

be the case. It is, however, related to the sphere which touches the six edges of the tetrahedron and which cuts the four spheres orthogonally at their six points of contact, and is in fact equal to $12\varepsilon^2$ where ε is the bend of this sphere.

The expression does not change its value if we substitute for any of the original four spheres the opposite members of the hexlet touching the remaining three. The same sphere touches the edges of the four other tetrahedrons which can be formed in this way and thus cuts the spheres orthogonally at twelve other points of contact as well as the original six.

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¹ NATURE, 139, 77 (Jan. 9, 1937).

THE beautiful result arrived at by Mr. Gosset thus gives an alternative very simple expression for the bend of any of five spheres in mutual contact,

namely, $\sigma/2 + \sqrt{3\varepsilon}$, where σ denotes the sum of the bends of the other four, whilst the volume of the tetrahedron involved is $(2\varepsilon)/(3\alpha\beta\gamma\delta)$. It applies in general to tetrahedra for which the sum of opposite pairs of edges is, for all three pairs, the same.

I take the opportunity of recording that the tetrahedra formed by joining the four points of contact of any one sphere with the other four, when five are in mutual contact, have the product of opposite edges constant. This much simplified the original solution of the problem, and a proof by inversion has recently been sent me by Mr. Hodgkinson. This product is $4(\varphi + \alpha)(\varphi + \beta)(\varphi + \gamma)(\varphi + \delta)^{1/2}$ and the volume of such tetrahedra is given by

$$V = \frac{2}{\sqrt{3}} \left[\frac{\varphi}{(\varphi + \alpha)(\varphi + \beta)(\varphi + \gamma)(\varphi + \delta)} \right].$$

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Points from Foregoing Letters

From observations of disturbances of the earth's magnetism accompanying hydrogen eruptions in the sun, A. G. McNish infers that magnetic disturbance may be attributed to a sheet of current in the electrical layer of the upper atmosphere (ionosphere) together with oppositely directed currents in the earth.

A statistical investigation of the time-distribution of rainfall at Diamond Plantation in British Guiana, over a period of twenty years, leads C. H. B. Williams to the conclusion that there is no support for the local view that more rain is likely to fall at the new or at full moon than during the days just before or just after these phases.

Assuming that the components of a double star are parallel magnetic dipoles giving rise to an electric field, Prof. H. Alfvén calculates that energies of the order of 10^{11} electron volts, such as are found in cosmic rays, could be imparted to electrically charged particles.

Graphs showing the change in apparent brightness according to the point of entry of light rays into the pupil of the eye are given by Dr. W. S. Stiles and B. H. Crawford. The authors have also measured the differences in the apparent hue of monochromatic light in the case of central and peripheral entry.

Photographs of the ultra-violet spectra of several stars indicate, according to Dr. T. Dunham, jun., the presence in interstellar space of ionized titanium with a mean life-time up to several weeks. The author discusses these findings in relation to the temperature and mean density of interstellar matter.

D. A. Webb points out that in spectrographic analyses of tissue ash or similar materials, it is easy to mistake impurities in the electrodes used for the arc for constituents of the specimen, even if a blank spectrum of the electrodes is used as a control. This arises from the fact that the spectrum of the impurities may be enormously intensified by the introduction of the ash into the arc. Copper, vanadium and titanium are the elements most likely to give misleading results from this cause.

A table showing the intensity of various bands in the luminescent spectrum excited by the ultra-violet in dilute solutions of terbium salts is submitted by A. Seidel. The author gives a formula for the differences between the frequencies of the seven bands observed and discusses the quantum transition levels which would account for them.

Max Frankel, R. Maimin and B. Shapiro state that the generally accepted view of the hydrolytic properties of papain requires correction. Latex of *Carica papaya* and preparations obtained directly from it, split not only proteins, but also peptones, though papain was supposed to acquire this latter property only by artificial activation. By fractionating the natural latex, several preparations were obtained, among them one which shows all the features generally attributed to papain. Furthermore, a thermostable natural activator inducing peptone cleavage was found. The properties of the various preparations suggest that the natural activation (and inhibition) of protein- and of peptone-cleavage respectively are different processes.

While it is usual for the nematodes of the alimentary canal of vertebrates to attach themselves, firmly or otherwise, to the mucous membrane, D. G. Davey reports an instance in which the sheep hook-worm has drawn into its buccal capsule a portion of the common sheep tapeworm. He discusses its bearing on the factors which lead the nematodes to the mucous membrane.

From theoretical considerations, Prof. E. J. Conway has deduced certain relations between the weight of the kidney in mammals and several other factors such as the length of the secreting tubule (l) and the diameter of the glomerulus (g) of the organ in question.

Mr. T. Gosset, continuing the correspondence on the hexlet, states that he has derived a simple expression for the 'bend' of any of five spheres in mutual contact, and Prof. F. Soddy also notes a further development of the subject.