

The idea for an amalgamation of this kind was not, however, of one-man inception; rather, it lay in the gradual growth, shaping, and ripening of aspirations long cherished by many men of science desirous of achieving some definite international reciprocity for the better advancement of scientific or philosophical schemes of general utility.

Foremost among those thus animated were the leaders of the four academies of Göttingen, Leipzig, Munich, and Vienna. They constituted some years ago an association called a "Cartell," a body which sent representatives from each academy, and which met regularly and in turn at the above cities for the discussion of matters of the hour, as well as to take decisions involving common action. Later on—to be precise, in 1899—the Royal Society of Göttingen invited its sister society of London to send delegates to participate in that year's Cartell. This was chiefly prompted by the fact that the project for a grand catalogue of scientific literature which the latter was then promoting was to come up for discussion. Following this invitation, the whole Cartell asked the Royal Society of London if it would join the existing association, an appeal which led ultimately to the adoption of a wider basis of organization and the adhesion, one by one, of the principal academies of the world, represented in all cases by the sections of Science and of Letters wherever these formed an integral part of the respective institutions.

By the statutes that are in force, during the triennial intervals of the General Assembly, the business of the association is conducted by an international council, this being under the guidance of one of the constituent academies, and denominated the "directing academy." Since the Paris meeting, the Royal Society has acted in the latter capacity, but will now transfer the duty to such other academy as may be nominated by the vote of the Assembly. In all likelihood the Imperial Academy of Vienna will be selected for this onerous assumption of duty.

The international character of the association is seen in the category of cities from which the academies hail. They include Amsterdam, Berlin, Brussels, Budapest, Christiania, Copenhagen, Göttingen, Leipzig, London, Madrid, Munich, Paris, Rome, St. Petersburg, Stockholm, Vienna, and Washington. In the case of London, it is just now of interest to record the names of the delegates acting in the two sections. The Royal Society has chosen a distinguished band, namely, Sir William Huggins, Lord Kelvin, Sir William Ramsay, Sir Norman Lockyer, Sir David Gill, Prof. Larmor, Prof. H. E. Armstrong, Prof. G. H. Darwin, Prof. Forsyth, Prof. Liversidge, Mr. F. Darwin, Dr. Waller, Mr. A. B. Kempe, Prof. Schuster, and Mr. W. Bateson; while, similarly for letters, the British Academy for the Promotion of Historical, Philosophical, and Historical Studies sends Lord Reay, Mr. James Bryce, Sir Richard Jebb, Dr. Caird, Sir Courtney Ilbert, Sir Alfred Lyall, and Prof. Rhys Davids. This latter and newly-created body now fills the void so confessedly apparent at the Paris Assembly of 1901 through the hitherto non-existence of any organization of the kind in England, and it will join forces with the Royal Society in welcoming the Witenagemot.

From the composition of the list of foreign scientists and men of letters who have been authorized to attend the Assembly, it is evident that the best thought and culture of the several countries concerned will be represented in the conclave. For example, to specify only a few among many eminent names, the French Institute depute M. Mascart, president of the Academy of Sciences, and M. Gaston Darboux, permanent secretary, together with Prof. Moissan, the Count de Franqueville, Baron de Courcel, and M. Georges Perrott; Berlin will send Prof. W. von Bezold; Belgium, the Chevalier Descamps, president of the Belgian Academy of Sciences; Madrid, Prof. Ramon y Cajal; Stockholm, Prof. Gustav Retzius; Vienna, Prof. Viktor von Lang; and so on, through a long list of notabilities.

The United States is represented in the Assembly by the National Academy of Sciences of Washington, but we chronicle the very regrettable circumstance that no delegate has been found whose engagements would permit the short visit across the Atlantic to participate in the deliberation of the Congress. The breach has been filled by the nomination of two English members on the roll of the National Academy, namely, Sir Archibald Geikie, late Director-General of the Geological Survey of Great Britain, and Prof. Ray Lankester, the Director of the Natural History Museum. None the less is the loss of direct representation to be deplored, especially as Prof. Lincoln Goodale, delegate from Harvard, was an enforced absentee, through indisposition, on the occasion of the first meeting in 1901.

The business that will be dealt with at the meeting of the Assembly in London is of a varied character. A report will be furnished by Sir David Gill on the great work proceeding in South Africa appertaining to the measurement of the geodetic arc from the Cape to Cairo; there will be a discussion on a comprehensive scheme for the furtherance of seismological investigation; and one on the report of a special commission instituted by the association for the purpose of pro-

moting the study and investigation of the anatomy of the brain. The Royal Academy of Sciences, Berlin, intend to move for the nomination of a committee charged to consider the question of securing magnetic observations at sea, with the view to an extended magnetic survey. American scientists in particular will watch with interest the outcome of a matter which will be brought up. A resolution was arrived at some time ago at Turin, by the International Congress of Physiologists, expressive of the desirability of the laboratory on Monte Rosa being recognized as an international establishment, to be carried on for the benefit of science, under the auspices of the Association of Academies. This proposition has received the joint support of the National Academy of Sciences, Washington, and of the Reale Accademia dei Lincei, Rome. It is, however, expected to provoke considerable discussion. At present the Association of Academies has no funded property, relying for support upon its collective subscriptions, so that in order to provide maintenance for this or kindred projects it must obtain donations or subventions from states, both of which courses are naturally fraught with some difficulty. So strongly is this felt by the Royal Society, that Sir Michael Foster will propose the following resolution relating to scientific undertakings: "That the initiation of any new international organization, to be maintained by subventions from different states, demands careful previous examination into the value and objects of such organization, and that it is desirable that proposals to establish such organizations should be considered by the International Association of Academies before definite action is taken."

THE HEAVENS IN JUNE.

BY HENRY NORRIS RUSSELL, PH.D.

There is still rather a lack of news in the astronomical world. Nothing more remarkable than the discovery of a new comet has been recorded during the past month. This is so frequent an event that it is usually hardly deserving of comment; but the present comet—discovered by Brooks at Geneva, N. Y., on April 16—may turn out to be unusually interesting, as it appears that it may have a very short period.

When a comet is discovered, the first efforts of astronomers are naturally directed to obtaining accurate observations of its position. When enough of these have been obtained, the elements of the comet's orbit can be calculated, and from these its future motion can be predicted.

It is theoretically possible to determine a comet's orbit from any three observations; and if the observations were perfectly correct, the results of the calculation would give us the true orbit. But actual observations are inevitably affected by small "accidental" errors, and an orbit calculated from three of them will represent, not the true places of the comet at the time of observation, but the slightly erroneous recorded places. Now in many cases, especially when the intervals between the dates of observation are short, it may require large alterations in the elements of the comet's orbit to produce these small changes in its calculated positions for the given times, so that an orbit calculated from only three observations (though the numerical work is perfectly correct) may nevertheless be considerably in error.

In such a case, the predicted positions of the comet will diverge more and more rapidly from the true ones as time goes on. But as more observations are obtained, the preliminary orbit can be corrected, and a new one found which represents all the observations up to date pretty closely, instead of agreeing exactly with three, and not at all with the later ones. As the interval since the discovery, and the number of observations, increase, the influence of the accidental errors of observation becomes much smaller. But it is usually not worth while to try to predict the comet's motion for more than a month ahead, until several weeks' observations are available upon which to base one's calculations. (It may be said in passing that this fact makes it difficult to give satisfactory accounts of the movements of new comets in a series of articles like the present, which must be prepared some time before publication.)

For the reasons just given, it appears that the preliminary orbits calculated by two different astronomers for the same comet may differ a good deal, though neither one has made any mistake in his computations. The errors of observation are responsible. But there is an additional cause for discrepancies. Most comets move in parabolic orbits, coming from distant space, swinging around the sun, and returning in the direction whence they came, not to return for many centuries, if at all. A respectable minority, however, move in elliptical orbits, and return regularly, sometimes in periods of only a few years. A parabolic orbit is easier to compute than an elliptical one, so most computers usually assume at first that a new comet is moving in such an orbit.

The chances are that this assumption will prove to be nearly right, and if it proves to be wrong, new elements can then be easily calculated.

Several astronomers have computed parabolic orbits for Brooks' comet, which agree in giving a perihelion distance about $2\frac{1}{2}$ times the radius of the earth's orbit, though they show minor differences, due no doubt to the observational errors.

On the other hand, Dr. Leuschner, of the University of California, has computed an elliptical orbit from three observations, and reaches the very remarkable result that the comet's orbit is nearly circular, with a period of about three years. This is shorter than the period of any known comet, and, if further observations confirm these calculations, Brooks' comet will take its place among the most remarkable of such bodies. But Dr. Leuschner expressly states that in this case the errors of observation may have a large effect, and so there will be no reason for surprise if the period of the comet turns out to be actually a good deal longer.

The comet is of about the ninth magnitude, and is growing fainter. While beyond the reach of a field-glass, it is well placed for telescopic observation, being on the borders of Draco and Boötes, with a westerly motion toward Ursa Major. It is being carefully observed, and before long the true character of its orbit will be known.

THE HEAVENS.

The principal constellations which are visible at nine o'clock in the evening in the middle of June are as follows:

Cassiopeia is low in the north under the pole, Cepheus lies above, and to the right is Cygnus, lying in the Milky Way, with Lyra above it, marked by the brilliant Vega. Below on the right is Altair, the principal star of Aquila. Though there are no particularly bright stars to the south of this, the Milky Way is very conspicuous, and full of bright knots and patches.

Just south of east is Scorpio, with the ruddy Antares at its heart, and the long line of the tail curving down to the horizon and bending up again. The region west of this is barren, but higher up, near the meridian, is Boötes, with Arcturus blazing brilliantly. Between this and Vega are Corona and Hercules. Virgo lies southwest of Boötes, and its principal star, Spica, is the brightest in that part of the sky. Farther west is Leo, which is now sinking rapidly toward the horizon, and preparing to follow Gemini, whose last stars are disappearing in the northwest. Ursa Major lies north of Leo, and Ursa Minor and Draco are on the meridian above the pole.

THE PLANETS.

Mercury is morning star in Taurus, and reaches his greatest elongation on the 8th. At this time he rises an hour before the sun, and may be seen low down in the east in the dawn; but he is south of the sun, and this is not a favorable apparition.

Venus is morning star in Taurus and Gemini, but is too near the sun to be seen with the naked eye.

Mars is also morning star, and too near the sun to be seen, so that his conjunction with Venus on the 19th is unobservable.

Jupiter is morning star in Pisces, and rises before 3 A. M. on the 15th, so that he is conspicuous in the morning sky.

Saturn is in Capricornus, and comes to the meridian about 4 A. M.

Uranus is in Sagittarius, and comes into opposition on the 19th. His position on the 2d is R. A. 17h. 54m. 7s., dec. 23 deg. 38 min. south, and on the 30th R. A. 17h. 49m. 12s., dec. 23 deg. 38 min. south. As his motion between these dates is nearly uniform, it will be easy to find his exact place on a star-map. He appears as a greenish star of the sixth magnitude, just visible to the naked eye on a clear dark night.

Neptune is in conjunction with the sun on the 27th, and is invisible throughout the month.

THE MOON.

Last quarter occurs at midnight on the 5th, new moon at 4 P. M. on the 13th, first quarter at 10 A. M. on the 20th, and full moon at 3 P. M. on the 27th. The moon is nearest us on the 17th, and farthest off on the 5th. She is in conjunction with Saturn on the 4th, Jupiter at 3 A. M. on the 9th, Mercury on the 11th, Venus and Mars on the 13th, Neptune on the 14th, and Uranus on the 26th. Only the conjunction with Jupiter is close.

Cambridge, England.

CHARLES H. HASWELL'S NINETY-FIFTH BIRTHDAY.

America's oldest living engineer, Mr. Charles H. Haswell, celebrated his ninety-fifth birthday recently as a guest of the Engineers' Club in New York city. Despite his advanced years, Mr. Haswell is still actively engaged in his profession, and appears every day in the City Hall of New York at his desk. He is the assistant engineer of the Board of Estimate, and has been in the service of the city for many years. Mr. Haswell was the first chief engineer of the United States navy. He had the distinction of seeing the "Clermont" make her first run up the Hudson River.

The SCIENTIFIC AMERICAN extends its congratulations to Mr. Haswell.