Our Astronomical Column.

RETURN OF TEMPEL'S COMET.—Tempel's second periodic comet, discovered in 1873, was detected by Mr. Kudara at Kyoto, Japan, on May 25d. 7h. 10m. G.M.T., in R.A. 20h. 55m. 7s., S. decl. 4° 53′. The approximate time of perihelion passage is 1920 July 10·36. The other elements are approximately as follows:—ω 186° 38′ 43″, Ω 120° 37′ 59″, i 12° 45′ 17″, ϕ 33° 54′ 21″, μ 685·881″. The following ephemeris has been computed for midnight:

		R.A.	S. Decl.	Log r	Log Δ
		h. m. s.	° ′		
June	4 ...	21 28 0	4 34	0·1402	9·8077
	12 ...	21 54 28	4 41	0·1330	9·7739
	20 ...	22 21 44	5 7	0·1274	9·7440
	28 ...	22 48 40	5 58	0·1236	9·7166
July	6 ...	23 15 20	7 15	0·1216	9·6950

The comet is probably faint, but as it is approaching both sun and earth its brightness should increase perceptibly. It rises half an hour before midnight, and is fairly well placed for observation just before dawn.

DOUBLE STARS.—Since its erection in 1894, the 28-in. equatorial at Greenwich has been mainly used for the observation of double stars; the list included many of special difficulty owing to faintness or close proximity. Mr. J. Jackson has discussed the observations made at Greenwich and elsewhere in Monthly Notices for March, and publishes twenty revised orbits. One of the stars is Struve 2525, for which very discordant values of the period have been found. The new value, 354·9 years, is larger than those previously found, which range from 138 to 307 years. The semi-axis major is 1·1″ and the eccentricity 0·93, so that at the time of periastron, 1887·3, the star could not be separated.

The star Struve 2055 had given much trouble to computers; two observations by Sir William Herschel in 1783 and 1802 were mutually inconsistent. Mr. Jackson has unearthed a note that the micrometer reading was not written down at the time, and that the reading entered may be wrong. The quadrant noted is shown to have been correct, and Herschel's other observation in 1802 is well satisfied. The period assigned is 110 years and the eccentricity 0·86.

With respect to notation, he directs attention to diversity in the method of reckoning the angle ω, and recommends the general adoption of the system used by Campbell, Aitken, and Hussey, in which it is measured in the direction of motion in the orbit plane.

DIFFRACTION IMAGE OF A DISC.—Mr. H. Nagaoka contributes a useful article on this subject to the *Astrophysical Journal* for March. Diagrams of the "isophotes" are given, and it is shown that the results explain the black drop observed in transits of Venus, and the projection of bright stars upon the moon's disc that has often been observed in occultations at the illuminated limb. A striking case of this phenomenon has lately been noted in the reappearance of the star Leipzig I 4091 from behind Saturn on March 22 last. Messrs. Reid, Dutton, and McIntyre, observing in South Africa, saw the star reappear within the limb of the planet, its conspicuous orange colour facilitating its detection. They give the explanation that the outer portion of Saturn is composed of transparent clouds, but it would seem that the expansion of the disc by diffraction is sufficient to account for it. (B.A.A. Journal April.)

It is of interest to note that in South Africa the star at disappearance passed behind the ring, while in Europe, owing to parallax, it did not. It was clearly visible through the ring, showing that the separate particles composing the ring are not very densely massed.

Monument to Charles Gerhardt.

NOW that Alsace is once more united to France, it is peculiarly fitting that Strasbourg, his native place and where he lies buried, should be the site of the long-delayed monument it is proposed to erect to the memory of Charles Gerhardt. British chemists who are at all familiar with the history of their science scarcely need to be reminded of the part played by Gerhardt in its development, or of the influence which his writings exercised in the search for methods of elucidating the structure and constitution of chemical compounds.

His "Traité de Chimie organique" may be said to mark an epoch; it was a significant feature of a movement which characterises the middle of the nineteenth century, and which the book itself greatly accelerated. Although much of its teaching, as the systematised expression of the facts of organic chemistry, is obsolete, the work is, and will remain, a classic, for it forms the basis upon which the superstructure of modern chemistry is erected. Gerhardt, however, was not only a speculative philosopher of the highest type; he was also an experimentalist of uncommon power and insight who framed his theoretical conceptions in the light of his own ascertained facts, and tested them by further investigations designed either to substantiate or to disprove them. His name is associated with the discovery of many new substances, some of which, like the acid anhydrides, are of the greatest theoretical and practical importance. It may be claimed for him that, together with Dalton and Berzelius, he was one of the principal founders of the atomic theory and the originator of the notation which immediately flows from it.

An influential committee has now been formed to discharge the debt—long overdue—which the chemical world owes to Gerhardt's memory. It comprises the names of some of the most eminent of French men of science and of those of Allied countries, under the presidency of M. Armand Gautier, member of the Institute, with an executive consisting of M. Haller, member of the Institute, as chairman; M. Chenal, treasurer of the French Chemical Society, as treasurer; and M. Tiffeneau, assistant professor of the Faculty of Medicine, as secretary. The object is well worthy of the consideration of British chemists, and may be specially commended to the notice of the Chemical Society and the Society of Chemical Industry if these bodies have not already responded to the appeal.[1]

T. E. THORPE.

Biological Papers from Bengal.

THE publications of the Asiatic Society of Bengal during the years 1916 to 1919, which we have lately received for review, contain a large number of contributions to biology, showing an activity in this department that has not been surpassed before. If we consider also the publications issued by the Indian Museum, the Calcutta Botanic Gardens, and the flourishing Bombay Natural History Society, we have reason to rejoice over the prosperous state of this branch of knowledge in our Indian Empire. Allusion should be made also to the enterprise of Dr. N. Annandale, who, alone or with other members of the Zoological Survey of India, of which he is the director, has in the last seven years investigated the

[1] A circular signed by Sir James J. Dobbie, president of the Chemical Society, has just been issued inviting fellows of the society to contribute to the memorial fund. Such contributions should be sent to the Treasurer, Chemical Society, Burlington House, London, W.1.—ED. NATURE.

macroscopic fauna of various Asiatic lakes, with results that are of the greatest interest.

The Asiatic Society of Bengal issues Memoirs in quarto, and Journal and Proceedings in octavo. In the Memoirs, parts ii. to v. of Dr. Annandale's "Zoological Results of a Tour in the Far East" further testify to the author's wonderful activity and versatility, which are known to all zoologists. In these parts he deals himself with the Hydrozoa and Ctenophora, the Batrachia, the Sponges, and the Mollusca, together with additions to ethnography; whilst other groups have been entrusted to C. A. Paiva (aquatic Hemiptera), Col. J. Stephenson (aquatic Oligochæta), Dr. Asajiro Oka (Hirudinea), Sir Charles Eliot (Mollusca Nudibranchiata), Tokŏi Kaburaki (brackish-water Polyclads), and Stanley Kemp (Crustacea Decapoda and Stomatopoda). Numerous text-figures and five plates illustrate these contributions.

Dr. Annandale's paper on the Hydrozoa and Ctenophora is one of special interest, our knowledge of the Oriental fresh-water forms of these two groups being of rather recent date and, as the author observes, still very imperfect. A new Medusa is described under the name of *Asenathia piscatoris*, g. et sp. nn., from the tidal creeks containing water of low but extremely variable salinity in the vicinity of Port Canning, in the Gangetic Delta. It is referred to the family Olindiadidæ of Mayer (order Trachymedusæ), and is regarded as not improbably the sexual generation of the hydroid *Annulella gemmata*, Ritchie.

In the part devoted to the Batrachians, Dr. Annandale deals chiefly with the Oriental frogs of the groups of *Rana tigrina*, *R. limnocharis*, and *R. Liebigii*, as well as with the species clustering round *R. Tytleri* and *R. erythraea*; also with various tadpoles from Japan, China, the Malay Peninsula, Burma, and Ceylon. The author's views on *R. tigrina* have since been a subject of discussion between him and Mr. Boulenger in the Records of the Indian Museum, and further differences of opinion between the two authorities will shortly appear in a monograph of the Oriental species of Rana to be published by the Indian Museum.

The two marine Sponges (*Reniera implexa*, Schmidt, and *Amorphinopsis excavans*, Carter, var. n. *Robinsonii*) discussed by Dr. Annandale were found growing on the wooden piers of a landing-stage at Port Weld in Perak, Malay Peninsula, and their chief ethological interest lies in the fact that they grew immediately below high-tide level, and were, therefore, exposed daily for a considerable time to the air and to the heat of a tropical sun. Several new fresh-water Sponges from Japan, China, and the Malay Peninsula are described, and a list of the Spongillidæ of Asia, with synonyms, is appended.

Among the Mollusca the hybrid name Pseudovivipara for a new genus is a regrettable choice.

A paper in French is a revision of the fungi of the genus Nocandia, Toni and Trevisan, by Capt. Froilano de Mello and Dr. St. Antonio Fernandez, of the Portuguese India Bacteriological Service.

The Memoirs contain also a revision of the lizards of the genus Tachydromus, with two plates, by Mr. G. A. Boulenger, in which this genus is shown to be very closely connected with Lacerta, instead of occupying a quite isolated position in the family to which it belongs, as hitherto believed. Two new genera are proposed under the names of Platyplacopus and Apeltonotus.

In the Journal and Proceedings we have a paper by Baini Parshad on the seasonal conditions governing the pond-life in the Punjab. There are three papers on Mollusca: two by E. Vredenburg on the occurrence of *Cypraea nivosa* in the Mergui Archipelago, the only previously recorded habitat of this species being Mauritius, and of *Dolium variegatum* at Mascat and Karachi, a species hitherto regarded as special to the living fauna of Australia, but recorded from the Pliocene of Java; and one by Dr. Annandale and B. Parshad on the taxonomic position of the genus Camptoceras and of *Lithotis japonica*. W. H. Phelps describes the weaving habits of the spider *Cyrtophora citricola*, and Maude L. Cleghorn has experiments on the vitality and longevity of silkworm moths during the cold and rainy seasons in Bengal.

Botany is represented by four contributions: Notes on the flora of the Anaimaly Hills, by C. Fisher; on the pollination of flowers, by I. K. Burkill; on the Burmese sesamum varieties, their variation and growth, by A. McKerral; observations and experiments on the rust of *Launaea asplenifolia*, commonly known as Jangli Gobi, by Karm Chand Mehta; and on the constituents of the bark of *Hymenodactyon excelsum*, by C. L. Gibson and J. L. Simonsen.

Attainment of High Levels in the Atmosphere.

SCIENCE for March 19 has an article by Prof. Alexander McAdie, of Blue Hill Observatory, on "The Attainment of High Levels in the Atmosphere." A period of 135 years is dealt with, during which various methods and agencies have been employed for exploring the high levels of the atmosphere. Dr. John Jeffries crossed the English Channel in January, 1785, and attained a height of about 2012 metres, and in the following twenty years heights of more than 4000 metres were attained. In September, 1862, Glaisher and Coxwell reached a height of 11,200 metres. Three other noteworthy records by manned balloons are mentioned. Tissandier, Spinetti, and Sivel, acting for the French Academy, attained a height of 8530 metres in April, 1875; Dr. A. Berson reached 9600 metres in December, 1894; and Berson and Süring in 1901 attained a known elevation of 10,500 metres, and probably 10,800 metres, both men being unconscious at the higher level. Dealing with other than manned balloons, the extreme elevations noted are:—By kites, 7044 metres in 1907; by rigid dirigibles, 6200 metres in 1917; by sounding balloons, 37,000 metres in 1912; and by pilot balloons, height determined by theodolite, 39,000 metres. The aeroplane record has rapidly advanced. In 1909 Latham made 161 metres, and Drexel in 1910 made 1829 metres. Prior to 1914 the maximum height attained, according to Prof. McAdie, was 6000 metres by Perreyon in March, 1913. The war gave a great impetus to the development of the aeroplane, and since the war, in February, 1920, Major R. W. Schroeder, chief test pilot at Dayton, U.S.A., is stated to have attained 10,979 metres; in this ascent the oxygen-supply was exhausted. The 10-km. level is the bottom of the stratosphere or isothermal region, and the top of the troposphere or convectional region—an exceedingly important elevation to meteorologists. Schroeder's thermograph indicated a minimum temperature of −55° C., or 99° below the freezing point on the Fahrenheit scale.

In *Science* for April 9 Dr. J. G. Coffin, director of aeronautical research of the Curtiss Aeronautical and Motor Corporation, suggests that Prof. A. McAdie has sometimes accepted too readily unauthorised statements made in the Press as to altitudes reached. A criticism is made of expressing results without air-temperature correction, which is not only unsatisfactory, but also scientifically incorrect. The correction is the larger the colder the air encountered in the flight. It is pointed out that it is essential so far as possible for all concerned to work on the same un-