ton Observatory, with the 5-inch finder, at 5h. 7m. (G.M.T.) on November 29, 1906.

At that time Venus was about 1° 49′ from the sun's centre, and in moments of atmospheric steadiness the complete outline of the planet's disc was seen distinctly. The space within the circle always appeared a shade darker than that without, but this was probably a subjective effect. A bright spot was several times suspected in the bright part of the ring. If the atmospheric conditions are very favourable, the ring-phase of this planet may be seen again in 1914; after that there will be no further opportunity until 1972.

OBSERVATIONS OF JUPITER, 1906–7.—During the opposition of 1906–7, the Rev. T. E. R. Phillips observed Jupiter on 106 occasions, and records the results of his observations in a paper communicated to the Royal Astronomical Society (Monthly Notices, vol. lxvii., p. 522, June).

The most remarkable change, as compared with the previous opposition, was observed in the great development of the N. equatorial belt, which had become broader and darker, and, in August, was marked with numerous white rifts and dark reddish streaks along its S. edge.

Later in the apparition this belt was seen to be triple, the S. component being the darkest of the three. Changes of colour were also observed in this belt and on the whole of the disc lying between the N.N. temperate belt and the N. pole. Observations of the dark matter in the great S. tropical disturbance tend to confirm, in principle, Major Molesworth's hypothesis concerning the sudden transference of the dark matter from the following to the preceding end of the red spot, for this transference took place in about two weeks instead of taking nearly three months as it should do under normal conditions of transit.

AUGUST METEORS, 1907.

ENCOURAGED by the appearance of several bright Perseids on the nights of August 4 and 6 to expect a somewhat plentiful return of this shower, a careful watch was maintained of the sky on August 10, 11, and 12, but the results scarcely realised expectation. The display was by no means an abundant one, and the individual meteors were not so bright generally as in ordinary years.

The results of watches were as under:—

August 10.

10h. to 12h., twenty-five meteors per hour, of which half were Perseids; 13h. to 14h., forty-five meteors, of which two-thirds were Perseids; 14h. to 15h., twenty-five meteors seen, but there were many passing clouds from west. Two other observers at Bristol counted thirty-one meteors between 11h. and 12h.

August 11.

9h. to 10h., fifteen meteors; about half of them were Perseids; 13h. to 14h., thirty-six meteors, of which twenty-two were Perseids. Sky rather misty. The shower was regarded as very poor for August 11.

Miss Irene Warner, of Horfield Common, Bristol, obtained the following results:—

9h. 25m. to 10h. 5m., eleven meteors, including eight Perseids; 10h. 5m. to 11h. 5m., thirty-three meteors, including twenty-seven Perseids; 11h. 5m. to 11h. 40m., twelve Perseids.

The horary number was about twenty-eight meteors, of which about twenty-four were Perseids.

Two other observers at Bristol, watching from 9h. to 11h., counted thirty-five meteors.

August 12.

Miss Warner watched as follows:—

9h. 15m. to 9h. 40m., five meteors; 10h. 10m. to 11h. 20m., twenty-one meteors; 11h. 20m. to 12h. 20m., twenty-three meteors. Fine meteor seen at 10h. 55m. with train. The path was from δ to α Cygni. At 11h. 20m. one as bright as Venus from about $35° + 58°$ to $60° + 47°$.

11h. to 12h., about forty-five meteors, including thirty-three Perseids; 13h. to 14h., about fifty meteors, including thirty-five Perseids.

There were many passing clouds, rendering observation difficult, and the horary numbers were derived from the number of objects seen during clear intervals.

Radiant point on August $10 = 44° + 56°$.
Radiant point on August $12 = 47° + 57°$.

A brilliant flash was noticed on August 11, 13h. 17m., probably given by a large Perseid falling in the southern sky, but this quarter was hidden from the observer by a building.

I would be glad to hear of any duplicate observations of the following objects seen on August 10:—

	h. m.				
(1)	10 22	...	$1\frac{1}{2}$	...	$339° + 66°$ to $306° + 57\frac{1}{2}°$
(2)	10 30	...	1	...	$5 + 26$,, $8 + 22\frac{1}{2}$
(3)	11 6	...	$1\frac{1}{2}$	...	$2\frac{1}{2} + 65$,, $54 + 73$

No. 2 was a fine, bluish-white Cygnid, which flashed out suddenly in a short diving course. No. 3 was from the direction of the λ Aquilid radiant, and it moved very slowly, occupying $3\frac{1}{2}$ seconds in sailing along its path of 19°. The nucleus was yellow, and it threw off a trail of reddish sparks.

Other showers were seen on August 10–12 from $332° + 50°$ and $333° + 28°$.

W. F. DENNING.

TREASURY GRANTS TO UNIVERSITY COLLEGES.

THE report of the permanent advisory committee appointed on January 31, 1906, to advise the Treasury as to the distribution of the grant in aid of colleges furnishing education of a university standard has now been published.[1] The report states that a study of the problem how education of a university standard may be most advantageously assisted by State grants shows that there is at the present time considerable complexity surrounding the question, not only by reason of the overlapping due to various educational bodies carrying on similar work in the same areas, but also by reason of public money derived from rate or tax being voted for higher education by different authorities with insufficient information as to one another's operations. For these reasons the committee has obtained permission to shorten from five years to two the period for which the present re-allocation shall hold good. It is hoped that it will be possible by April 1, 1909, to make recommendations for a permanent arrangement.

With regard to the question of standard, the committee finds that it is only in comparatively few of the university colleges that the majority even of the day students have passed a matriculation examination or equivalent test. A well-recognised standard once established would make it easier for the colleges to coordinate their curricula with those of secondary schools. For the present, the report continues, a step may be taken in this direction by excluding rigorously from the category of university work all classes which are preparing students for matriculation.

The committee appointed two inspectors to visit the colleges which already receive grants and certain other institutions which had applied for recognition. Sir Thomas Raleigh, K.C.S.I., and Dr. Alex. Hill undertook this task, and their reports on the various institutions visited are printed as an appendix to the report.

After summarising the financial assistance received by the colleges from Imperial funds and recapitulating the rules laid down for its guidance in various Treasury minutes, the committee recommended that a new maximum limit for all grants be set up, and 10,000*l*. has been decided upon. This maximum relates only to the annual grants for general purposes, and is exclusive of grants for special purposes which may be made from time to time.

The grants recommended for the intervening period of two years, pending a settlement of the general questions referred to in the report, are shown in the following table:—

1 "University Colleges (Great Britain)." Grant in Aid. [267]. Price 1*s*. 6*d*.

College.	Grant, 1906–7. £	Proposed Grant. £
Victoria University of Manchester	12,000	10,000
University of Liverpool	10,000	10,000
University College, London	10,000	10,000
University of Birmingham	9,000	9,000
University of Leeds	8,000	8,000
King's College, London	7,800	7,800
Armstrong College, Newcastle-on-Tyne...	6,000	6,000
University College, Nottingham	5,800	5,000
University of Sheffield	4,600	5,000
Bedford College for Women, London ...	4,000	4,000
University College, Bristol	4,000	4,000
University College, Reading	3,400	3,400
Hartley University College, Southampton	3,400	2,250
London School of Economics	—	500

The report gives the committee's reasons for the diminution of the grant in the case of Manchester, Nottingham, and Southampton, and for the grant to the London School of Economics.

After a consideration of the reports of the inspectors who visited the institutions and of the statistics provided by them, the committee decided not to recommend a grant in the case of the Birkbeck College, the East London College, and the Royal Albert Memorial College, Exeter.

The grants enumerated in the table above amount to 84,950*l.*, leaving, if the grant of 1000*l.* to Dundee University College is continued, a balance of 14,050*l.* available for grants for special purposes.

THE BRITISH ASSOCIATION.

SECTION G.

ENGINEERING.

OPENING ADDRESS BY SILVANUS P. THOMPSON, D.Sc., F.R.S., PAST PRESIDENT OF THE INSTITUTION OF ELECTRICAL ENGINEERS, PRESIDENT OF THE SECTION.

IT would be impossible for any assembly of engineers to meet in annual gathering at the present time without reference to the severe loss which the profession has so recently sustained by the death of Sir Benjamin Baker. Born in 1840, he had attained while still a comparatively young man to a position in the front rank of constructive engineers. His contributions to science cover a considerable range, but were chiefly concerned with the strength of materials, into which he made valuable investigations, and with engineering structures generally. His name will doubtless be chiefly associated with the building of great bridges, to the theory of which he contributed an important memoir entitled "A Theoretical Investigation into the Most Advantageous System of Constructing Bridges of Great Span." In this work he set forth the theory of the cantilever bridge. Upon the plan there laid down he built the Forth Bridge, besides many other large bridges in various parts of the world. With that memorable structure, completed in 1890, his name will ever be associated; but he will be remembered henceforth also as the engineer who was responsible for the great dam across the Nile at Assouan, a work which promises to have an influence for all time upon the fortunes of Egypt and upon the prosperity of its population. Sir Benjamin Baker was, moreover, closely associated with the internal railways of London, both in the early days of the Metropolitan Railway and in the later developments of the deep-level tubes. He was elected a Fellow of the Royal Society in 1890, became President of the Institution of Civil Engineers in 1895, and was a member of Council of the Institution of Mechanical Engineers, besides being an active member of the Royal Institution and of the British Association. He was also a member of the Council of the Royal Society at the time of his death.

He enjoyed many honorary distinctions, including degrees conferred by the Universities of Cambridge and Edinburgh. In 1890 there was conferred upon him the title of K.C.M.G., and in 1902 that of K.C.B.

He had but just returned from Egypt, whither he had gone in connection with the project for raising the height of the Assouan dam, so as to increase its storage to more than double the present volume, when he died very suddenly on May 19, in his sixty-seventh year.

The Development of Engineering and its Foundation on Science.

We live in an age when the development of the material resources of civilisation is progressing in a ratio without parallel. International commerce spreads apace. Ocean transport is demanding greater facilities. Steamships of vaster size and swifter speed than any heretofore in use are being built every year. Not only are railways extending in all outlying parts of the world, but at home, where the territory is already everywhere intersected with lines, larger and heavier locomotives are being used, and longer runs without stopping are being made by our express trains. The horsed cars on our tramways are now being mostly superseded by larger cars, electrically propelled and travelling with greatly increased speeds. For the handling of the ever-increasing passenger traffic in our great cities electric propulsion has shown itself a necessity of the time; witness the electric railways in Liverpool and the network of electrically worked tube railways throughout London. In ten years the manufacture of automobile carriages of all sorts has sprung up into a great industry. Every year sees a greater demand for the raw materials and products, out of which the manufacturer will in turn produce the articles demanded by our complex modern life. We live and work in larger buildings; we make more use of mechanical appliances; we travel more, and our travelling is more expeditious than formerly; and not we alone but all the progressive nations. The world uses more steel, more copper, more aluminium, more paper; therefore requires more coal, more petroleum, more timber, more ores, more machinery for the getting and working of them, more trains and steamships for their transport. It requires machines that will work faster or more cheaply than the old ones to meet the increasing demands of manufacture; new fabrics; new dyes; even new foods; new and more powerful means of illumination; new methods of speaking to the ends of the earth.

We must not delude ourselves with imagining that the happiness and welfare of mankind depend only on its material advancement; or that moral, intellectual, and spiritual forces are not in the ultimate resort of greater moment. But if the inquiry be propounded what it is that has made possible this amazing material progress, there is but one answer that can be given—science. Chemistry, physics, mechanics, mathematics, it is these that have given to man the possibility of organising this tremendous development. And the great profession which has been most potent in applying these branches of science to wield the energies of Nature and direct them to the service of man has been that of the engineer. Without the engineer how little of all this activity could there have been; and without mathematics, mechanics, physics, and chemistry, where was the engineer?

If looking over this England of Edward the Seventh we try to put ourselves back into the England of Edward the Sixth—or for that matter of any pre-Victorian monarch—we must admit that the differences to be found in the social and industrial conditions around us are due not in any appreciable degree to any changes in politics, philosophy, religion, or law, but to science and its applications. If we look abroad, and contrast the Germany of Wilhelm the Second with the Germany of Charles the Fifth, we shall come to the like conclusion. So also in Italy, in Switzerland, in every one indeed of the progressive nations. And it is precisely in the stagnant nations, such as Spain, or Servia, where the cultivation of science has scarcely begun, that the social conditions remain in the backward state of the Middle Ages.

Interaction of Abstract Science and its Applications.

In engineering, above all other branches of human effort, we are able to trace the close interaction between abstract science and its practical applications. Often as the connection between pure science and its applications has been emphasised in addresses upon engineering, the emphasis has almost always been laid upon the influence of the abstract upon the concrete. We are all familiar with the