

relatively slow spiral motion; on the other hand, there is no direct evidence that such an outward spiral motion exists.

Recent work shows that the radial motion is confined to the lower chromosphere—the “reversing layer.” In the higher chromosphere the absorption lines H_{α} , K_{α} , and probably H_{α} , are usually twisted in the opposite direction to the other lines, thus indicating an inward movement of the vapours. This apparently agrees with Prof. Hale’s observation of a dark flocculus moving towards the centre of the spot. There is still an apparent discrepancy between this radial movement and the vortex motions invoked by Prof. Hale to explain the Zeeman effect in sun-spot lines, and, according to Mr. Evershed’s results, the vortex, if it exists, either above or below a sun-spot, does not affect the absorbing gases of the “reversing layer” in the penumbrae of spots.

BINARY STAR ORBITS.—In No. 4, vol. xxix., of the *Astro-physical Journal*, Father Stein discusses the photometric observations of the binary star RZ Cassiopeiae on the assumption that it is an Algol variable. Assuming that the orbit is circular, and that the mean densities of the two components are equal, he finds that the mass of the system is 1.002 the sun’s mass, the mass of the bright body, the primary, being 0.646 sun’s mass; the radius of the bright body is 1.43, and that of the satellite 1.17 the sun’s radius, the mean density of each body being 0.222 that of the sun’s density. The centres of the two bodies are separated by 0.022 astronomical unit.

No. 13, vol. i., of the publications of the Allegheny Observatory, contains a discussion of the orbits of the spectroscopic components of 2 Lacertæ, by Mr. R. H. Baker. In spectrograms of this star taken on fine-grained plates, the lines of the components are, at certain epochs, separated, and it is interesting to note that the “blend” curve differs considerably from various parts of the primary curve, thus suggesting that for all spectroscopic binaries having a large range of velocities it is desirable that spectrograms should be taken on the finest-grained plates obtainable at the epochs of maximum velocity. The measurement of such plates might, supposing the lines to be separated, considerably modify the results obtained from coarser-grained plates on which the component spectra are inseparable. Mr. Baker finds the period of this star to be 2.6164 days.

MICROMETRIC MEASURES OF DOUBLE STARS.—In No. 4336 of the *Astronomische Nachrichten*, Mr. Phillip Fox publishes the measures of a number of miscellaneous double stars made with the 12-inch and 40-inch refractors of the Yerkes Observatory. The 40-inch is not used regularly for this work, but is employed when conditions are not suitable for securing parallax plates. Mr. Fox’s observing-list is mainly made up of Holden double-stars, about half of which have now been observed, but these measures are reserved until the complete list is ready. The present publication includes the measures, made during 1907–8, of about 130 multiple systems.

THE IDENTITY OF COMETS 1908a AND 1908b (ENCKE).—In No. 4332 of the *Astronomische Nachrichten*, Dr. Ebell discusses the question of the identity of comet 1908a with Encke’s comet. It will be remembered that when 1908a was first discovered by Prof. Wolf, it was announced as being Encke’s comet, but the latter was not discovered until May, 1908, when it was found by Mr. Woodgate at the Cape Observatory. Dr. Ebell finds that both the motion and the brightness of comet 1908a are against the theory of identity with Encke’s, for the latter was, theoretically, much fainter, about 3.5 magnitudes, than the observed object. There still remains the question as to whether 1908a was a fragment of Encke’s, split off by some accidental encounter or explosion, and this question is being investigated at Pulkowa.

COMET 1909a.—Photographs of comet 1909a (Borrelly-Daniel) were obtained at the Greenwich Observatory, with the 30-inch reflector, on June 22 and 30, and the resulting positions are published in No. 4337 of the *Astronomische Nachrichten*. The same journal also contains a set of elements computed by Prof. R. T. Crawford, and elements and ephemeris calculated by Prof. Kobold.

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THE KING ON INCREASED PROVISION FOR ADVANCED SCIENTIFIC INSTRUCTION AND RESEARCH.

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY.

THE King laid the first stone of the new buildings of the Imperial College of Science and Technology on Thursday, July 8. The plans exhibited were those of the Royal School of Mines and an extension of the City and Guilds of London Institute, which will occupy the block of ground at the corner of Exhibition and Prince Consort Roads, South Kensington, and extend as far west as the Royal College of Music. The Imperial College of Science and Technology consists at present of the Royal School of Mines, the Royal College of Science, and the City and Guilds of London Institute, and is administered by a Board of governors appointed by Royal charter, and under the presidency of Lord Crewe.

It is interesting to note that the first building to be erected by the governors of the Imperial College is the much-needed one for the Royal School of Mines, and that the funds for the purpose have been provided chiefly by the late Mr. Alfred Beit and Sir Julius Wernher, of the mining house of Messrs. Wernher, Beit and Co.

The life of the Royal School of Mines has been one of many vicissitudes. Even from the time of its foundation in 1851, difficulty has been experienced in providing adequate accommodation. The move from Jermyn Street to South Kensington, which began in 1872, and, as was stated by Lord Crewe in his address to his Majesty, was not completed until 1880, furnished better accommodation for subjects such as chemistry, physics and mechanics; geology was probably in but little worse position than in Jermyn Street, and metallurgy had better laboratories than before, but mining, which was the last to move, has had but poor quarters. The demand for scientific education, however, has grown so rapidly that even the laboratories for chemistry and physics soon became too small, and the fine buildings in Imperial Institute Road, in which the Royal College of Science has its chemical and physical laboratories, have for the past two years received the students. The buildings now to be erected will comprise well equipped laboratories, museums, lecture- and classrooms, and drawing offices for the mining, metallurgical, and geological sections, and, in a one-storied building, 250 feet by 120 feet, under a separate roof, ore-dressing testing works and an experimental metallurgical laboratory are to be erected, the equipment being provided by the Bessemer Memorial Committee.

The extension of the City and Guilds of London Institute will include a laboratory for the study of hydraulics, equipped by Mr. G. Hawksley, but the extension is chiefly necessary on account of the number of students having already outgrown the space available, and the introduction of advanced courses on special subjects requiring more room. Here, again, top-lighted courts will allow the extension of the mechanical laboratories of the institute. The Goldsmiths’ Company has provided a large sum towards this work.

In the course of his reply to the address delivered by Lord Crewe on behalf of the governors, professors, students, and staff of the Imperial College, the King said:—

“The concentration of various associated colleges into one institution, which was effected by our Order in Council of July, 1907, has always seemed to me to be an admirable scheme for the furtherance of scientific instruction, which my dear father had so much at heart; and the names which appeared in the first list of the members of the governing body were sufficient in themselves to give the college a very high status in the educational world.

“The purposes of the college, as stated in the charter, are to give the highest specialised instruction and to provide the fullest equipment for advanced teaching and research in various branches of science, especially in its application to industry. In recent years the supreme importance of higher scientific education has, I am happy to say, been fully recognised in England; and as time goes on I feel more and more convinced that the prosperity, even the very safety and existence, of our country depend on the quality of the scientific and technical training of those who are to guide and control our industries. The rapid

growth of knowledge makes it necessary for the teacher of any branch of applied science to be a specialist of a high order, and the most accomplished specialist cannot impart the full advantage of his knowledge without that complete provision of apparatus for research and instruction which this college will supply.

"The college has already given admirable results, and we may well look for a steady increase in the number of students and in the efficiency of the instruction provided.

"The thanks of the country are due to those public-spirited donors through whose generosity a large portion of the funds have been provided for this great work, and I join in your appreciation of their munificence. I think it is especially fitting that the great discoveries of the late Sir Henry Bessemer, to which the remarkable development of the engineering industries in the last half-century is largely due, should be commemorated by the equipment of the new laboratories of this institution."

UNIVERSITY OF BIRMINGHAM.

On July 7 the King and Queen, accompanied by the Princess Victoria, performed the opening ceremony of the new buildings of the Birmingham University. Inasmuch as the founding of the University on the initiative of Mr. Chamberlain has been effected almost entirely by means of money subscribed by the inhabitants of the Birmingham district, the occasion was appropriately made to partake largely of the nature of a civic function.

The characteristic note of the proceedings may perhaps best be given by some quotations from the King's speeches. In replying to the address from the Corporation, after warmly commending the public spirit of the citizens, His Majesty said:— "Great schemes such as that for providing your city with pure water have been undertaken in the past, and have been brought to a successful issue; but none is worthier of support or more far-reaching in its scope than the establishment and extension of the great University in which you have taken so important a part." Later, in reply to an address from the Chamber of Commerce expressing the recognition by the commercial and mercantile classes of the value of the advancement of higher education, his Majesty said:—"I am glad to learn that the commercial community have been faithful and generous supporters of the University. I feel assured that your expectations of advantages to be derived from the Faculty of Commerce in training the future captains of industry will be realised."

After a luncheon at the Council House, their Majesties drove, through roads lined with enthusiastic spectators, to the new buildings at Bournbrook, a distance of about three miles. The opening ceremony took place in the great hall of the University, which was occupied largely by members of the University and representatives of other educational bodies.

The University address was read by Sir Oliver Lodge, and the following characteristic passage may be quoted:—"Guided by our Chancellor, whose inability to be present on this memorable occasion we deeply regret, we have made no attempt to give an appearance of finality to our present undertaking. Rather do we regard it as capable of indefinite expansion. Whilst the field of scientific research is ever widening, and its discoveries demand yearly a fresh application to the facts of life, the claims of the human studies become none the less imperative; and in both these branches of human activity, which can only flourish side by side, we realise the need of continual development. But we believe that the work which we have begun, upon which this day your Majesties set the seal of your Royal approbation, can confidently be entrusted to the generosity and to the devoted service of the generations that are to come."

His Majesty, in replying, after paying a tribute to the Chancellor, proceeded:—"For the wonderful progress of higher education in the country we have largely to thank the great universities established in our principal cities. No nobler object for munificence can be found than the provision for the necessary equipment for such education; an equipment which, in view of the diverse and elaborate requirements of the modern schools of instruction, must be costly; but without which these schemes, however carefully designed, will prove fruitless. Such institutions as this are of paramount importance in enabling students to

obtain in their native city instruction in science and technology, in art and mathematics, which in former days they were compelled to seek in places far distant from their homes, at an expense which in some instances they could ill afford. The universities also foster a wholesome rivalry, and encourage the growth of the highest form of public spirit. A man educated at this University will be a better citizen of Birmingham, and a better subject of the Empire."

At the close of the opening ceremony, their Majesties inspected a part of the departments of civil and electrical engineering.

THE SCIENCE COLLECTIONS AT SOUTH KENSINGTON.

THE question of the worthy housing of the science collections at South Kensington has been brought before the Government on several occasions during the last thirty years or so. The object of a deputation which waited upon Mr. Runciman at the Board of Education on Tuesday was again to endeavour to obtain an assurance that the Government will provide the money for the building of a museum in which the science collections can be exhibited as satisfactorily as are those of art. The deputation included distinguished representatives of the leading scientific societies and institutions, and the memorial which was presented was signed by the president and officers of the Royal Society, all its living past-presidents, and 128 of its Fellows distinguished in physical science; the Chancellors of the Universities of Cambridge, London, Glasgow, and St. Andrews; the Vice-Chancellors of the British universities; the presidents of scientific societies and institutions; professors of chemistry, physics, mathematics, astronomy, and engineering in all the British universities, university colleges, and principal technical schools and polytechnics; the directors of the chief polytechnics in London and in the provinces; and a very large and distinguished body of persons eminent in and interested in British science and desirous of its promotion.

There can be no doubt, therefore, as to the opinion of representatives of physical science upon the urgent need of satisfactory provision for the housing of the science collections. As Sir William Anson said in introducing the deputation, "the museum, which represents the application of science to material, should be placed in the same position as art and natural history by the Government of the country."

The collections should be in a suitable building, with room for rearrangement and expansion. A site is available at South Kensington if the Government will come forward with the offer of funds for the actual building; but in spite of the memorial and the deputation, Mr. Runciman did not give an assurance that the money will be forthcoming. He was sympathetic, and promised to place the matter before the Prime Minister and the Chancellor of the Exchequer, and with this result we must be satisfied for a while. A useful purpose has certainly been served by bringing the subject into public view. We can now only hope that the Government will rise to the opportunity and offer to the physical sciences, which are closely connected with the industries of this country, the same advantages for its collections as are already possessed by natural history and by art.

From a full report of the deputation in Wednesday's *Times* we make the subjoined extracts.

The memorial presented by Sir Henry Roscoe was as follows:—

"We, the undersigned, being deeply interested in the practice and progress of British science, desire to bring before you the importance of the proper housing of the Science Collections at South Kensington. The permanent buildings now erected provide accommodation for art collections only; to complete the scheme a suitable building for the science collections is a necessity. The formation of a science museum representative of all branches of physical science, both pure and applied, has long engaged the attention both of the Government and of British scientific men. So long ago as 1874 the Duke of Devonshire's Commission on Science strongly recommended the establishment of such