evident that many observations hitherto unexplained will be capable of explanation on lines suggested by these results.

IN a paper entitled "Absorption and Adsorption with Reference to the Radio-active Emanations," published in the Bulletin of the Macdonald Physics Buildings of McGill University, Dr. R. W. Boyle shows that the radio-active emanations behave as all ordinary gases in obeying the laws of solution and of gaseous adsorption. In the case of thorium emanation, the experiments described show that the amount of emanation absorbed by charcoal is proportional to the concentration of the emanation in the gas in contact with it. The absorption also depends on the nature of the charcoal and the amount of surface exposed, and, as with ordinary gases, the absorption decreases with increase of temperature. On comparing the results of several experiments, it appears that thorium emanation is four times as soluble in water as radium emanation, but in petroleum the former is only half as soluble as the latter. Experiments with thorium emanation showed that this gas is less soluble in solutions such as copper sulphate and calcium chloride than in pure water, and the most powerful solvents used were petroleum and alcohol. The order of the solubilities of radium and thorium emanations in different solvents was found to be the same. The paper concludes with a brief notice of current ideas on adsorption, and there is appended a bibliography on the subjects treated.

THE University of Illinois Bulletin No. 41 contains an account of tests made on timber beams by Mr. A. N. Talbot. The tests were made with the view of adding data on the properties of timber in the form of stringers, as used in many railroad structures. The timber stringers were 8 inches by 16 inches by 15 feet to 7 inches by 12 inches by 14 feet in size. One hundred and twelve samples in all were tested, including long-leaf pine, short-leaf pine, loblolly pine, and Douglas fir. The load was applied equally at one-third points of the span length. The dimensions of the specimens were such as to bring out the strengths of timber in horizontal shear. The influence of knots, seasoning checks, and wind shakes can be traced in the results. Much of the data in existence is based on tests made on small specimens, and a valuable feature of the present series consists of the results of tests on minor specimens cut from the stringers. The flexural and shearing strengths of these smaller specimens were determined, and the relation of their properties to those of the full-sized stringers may be studied from the results given. In addition to many tables of results, the bulletin includes photographs showing characteristic fractures under the bending and shearing tests.

OUR ASTRONOMICAL COLUMN.

A CENTRAL BUREAU FOR METEOR OBSERVATIONS.—Under the auspices of the Astronomical Society of Antwerp, a central office has been established for the collection and coordination of observations of meteors. A beginning was made in 1907, and in twenty-two months 5960 observations were recorded by forty observers in thirty-six localities. This essay showed that a much wider organisation was desirable, and the new Bureau Central Meteorique hopes to receive the cooperation of all observers of meteors, amateurs and otherwise, the world over. In the Publication No. 1 is given a complete set of directions and advice, so that anyone, astronomer or not, who can observe regularly, may at once join in the international cooperative scheme. In a circular which accompanies the publication, M. Birkenstock points out that the expenses of the new organisation will be large, and asks all those interested in meteoric astronomy to assist by making an annual subscription of at least 5 francs.

THE ROTATION OF SUN-SPOTS.—To No. 4429 of the *Astronomische Nachrichten* Herr P. Kempf contributes some interesting results derived from sun-spot observations made during 1891–3.

A number of solar observers have been unable to establish any definite rotation of sun-spots, but here the observer shows from careful observations that in thirteen cases there was a distinct rotatory movement of the spot about its own centre. Seven of these occurred in the northern, and six in the southern, hemisphere, but there appears to be no relation between the direction of the rotation and the latitude—north or south—of the spot; only in two cases in each hemisphere was the motion in the negative (*i.e.* N.W.S.E.) direction. In one case (Greenwich spot-number 2277, August 5–16, 1891) the spot rotated 139° in eleven days, while the average daily motions ranged between 7° and 37°; for the northern hemisphere the mean was 11°, and for the southern 20°.

HALLEY'S COMET.—An interesting popular summary of the phenomena presented by Halley's comet during its recent apparition is published in the July number of *The World To-day* by Prof. Frost. Discussing the "never-to-be-forgotten spectacle" presented by the 100° tail seen about the time of the comet's passage, Prof. Frost affirms that the earth probably passed through a part of the tail on the morning of May 19, and suggests that we were within the forks, or separate streamers, of it for two days following, hence the east and west tails. The strangely iridescent clouds, with a kind of horizontal "rainbow," seen at the horizon, may also have been due, at least in part, to the presence of cometary dust.

Some excellent photographs were secured by Mr. Ellerman, who led a comet expedition to the Hawaiian Islands.

LARGE METEORITES.—A description of the Guffey meteorite, discovered by two cowboys near Guffey, Park County, Colorado, in 1907, is given by Mr. Edmund O. Hovey in a reprint from the *American Museum Journal*, vol. ix., pp. 237–48.

This object is a siderite 36·5 inches long, 15 inches maximum height, and 8 inches wide. The mass is roughly pear-shaped, and weighs 682 lb. Two sides show well-developed "thumb marks" or "piëzoglyphs," but on another, which is nearly straight, these are not so well developed; the author suggests that the straight edge and lack of marks indicate that the mass split into two or more parts when near the end of its flight, and that another part may, therefore, yet be found. The mass is very homogeneous, and chemical analysis shows it to contain 88·7 per cent. Fe, 10·5 per cent. Ni, 0·5 per cent. Co, with traces of Cr, C, S, and P; the specific gravity is 7·939. It is supposed that this may be the remains of a vivid meteor which was observed to pass over the Fresh-water River region during the autumn of 1906; it now lies in the foyer of the American Museum.

Mr. Hovey also describes two other recent additions to the foyer, viz. a slice and cast of the Gibeon meteorite and the largest known portion of the Modoc meteorite. The Gibeon meteorite, weighing 562 lb., was discovered in Great Namaqua Land (lat. 25° 8′ S., long. 17° 50′ E.), and is in the possession of the Hamburg Natural History Museum. A slice of this and a plaster cast were sent to the American Museum, where it is ingeniously mounted with the slice *in situ*, the two halves of the cast being hinged so as to show the complete form with the polished surface of the slice.

The "Modoc" is the largest known portion (20 lb. 3 oz.) of a meteorite seen to fall near Modoc, Scott County, Kansas, on September 2, 1905. Twenty-five fragments have been found, and, where pieces have been broken off by the plough, the meteorite is shown to be composed of whitish stony material containing bright specks of iron.

Photographs of the Guffey and Gibeon meteorites illustrate the paper.

THE UNITED STATES NAVAL OBSERVATORY.—The report by the superintendent for the year ending June 30, 1909, shows that the Astronomical Council, consisting of the various officers and assistants at the U.S. Naval Observa-

tory, is fulfilling a useful function in formulating the programmes of work for the various instruments. During the year, the 6-inch and 9-inch transit circles were thoroughly examined for their fitness for fundamental work, and various adjustments and modifications were made. The latitude-variation observations made with the prime vertical instrument were compared with those made with zenith telescopes at Philadelphia, Cincinnati, and Gaithersburg, and were found to give different values. The cause of this difference between the values given by the two forms of instrument was carefully looked for in the prime-vertical observations, but could not be found. Prof. Skinner was engaged until the end of the year in preparing material for the discussion of the proper motions of the 8824 stars observed by him, and published in the A.G. Zone Catalogue -13° 50′ to -18° 10′, but the work cannot be carried further until the cataloguing of the Washington zone observations, 1846–52, is completed.

MEASURES OF DOUBLE STARS.—Prof. Burnham continues his record of double-star measures in Nos. 4426–7 of the *Astronomische Nachrichten*, where a large number of measures, made with the 40-inch telescope during 1909, are given. Particular attention was paid to doubles generally neglected or little known, also to measurements for the better determination of the proper motions of faint stars and of doubles where the motions are small or uncertain.

THE BRITISH MEDICAL ASSOCIATION IN LONDON.

THE seventy-eighth annual meeting of the British Medical Association was held in London, for the first time since 1895, on July 26–30, in the buildings of the University of London. There was a very large attendance, which included a number of foreign guests and over-sea delegates and members. The Earl of Crewe and the Right Hon. Walter Long, M.P., were elected honorary members. Reference was made to Mr. Long's work, which resulted in the abolition of hydrophobia from these islands. Mr. Henry T. Butlin, the famous surgeon, was elected president. At the commencement of the proceedings he announced, amid loud cheers, that the King had signified his willingness to become patron, as his revered father was before him. The president in his address directed attention to the persevering work of the association since 1834 in placing the medical profession upon an increasingly satisfactory footing. He referred to the valuable assistance given by the association to the cause of original research. Since 1874, when scientific grants were founded, large sums have been awarded every year for research work. In 1884 two research scholarships were founded to enable men to devote their whole time to particular researches. Mr. Butlin pointed out that it was desirable to encourage research even though there were no prospect of immediate benefit from the particular line of research taken up, and he instanced cases in which an apparently unproductive investigation had led to results of vast practical importance.

At the present time the association consists of twenty-two thousand members in seventy branches. The business of the recent meeting took place in twenty-one sections dealing with particular branches of medical science, and in each section the line of inquiry which is receiving particular attention at the present time was given full discussion, foreign investigators taking a prominent part in the discussions in many of the sections. In the section of radiology and medical electricity, Sir J. J. Thomson, F.R.S., gave an address in which he pointed out that the softer rays given out from an X-ray tube were inevitably absorbed by the glass wall of the tube, and were therefore not available for application in medical treatment. He then directed attention to the researches of Prof. Barkla, of King's College, who found that substances such as metals when exposed to Röntgen radiation emitted secondary rays, the penetrating power of which was specific for the particular metal, and was independent of the penetrating power of the rays which impinged upon it. The rule was a simple one, for the hardness of the ray given out increases as the atomic weight of the metal. The only necessary condition is that the rays emitted from the X-ray tube must be harder than the specific radiation of the substance. Only substances the atomic weight of which is greater than that of calcium are found to give out these secondary rays. We have thus the power of using rays of uniform penetration for medical treatment. Thus if silver be used, the secondary rays which it gives off are about equal in penetrating power to the β radiation of radium. With iron the radiation is considerably less penetrating, while with tin it is more penetrating; with iodine, extremely penetrating radiation is given off. A large number of other papers were read bearing on Röntgen-ray diagnosis and treatment, and the great advance that has been made in Röntgen-ray diagnosis came prominently to the fore. Thus the papers of Dr. H. Orton and Dr. A. C. Jordan on phthisis showed this method to be a most valuable and trustworthy means of detecting phthisis in its early stages, and of determining the extent and position of the lung trouble. In the section of medicine, Dr. A. C. Jordan also read a paper on the Röntgen-ray appearances of thoracic aneurysm, and the lantern-slides with which it was illustrated showed very clearly the condition of the heart and great arteries in this disease. In many other sections the value of Röntgen-ray diagnosis was also evident. Thus the first session of the surgery section was devoted to a discussion of the operative treatment of simple fractures, in which Mr. Arbuthnot Lane described his method of uniting the severed fragments by means of metallic plates and screws, and in his paper, and all those that followed it, the conclusions were founded, to a very great extent, upon the Röntgen-ray appearances of the fractured part.

The discussion on chronic constipation turned very largely on the Röntgen-ray examination of the large bowel after the patient had taken a meal containing an insoluble salt of bismuth. This discussion was opened by Dr. J. F. Goodhart, who pointed out that constipation in old persons was frequently due to failure of voluntary effort. He said he held a brief for the importance and utility of the large bowel in opposition to those who, following the teaching of Metchnikoff, have come to regard the large bowel as a mere place of storage for the waste material of the food, in which poisons were generated which were very apt to be injurious. The large bowel, he stated, is meant to be full, not empty. Mr. Arbuthnot Lane said that in certain cases poisons were actually generated in the large bowel to such an extent that the patient's life was intolerable. In such cases he had removed a part or the whole of the large bowel with great benefit to his patient.

Drs. Dominici and Wickham came from Paris to discuss the subject of radium treatment. They made it clear that cancer in accessible regions can be greatly reduced in size by radium treatment, and can in certain cases be actually cured. In the case of large, deeply seated growths, a cure is not to be expected, although great diminution in size may be effected and much relief afforded. Various special forms of apparatus have been devised for applying radium to internal growths such as those of the throat, œsophagus, and stomach. Early detection of the cancer and early application of radium are the most important points.

In pathology and bacteriology, a number of important papers were read by those most fitted for the task. Thus Colonel Sir David Bruce, C.B., F.R.S., discussed human trypanosomiasis, while the paper of Prof. Wassermann, of Berlin, opened a discussion on the complement-deviation method in diagnosis—the method which he introduced for the diagnosis of syphilis, and which is now used for this purpose throughout the world. Its application to certain other diseases is now being worked out, so that it is one of the most important matters before the pathologists at the present day. A discussion on the lactic acid organisms took place, at which Prof. Hewlett was among those who took part. There was a most important discussion on the effect of digitalis on the human heart, opened by Prof. Wenckebach, of Gröningen. He was followed by Dr. James Mackenzie, Sir Lauder Brunton, and others.

The subject of dental decay was given very full discussion. It is now taught that both doctors and patients should regard decay of the teeth as a serious danger-signal, and the wholesale decay in young people and in many families so prevalent at the present time requires