WITH the close of the year 1909 the hundredth volume of the *Chemical News* was completed; and as these volumes cover a period of fifty years' progress in chemistry and physics, the announcement that a general index has now been prepared, and is in the press, will be widely welcomed. The price of the general index on publication will be *2l.*, but to subscribers who order it before the date of publication the price will be *1l.* 15*s*.

THE first part of an important work on "The Birds of Australia," by Mr. G. M. Matthews, will be issued by Messrs. Witherby and Co. next month. The author has lived all his life in Australia, and has been a devoted student of its avifauna. He has secured the active assistance of a large number of field-ornithologists in all parts of Australia, and his work will incorporate all the available information upon the subject with which it deals. There will also be hand-coloured plates depicting all the known species of Australian birds. The edition of the complete work is limited to three hundred numbered sets.

OUR ASTRONOMICAL COLUMN.

A BRIGHT PROJECTION ON SATURN.—In No. 4445 of the *Astronomische Nachrichten* Signor M. Maggini describes a brilliant projection which he observed on the west limb of Saturn at 23h. 36m. (Cent. E.M.T.) on September 29. The observation was made at the Ximeniano Observatory, Florence, with a 350 mm. Calver telescope, and the projection was seen in profile against the shadow cast by the planet on the ring. It was also seen to be near a large whitish spot at the edge of the south equatorial band. The phenomenon remained visible until the whitish spot left the terminator, and was last seen at oh. 20m. September 30.

SPECTRUM AND RADIAL VELOCITY OF ϕ PERSEI.—The spectrum of ϕ Persei is a peculiar one, in which a dark, narrow, Hγ absorption line appears to be bordered by very bright lines, and as this is the most prominent line on which radial-velocity determinations have been made, the values of the line-of-sight motion have not been in full agreement.

An investigation carried out by Dr. Ludendorff has explained some of the anomalies, and the results now appear in No. 4442 of the *Astronomische Nachrichten*. Photographs were taken at Potsdam on which other faint lines, which could be identified with solar lines in Rowlands's tables, were measurable, and the radial velocities have been determined from these independently. Among other results, Dr. Ludendorff finds that the intensities of the components of the Hγ line oscillate, so that when the emission lines are faint the absorption line is strong, and *vice versa*, but he has been unable to discover any law for the complementary oscillations. The variation curves and the departures from them during several revolutions show that the conditions in the system of ϕ Persei are very complicated and unusual.

METCALF'S COMET, 1910*b*.—Observations of Metcalf's comet, made by M. Quénisset at the Juvisy Observatory, are placed on record in the October number of the *Bulletin de la Société astronomique de France*. On August 24 the comet was seen as a tenth-magnitude nebulosity having a well-marked condensation and a tail about 4′ long in position-angle 120°; with an exposure of sixteen minutes, using a portrait lens working at *f*.3, a tail 45′ long was shown on the photograph.

New elements and a daily ephemeris for this comet are published by Dr. Kobold in No. 4445 of the *Astronomische Nachrichten*. The elements give the time of perihelion passage as September 16, and, according to the ephemeris, the brightness is now slowly declining from magnitude 11·8. The comet is now travelling northward slowly through Serpens, its position for October 20 being given as $\alpha = 15$h. 28m., $\delta = +19° 12·5'$.

COMETS AND ELECTRONS.—In an address to the Royal Academy of Science, Bologna, Prof. Righi discussed at length the functions of electrons in producing cometary phenomena; this address now appears, with a French translation, in No. 16, vol. viii., of *Scientia*. Prof. Righi outlined the several theories which have been evolved to account for the various phenomena, paying special attention to the experimental proof of light-pressure, and then showed how the electrons emitted by the sun could produce ionisation, which in turn would lead to such repulsion as would cause the development of a tail. In concluding, he described the results of some experiments carried out at Bologna during the earth's passage through the tail of Halley's comet on May 19. No remarkable variations in the atmospheric potential were recorded, but a greater degree of ionisation than usual was found to exist. The existence of radiations capable of travelling through black paper to a photographic plate was also demonstrated, but this experiment alone is not considered definite enough to warrant the assumption that these radiations could be ascribed to the proximity of the cometary matter.

MEASURES OF DOUBLE STARS.—In No. 4445 of the *Astronomische Nachrichten* the measures of double stars made by Mr. Sellors at the Sydney Observatory during 1897–1900 are published. Notes appended to many of the sets of measures give important information as to changes in position-angle and distance during definite periods, &c. No double-star observations were made at Sydney during the years 1901–8.

RECENT RESULTS IN SOLAR PHYSICS.—As an extract from the *Atti della Società italiana per il progresso delle scienze* we have received a brochure in which Prof. Riccò gives a very interesting, important, and comprehensive *résumé* of the results obtained from the study of solar physics during recent years. After briefly summarising the earlier researches, Prof. Riccò directs attention to the importance of correlating solar and meteorological phenomena, and refers briefly to the results obtained by Meldrum, Köppen, Lockyer, Bigelow, Nordmann, and others. Then he describes the different organisations which deal with solar research, and passes on to the spectroscopic results. This leads to a long discussion of the spectroheliographic results, and finally to the knowledge obtained from eclipse work.

THE NINTH INTERNATIONAL CONFERENCE ON TUBERCULOSIS.

THE International Conference on Tuberculosis held its ninth series of sessions at Brussels on October 5–8 under the patronage of King Albert of Belgium, who throughout took a very keen interest in the conference. The first day, October 5, was devoted to the meetings of the council and to the organisation of permanent commissions, some dealing with entirely new subjects, others with subjects already under consideration. To six of these commissions are referred questions of a more or less scientific character; to another six questions in which social elements predominate.

In the first group predisposition occupies the first place. In this group also are the commissions dealing with channels of infection; milk; methods of treatment, scientific and vaccinal; international method of notation; and the action of the solar rays.

In the second group are included the part played by women in the crusade against tuberculosis; child life and school hygiene; prophylaxis and the part played by the dispensary; the cure (?) of tuberculosis; public measures to be taken against tuberculosis; and the statistics concerning tuberculosis.

On these commissions are represented, so far as possible, the different nationalities taking part in the work of the congress.

On Thursday morning, October 6, the opening ceremony of the conference was under the presidency of M. Berryer, Minister of the Interior, who in a thoughtful and well-informed address compared the Tuberculosis Congress to the great Peace Congress at the Hague, "both inspired by the same profound thought and both wishing to obtain the same results," the former, indeed, helping the latter, "the warring of man against man being gradually replaced, thanks to a more humane sentiment, by a bringing together of all men in common action against the universal ills, vice, misery, disease, and death," a sentiment that

was echoed most eloquently by M. Bourgeois, the president of the conference.

Prof. Landouzy, introducing the first subject for discussion, the influence of predisposition and heredity, claimed that these were almost as important from the practical point of view as was the bacillus of Koch itself. He maintained that the tubercle bacillus in the parent might act in one of two ways, either by direct passage from the parent to the offspring, or by some toxic action on the ovum or upon the fœtus. He pointed out that these two sets of conditions were necessarily perfectly distinct, but maintained that the latter was of far more importance than the former, and that it accounted for the peculiar tubercular diathesis so frequently met with in patients. His thesis was that the subjects of this diathesis are degenerates who may "come into the world before their time, are under weight, short in stature, with thin, delicate bones, flattened chests, a skin delicate and soft, small extremities, pale and sickly face, veins very transparent, hair prematurely developed, long eyelashes, glands easily enlarged, aspect weakly." Such characteristics he has found specially amongst his tuberculous patients, and, curiously enough, this is exactly the type taken by the Venetian masters for their models, in whom we see silky golden or red hair, pale, transparent, and delicate freckled skin. This Venetian type, *vir rufus*, he maintained, was specially subject to tuberculosis. Moreover, animals with non-pigmented coats appeared to be more susceptible to tuberculosis than those of darker skin. In the discussion that followed it was agreed that tuberculosis was seldom communicated directly from mother to child, but that a certain transmitted functional debility might leave the child open to the ready invasion of various causes of disease and death, and that in this transmission the mother played a more important part than the father. It was suggested, however, that it was a very difficult matter indeed to demonstrate experimentally any predisposition, native or hereditary, to tuberculosis, though this was a matter that required further consideration.

The natural portals of entry were considered to be the lungs, the mucous membranes of the throat, the tonsils, the intestinal mucous membrane, and the epidermis, whilst the lymphatic glands were looked upon as playing a great part in sifting out and destroying the bacilli, though as they become lowered in vitality and no longer able to cope with the tubercle bacilli they may be broken down, and the scrofulous condition results.

Prof. Calmette, in speaking of the special susceptibility of children of tuberculous parents, said that this receptivity was not specific as regards tuberculosis, but applied generally to various infections and intoxications. The predisposed of the clinicians, he maintained, are very often the subjects of infection already. They are, he thinks, more or less gravely affected, especially as regards the lymphatic glands, and in almost all cases react positively to the various tuberculin tests. Moreover, he finds that if in place of tuberculin he injects mallein, he obtains a marked loss of weight. The stigmata of tuberculosis appearing at certain ages are, he thinks, the result of earlier infections, for he found that of children coming up to be vaccinated 90 per cent. of those from the town of Lille are already infected with the bacillus of tuberculosis even in cases where no definite lesions are developed, whilst in one lunatic asylum he found no fewer than 87·68 per cent. of the patients giving the skin reaction, so that if they were not already tuberculous they were already the bearers of the tuberculous germs.

Other speakers laid stress on tissue predisposition; on the marked respiratory changes that occur, not only in tuberculosis, but in other acute diseases; on the low arterial tension observed in those predisposed to tuberculosis; and on the importance of the observation that in cases where recovery took place pigmentation was both rapid and complete, whilst in those that succumbed such pigmentation did not occur.

One speaker, M. Piery, agreed that the offspring of tuberculous parents are undoubtedly specially liable to tuberculosis, and that the types of the disease in these patients are very varied, but on the other hand he thinks that a certain proportion of such offspring are actually immune, and that these patients, immune to a grave tuberculosis, are just the types in which the so-called stigmata of hereditary predisposition are present. Moreover, he believes with M. Calmette that many of the patients with these "stigmata of hereditary susceptibility" are really already suffering from the disease.

It seemed to be the general opinion that small numbers of slightly virulent tubercle bacilli taken into the alimentary canal might in certain cases act as immunising agents, but that in larger numbers and in virulent form they might set up typical lesions, especially in susceptible animals; that both immunity and predisposition might arise from the same cause, the bacilli in the one case setting up a kind of negative phase, in the other a positive phase, and that until the conditions under which these two phases are produced had been settled it was difficult to determine the part played by heredity in immunising or predisposing to the action of the bacillus.

Of the English delegates, Dr. Nathan Raw said that, as the result of an analysis of 232 cases of tuberculosis that had terminated fatally, he found that pulmonary tuberculosis was most frequently brought about first by direct inhalation of the *Bacillus tuberculosis* into the bronchioles; secondly, by extension from a bronchial gland to the parenchyma of the lung, this being specially associated with or following an attack of some acute infective fever such as measles, scarlatina, or diphtheria; by extension upwards from the abdomen by the diaphragm to the bronchial glands, and then to the lungs; by extension downwards from the glands of the neck directly to the pleura, and then to the apex of the lung; and, finally, by a general infection of the circulating blood, as in acute miliary tuberculosis.

Dr. C. Theodore Williams, following, insisted upon the importance of predisposition and on the wisdom of trying to ascertain the conditions of the human system which cause disposition to tubercle, and, conversely, those which confer immunity from tubercle. Analysing 1000 cases of consumption that occurred in the upper classes, he finds that the age of attack is earlier amongst females than amongst males, and that amongst males affected by hereditary predisposition it is earlier by three years than among those free from hereditary predisposition, and in females by six and a half years. Similarly analysing 400 consumptive cases seen in the out-patient department of the Brompton Hospital, he found that his former conclusion as regards the age of attack being hastened on by family predisposition was confirmed, though here the relative influence on the two sexes differs greatly from what was noted in the richer classes. Among the out-patients, the age of attack was about the same for male as females, the males being attacked earlier than among the rich, the females later. The age of attack in those free from family taint was later in both sexes, and the predisposition influence greater in the male than in the female.

One or two of the later speakers were of opinion that although many of the points raised that afternoon were of undoubted interest and of great importance to the individual, it was somewhat inadvisable to lay too much stress on this question of predisposition, except in so far as it pointed to the necessity to keep these patients out of the range of the attack of the tubercle bacillus. Of course, it was useful in connection with both prognosis and treatment, but at present the campaign must be carried on on a large scale against the tubercle bacillus and to remove the conditions under which it does its work most effectively, the predisposition being taken up specially in connection with the raising of the standard of health and of improving general hygienic conditions. There seemed to be some danger that the importance of the *rôle* of Koch's bacillus might be overshadowed in the popular mind, and it appeared to be necessary to insist that, although the tubercle bacillus does not always set up tuberculosis, no tuberculosis is ever set up without the presence of the tubercle bacillus. If heredity and predisposition are to be put so prominently forward, those who are dealing with the question might sometimes lose heart. At the same time, the acknowledgment that they may play a part should be followed by a call to the physician to look after the building up and strengthening of the patient. Then, again, it was always well to point out that on the one hand many blondes escape tuberculosis, whilst those richer in pigment, the negroes, are often affected, sometimes evincing even a high predisposition.

The morning sittings on Friday, October 7, were devoted entirely to tuberculosis in the child and in the schools, and in the afternoon to women's work in connection with tuberculosis. Mrs. Nathan Raw and Dr. J. Walker both took part in the discussion, stating the case for England. Perhaps the most interesting contribution of the afternoon was that made by Dr. Hermann von Schrötter on the action of sunlight and high altitudes, and their relation to the treatment of tuberculosis. It was of all the greater interest to English workers in that he had collaborated with Dr. Barcroft, who had been sent out to do similar work at Teneriffe. Some of his observations on the pigmentation of the skin seemed to bear out Prof. Landouzy's thesis. Dr. Schrötter believes that the pigment is formed by the cell, probably by the nucleus, that it does not come directly from the blood, and that the capacity to form pigment under stimulation gives some information as to the activity and stability of the cells. He also spoke of the effect of light, especially the ultra-violet rays, and high altitudes upon respiration, circulation, and metabolism, and is decidedly of opinion that not only is tuberculosis a disease of obscurity, but that it is a disease of concentration of population.

Saturday morning, October 8, was devoted to the nomination of committees and to the reports brought by the various foreign delegates. From these reports it may be gathered that not only in England, Ireland, and Scotland, but in many Continental countries, especially Sweden, tuberculosis is a gradually diminishing factor in both mortality and morbidity.

The social functions held during the conference were almost as interesting as the scientific sederunts. The receptions given by M. Beço, the Governor of Brabant, in the Government buildings of the province, and of the Burgomeister and the Town Council of Brussels in the Hôtel de Ville, were as interesting from the associations of the places in which they were held as from the people one met there. The annual dinner was also a great success, and the speaking was of a very high order. Amongst the congratulations and messages sent to the conference was one from King George dated from Balmoral Castle :—"The Queen joins me in thanking you and the members for your kind telegram. We earnestly pray that successful results may attend your labours, and that a further stimulus may be given to the great international campaign that is being carried out against this terrible disease. George, R. et I." Telegrams were also received from the Queen of Denmark, from the Kings of Rumania, Sweden, Spain, and Norway, from the Emperor of Germany and from President Taft, all of them expressing similar interest in the work of the conference. It may perhaps be held that no outstanding work was brought forward at the conference, but those who were privileged to take part in it could not but feel that these international conferences serve as admirable "stock-taking" occasions, and, as successes and failures are recorded, of determining, or at any rate of obtaining information as to, the best method of carrying on the campaign against the White Scourge. As they are held in a different country each year, they also afford opportunities of seeing how the work is being tackled and how far it is succeeding in various parts of the world.

THE INTERNATIONAL SCIENTIFIC CONGRESS AT BUENOS AIRES.

ONE of the important features of the celebration of the Centenario of the Revolution of May 25, 1810, was the International Scientific Congress. This congress was held in Buenos Aires from July 11 to 25, 1910, inclusive, under the auspices and direct management of the Argentine Scientific Society.

Great interest was manifested in this, as in other portions of the celebration, by the residents of Argentina. In spite of the distance from the populous northern hemisphere, the congress was well attended, there was great interest manifested in all the sections, and it can well be said that it was successful.

The opening session of the congress took place on the afternoon of July 11 in the Colón Theatre, the magnificent playhouse of Buenos Aires. The great popular interest was evidenced by the very large and fashionable attendance at these opening exercises. A short address of welcome was pronounced by the Minister of Public Instruction, Dr. Rómulo S. Naon. The principal address was made by the president of the congress, Engineer Luis A. Huergo, and short addresses by the foreign delegates, the whole being interspersed with excellent music.

The serious work of the congress began on the following day, when the various sections met at the principal scientific headquarters of the city. One of the sections held meetings in the library of the patriot Bartolomé Mitre, whose residence is now preserved as a museum by the city.

The work of the congress was divided into eleven principal sections as follows :—Mathematics, physics, and astronomy; chemistry; geology and geography; biology; anthropology; engineering; agriculture; psychology and pedagogy; jurisprudence and social science; military science; and naval science.

In the limits of a short account such as this it will be entirely impossible to give even the *titles* of all the papers presented. It is necessary, therefore, to refer only to those which appear to be of the greater interest to the general readers of NATURE, at the risk of omitting many of equal or perhaps greater importance.

Several of the delegates delivered public lectures in Buenos Aires and La Plata. A special meeting of the delegates from Spanish-speaking countries was held at the rooms of the Argentine Scientific Society to inaugurate a movement "to purify, to enrich, and to unify" the technology of the Spanish language.

Mathematics, Physics, and Astronomy.

Several interesting papers were presented in the field of pure mathematics, notably those by Volterra upon integral equations and their applications, and by Dr. Franck upon the surface of the second order of Lie and their relations to a point upon any surface whatever. Prof. Torres y Quevedo gave an exposition of the mathematical theory of an electro-mechanical calculating machine. A paper was sent by Prof. L. A. Bauer giving an account of the work done with the new magnetic survey vessel of the Carnegie Institution of Washington, the *Carnegie*. This vessel has proven successful beyond expectation.

In the subsection of astronomy, the observatories of Santiago, Chile, the temporary observatory of the Carnegie Institution at San Luis, La Plata Observatory, and the Argentine National Observatory at Córdoba were represented. The plans for the new Chilean National Observatory were shown by Dr. Ristenpart, as well as photographs of Halley's comet; two charts of the series being prepared by that Observatory from the Cape Photographic Durchmusterung. Prof. Tucker, in charge of the Carnegie branch observatory at San Luis, read a paper dealing with the fundamental system of star positions, which is being prepared by the department of Meridian Astrometry of that institution under the direction of Prof. Boss. Sunrise and sunset tables to 1950 were presented by the La Plata Observatory. Several papers were presented by the Córdoba Observatory dealing with the work in progress there, as well as a series of photographs of Halley's comet which had been obtained there. A proposition was discussed to publish an astronomical ephemeris suitable for the South American countries in place of those now issued by several of the observatories.

Chemistry.

Among the many important papers presented in this section were contributions to the study of Argentine oil, by Dr. Sabatini; composition of the alfalfa and other forages grown in Argentina, by Engineers Lavenir and Negri. These investigators demonstrated the superiority of corn grown in the Argentine. Dr. Quiroga presented a new chemical nomenclature of inorganic bodies.

Geology and Geography.

The principal papers in this section related to the countries of Argentina, Chile, and those adjoining to the east and north. The subject of mines and the laws relating to them, including fuel deposits, occupied a chief place. Engineer Patron presented a paper on the development of geographic and geodetic work of Chile, Prof. Codazzi one on mining in Colombia, Señor Maurtúa on geographical