

Washington, and the presence in the country of a special expedition composed of French astronomers. Judging from the accounts published in the New York papers on May 7, observations were more or less successful in many astronomical institutions, both the first and last contacts being generally well observed, and numerous photographs obtained during the passage of the planet across the sun's disc. At Ogden, Utah, where the French astronomers were located, the clouds prevented more than imperfect observations of the first contacts; but those at egress were satisfactory. Up to one o'clock only three photographs were obtained, but subsequently as many as seventy-five were secured, and the results, as a whole, were considered satisfactory. At the observatory of Dr. Draper, Hastings, on the Hudson, a number of observers, including Prof. Holden, of Washington, availed themselves of the admirable instrumental resources, and the weather being for the most part advantageous, very good results attended their efforts: of eighteen negatives taken by Dr. Draper several were particularly perfect. In addition to observations at the U.S. Naval Observatory Prof. Newcomb and assistants made satisfactory ones at the office of the *American Ephemeris* in Washington, noting the first internal contact at 10h. 7m. 43s. A.M., according to the *New York Times*, and the second internal contact at 5h. 53m. 50s. P.M.

The following differences between the calculated and observed times of first internal contact have been obtained by comparison with Leverrier's elements, with Newcomb's value of the solar parallax; the Greenwich mean time for the centre of the earth resulting from a calculation of somewhat greater refinement than that previously introduced in this column being 3h. 16m. 12.5s.

Place of Observation.	Observed G.M.T. reduced to earth's centre.			Error of Calculation.	
	h.	m.	s.		
Antwerp	3	15	46.0	+ 26.5	Two observers.
Christiania	—	41.2	+ 31.3		" Apparent internal contact."
"	—	52.9	+ 19.6		" True internal contact."
Göttingen	—	34.8	+ 37.7		Prof. Klinkerfues.
"	—	47.7	+ 24.8		Boeddicker and Heidorn.
Josephstadt	—	48.5	+ 24.0		Three observers.
Kiel	—	38.6	+ 33.9		Planet round.
"	—	53.3	+ 19.2		" Deutlicher Lichtfaden."
Palermo	—	55.9	+ 16.6		Spectroscope.
"	—	46.1	+ 26.4		Ordinary telescopic method.
San Fernando	—	49.1	+ 23.4		Geometrical contact.
"	3	16	11.7	+ 0.8	Separation of limbs.
Washington	3	15	58.4	+ 14.1	{ Prof. Newcomb and assistants.

The Greenwich mean time of second internal contact similarly calculated is 10h. 43m. 57.3s., which, compared with Prof. Newcomb's observations at Washington, shows a difference of + 19.6s. Other observations of the second internal contact given in the New York journals are either provisionally reduced or apparently affected by typographical errors or errors of transmission.

**THE ZODIACAL LIGHT AND SUN-SPOT FREQUENCY.**—In a letter addressed to Gruithuisen in February, 1839, published by the latter in his *Astronomisches Jahrbuch* for 1840, Olbers remarks, "My grandson, Wilhelm Focke, Doctor of Law, who with attachment and zeal often contemplates and scrutinises the starry heavens, asserts that the zodiacal light has been observed in January and February with quite exceptional brightness;" which, Gruithuisen observes in a note, is "a new confirmation of Cassini's observation that the zodiacal light is much more brilliant when numerous and large sun-spots are present, and diminishes in brightness when the spots are few. My observations show that during January and February the sun has exhibited unusually large and numerous spots," and he adds, "viel Licht und fast immer eine grosse negative Refraction." This refers to Cassini's concluding statement in his memoir entitled "Découverte de

la lumière céleste qui paraît dans le Zodiaque." "It is a remarkable circumstance that since the end of the year 1688, when this light began to grow fainter, spots have no longer appeared in the sun, while in the preceding years they were very frequent, which seems to support in some manner the conjecture that this light may arise from the same emanations as the spots and *faculae* of the sun." In a previous part of the memoir Cassini, endeavouring to assign a possible cause for the appearance of the zodiacal light, remarks that the observations of that century had made known that the sun is not only the source of light, but also of "une matière propre à terminer, à détourner, et à réfléchir ses rayons;" and that "cette matière ne coule pas toujours de la même manière, mais qu'elle a des vicissitudes sans règle, selon lesquelles nous voyons en certain temps dans son disque des facules, qui sont plus claires que le reste de la surface, et des taches obscures qui ne sont point pénétrées par sa lumière." And he goes on to say that if the matter which is the subject of this light is of the same nature as that which forms the *faculae* and spots on the sun, it should be liable to the same changes and irregularities. However inadequate or incorrect is the explanation of the spots and *faculae* given by Cassini, his conjecture that the brightness of the zodiacal light varies with the number and magnitude of the solar spots is worthy of note, though we do not remember to have seen any allusion to it in our popular astronomical treatises.

#### THE INTERNATIONAL GEOLOGICAL CONGRESS

THE time of the opening of this Congress in Paris has been finally fixed by the local committee for the 29th August, and the Congress will remain in session about two weeks. Further details as to organization and place of meeting will soon be made public. Meanwhile, it is announced that from the 20th August to the 15th September, the library and reading-rooms of the Geological Society of France, No. 7, rue des Grands-Augustins, Paris, will be at the service of members of the Congress. As before, it is requested that all those who desire to take part therein will make it known to the general secretary, Dr. Ed. Jannetaz, at the above address, where, also, the subscription of twelve francs, required for each member, may be sent to Dr. Bioche, treasurer. Ladies are admitted to the Congress.

The local committee add to the above announcements:—There is reason to believe that the numerous collections of geology and palæontology, minerals, rocks, fossils, maps, sections, plans, models in relief, &c., to be found in the *Exposition Universelle*, will realise the expectations expressed in the circular of the International Committee, of an International Geological Exhibition. All exhibitors of such collections are requested to send, as above, such lists as will enable the secretary-general, Dr. Jannetaz, to prepare a special catalogue of them for the use of the Congress.

T. STERRY HUNT,  
Secretary of the International Committee

#### A KINEMATICAL THEOREM

TAKE a plane, and, for clearness of idea, consider it as fixed horizontally. On this fixed plane lay another, and throughout the subsequent movement let the surfaces of the two planes always remain in contact. Now let the upper plane, starting from any position, be moved about in any manner whatever, making any number ( $N$ ) of rotations, the points on it describing curves of any desired degree of complexity on the lower plane; and let it finally settle down again into its initial position, the curves described by the points on it being, in consequence, closed curves. Take the upper plane, and let us investigate the position on it of those points which have described curves of any given area ( $A$ ) on the fixed plane.