years ago has been very great, but has been hampered by disunion in the Senate. Nor was that constitution framed so as to enable the Senate to deal with the difficult problems caused by the establishment of so strong and efficient an institution as the Imperial College.

Indeed, the whole question was raised, not only as to whether a new technological university should be established in London, but whether the Imperial College should not be regarded as a super-university institution to which other universities should be expected to send their best technical students, and which should gradually eliminate all teaching of undergraduates from its curriculum. With both these proposals the Commissioners deal very faithfully. For their arguments we must refer our readers to the report itself (sections 194–198). Suffice it to say that they sum up in the statement "that the analogy of the German Hochschule fails to support the claim for a technological university in England, and that the policy of establishing a super-university is neither a possible one nor to be desired on its merits."

But while thus decisively deciding on the main questions, the Commissioners have done much, indeed, it may be said, all that is possible, to secure both to the technical colleges and to the teachers of technology in general that freedom in educational matters the securing or retention of which was the main motive of those who feared the too complete absorption of the Imperial College in the University. The safeguards provided are described below. Turning from this point, which was largely the cause of the appointment of the Commission, we come to what logically precedes it, namely, the constitution proposed by the Commissioners for the University. It is chiefly on this point that the arrangements under which it has been working since 1900 have broken down.

The work of the University was then classed under two main heads, the internal and external sections respectively. The Senate consisted of fifty-six members, of whom thirty-two were equally divided between the graduates and the teachers, or practically between the external and internal sections, the remainder being chiefly representatives of learned and professional bodies. It is the opinion of the Commission that this scheme has not been successful, and that it has led to ambitions on the part of the external side of the University which, if fulfilled, would seriously hamper the development of a true teaching university in London.

The Commissioners, after describing the claims put forward in the report of the Council for external students, state that, "in our opinion it is these claims which, far more than anything else, form the real ground of the defective working of the University in so far as that is due to the present relations of the internal and external sides."

How far the External Council has departed from its true position is shown by the fact that it desires to be called the Imperial Council, while the present Academic Council is to be designated the Metropolitan Council, a title which implies, and is no doubt intended to imply, an inferior status. A house thus divided against itself cannot stand, and, as has been generally expected, the time has come for another drastic reform.

In outlining the measures necessary for this purpose the Commissioners propose to assimilate the constitution of the University of London to those of its northern sisters. In London, as in Manchester, the supreme legislative body will be a Court, consisting in London of about 200 persons, on which ample room can be found for all interests connected with the University.

The executive powers will be exercised by a small Senate, consisting of the Chancellor, Vice-Chancellor, and Chairman of Convocation, five persons appointed by the Crown, two by the Court, two each by the Academic Council and the London County Council, and one by the Corporation of the City of London.

Large powers of delegation are given both to the Court and the Senate, and, subject to the statutes and to the financial oversight of these bodies, the educational work of the University will be in the hands of faculties, the constitution of which differs in different cases, though in all the members will be wholly or in the main teachers of the University. These bodies are to have the power to determine generally the conditions for the award of degrees and diplomas, the courses of study, and the conduct of the examinations. They will present candidates for degrees and advise the Senate on the needs of the faculties. They are expressly prohibited from issuing detailed syllabuses, "for this is a matter for the professor, in consultation with his colleagues in the same branch of learning." They are to determine the respective parts played by written, oral and practical examination, and by records of work, in the tests for the several University examinations, and to appoint the assessors who are to take part therein.

The rights of the teachers as a body and as individuals are therefore amply secured.

These privileges can, however, only be conferred if the standing of the professors is commensurately high, and the Commissioners accept provisionally the standard already practically set in the appointment of University professors.

An Academic Council will consist primarily of the deans of the faculties and of eight members elected by the faculties in common session. This Council may be regarded as exercising a coordinating influence on the faculties, as advisory to the Senate, but as capable of exercising such powers of the Senate as may be delegated to it.

Full privileges of separate examination will be enjoyed only by constituent colleges and departments which have either been established by the University or have consented to incorporation. The teachers in institutions which do not satisfy these conditions will practically have the same position as the schools of the University now occupy. Their teachers will be banded into boards which will lay down the courses of study and supervise the tests for degrees, &c., reporting to the Senate through the faculties. The system of the separate recognition of teachers in minor institutions will be abandoned, and the common or general examination, devised for the schools which are not constituent colleges of the University, will serve for the examination of external students, or, as they are to be called, unattached students, except in the cases of medicine and technology.

This is no hardship to external students. At present they are examined by specially appointed examiners who have in general no common experience, who need not necessarily be teachers, or may have ceased to be teachers.

They will now be examined by men necessarily and actually engaged in teaching. But these men will be drawn from a number of institutions, and the papers will only contain questions which they, acting in common with assessors, or, if the term is preferred, external examiners, think are fair to all their own students, however differently the students may be taught. The possible vagaries of one or two men will therefore be neutralised by the opinions of their colleagues and assessors. At present two "hanging judges" may affect the results. In future their influence will be tempered by more merciful colleagues, and the same scheme which prevents undue severity will also check a too exuberant leniency. The absence of detailed syllabuses will tend to defeat the crammers, but the fact that the papers are to be set to the students of the examiners themselves, and that those students are taught in various institutions, will check individual excursions outside the limits of a syllabus which the majority of unprejudiced experts would regard as fair.

The arrangements for technology are of a special character. The interests of that subject

will be entrusted to a committee of fifteen members, including the Vice-Chancellor, the rector of the Imperial College, and other members appointed as to a bare majority by the Senate, and as to the remainder by the governing body of the Imperial College. University and King's Colleges would each be represented by two of the appointees of the Senate, and three-fourths of the whole would consist of men of affairs and experts in the branches of technology dealt with. The income of the Imperial College and that available for the departments of engineering in University and King's Colleges would be at the disposal of this committee; and the annual budget of the committee would be submitted to the Senate, the governing body of the Imperial College, and the delegacies of King's and University Colleges.

Such, in very brief outline, and with many omissions, especially that of the important proposals with regard to medical education, is the scheme of the Commissioners, and they estimate that 99,000*l.* a year will be required to carry it into effect. They also consider that the headquarters of the University should be situate in Bloomsbury.

They have evidently done their best to meet the reasonable desires of all interests. The professors will have a freedom of teaching and testing their pupils which they have not enjoyed before. The internal students will be members of a more real and efficient teaching university. External candidates will probably have a better test than that to which they have been accustomed. These advantages must no doubt be purchased by some sacrifices in so far as they touch vested interests, but the whole scheme provides a much more satisfactory prospect both for internal and external students than that now in force.

RECENT HYDROGRAPHIC INVESTIGATIONS.[1]

IN the first of the publications referred to below, Dr. Rolf Witting gives an account of the hydrographic observations—sea-temperatures, salinities, oxygen-contents, current and ice observations—made in the Gulfs of Bothnia and Finland during the year 1911 by the Finnish hydrographers. The paper consists almost entirely of tables, and these are models of clear and orderly arrangement.

The second publication contains the hydrographic data collected during the voyage to Spitsbergen, in 1910, of the Norwegian ship *Farm*. The observations are discussed by Drs. Helland-Hansen and Nansen, and deal chiefly with the distribution of the Atlantic current in the sea to the west of Spitsbergen. A considerable part of the paper is taken up with a discussion of the errors of the hydrographers who had previously investigated the same area; but in addition to this the authors describe the gradual disappearance of the Atlantic current to the north-west of Spitsbergen, as this water becomes diluted by lighter arctic water flowing round the South Cape. There is a discussion of the parallelism in the annual variations in temperature of this Atlantic Spitsbergen current, and those of the Atlantic Norwegian stream. "Temperature anomalies" are compared—that is, the deviations, in each year, from the mean of a number of years. The variations in temperature of the Atlantic Spitsbergen stream are, then, roughly parallel to those of the Norwegian stream, *if the former are compared with the latter of two years' previous date.* That is, the water flowing to the north from the Faröe-Iceland channel takes about two years to travel from the latitude of 62° N. to that of about 78° N. The variations in temperature anomaly in the sea to the west of Spitsbergen are also parallel to the variations in the area of ice-free water in the Barentz Sea in May of the same year.

The third paper is of considerable interest and importance. After indulging in a polemic with reference to the erring Swedish hydrographers, Dr. Nansen considers the mode of origin of the cold water occupying the basins of the North Atlantic and Norwegian seas. These water-masses are very homogeneous. At the bottom of the Norwegian Sea there is a salinity which varies only between 34·90 per cent. and 34·92 per cent., and thus requires very careful investigation in order to disclose differences of a real nature. The submarine Faröe-Iceland ridge divides the northern ocean into two masses with respect to the temperature of the bottom water: at a depth of about 1000–2000 mètres the water on the Atlantic side of the ridge has a temperature of about +2° C. to +3° C.; on the Norwegian side the temperature of the sea-water at the same depth is about −0·5° C. to −0·8° C.

How does this cold and dense bottom water originate? It does not come from the southerly-flowing, cold polar currents, for this water is of low salinity, and in spite of its low temperature its density is less than that of the bottom Atlantic and Norwegian water, so that it cannot sink to near the sea-bottom. It does not proceed from melting ice, for water of such origin has also a very low salinity, and, notwithstanding its low temperature, its density is also low. The southerly-flowing polar currents, indeed, protect the underlying warmer water-masses from cooling, and melting ice has the same effect. In both cases the sea is covered with low-saline water which does not mix by convection with that beneath it. In order that a vertical circulation, accompanied by the formation of a cold bottom stratum of water, may occur, certain conditions are necessary:—(1) The water at the surface of the sea must not be in rapid horizontal movement; the best conditions are those in the centre of an area possessing a cyclonic circulation.

[1] (1) "Abhandlungen der finländischen hydrographischen-biologischen Untersuchungen." No. 10. Pp. 132+4 Taf. (Helsingfors, 1912.)
(2) "The Sea West of Spitzbergen. The Oceanographic Observations of the Isachsen Spitzbergen Expedition in 1910." Vidensk. Skrifter. I., Mat.-Naturv. Klasse, No. 12. Pp. 89+6 plates. (Christiania, 1912.)
(3) "Das Bodenwasser und die Abkühling des Meeres." *Internat. Revue Ges. Hydrobiologie u. Hydrographie*, Bd. v., Heft i. Pp. 42+12 figs. in text. (Leipzig, 1912.)