parture of B^9 and Li^5 from the dotted line is especially noticeable on this plot. The close fit of the heavier nuclei to the dotted line is also clearly shown. The large radius of B^9 and Li^5 is consistent with the simple picture of the extra proton in a p state around a closed α-particle shell.

W. E. STEPHENS*

Westinghouse Research Laboratories,
East Pittsburgh, Pennsylvania,
May 1, 1940.

* Westinghouse Research Fellow.

[1] E. Feenberg and E. Wigner, Phys. Rev. **51**, 104 (1937).
[2] H. Brown and D. R. Inglis, Phys. Rev. **55**, 1182 (1939) (fitted to newer values of He^3-H^3 and $B^{11}-C^{11}$).
[3] H. A. Bethe, Phys. Rev. **54**, 436 (1938) (fitted to new $N^{13}-C^{13}$ value for central model and to average of heavier nuclei for homogeneous model).
[4] W. H. Barkas, Phys. Rev. **55**, 691 (1939).
[5] H. A. Bethe, Phys. Rev. **53**, 313 (1938).
[6] L. W. Alvarez and R. Cornog, Phys. Rev. **57**, 248 (1940).
[7] Williams, Shepherd, and Haxby, Phys. Rev. **51**, 888 (1937).
[8] H. Staub and W. E. Stephens, Phys. Rev. **55**, 131 (1939).
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[10] Haxby, Shoupp, Stephens and Wells, Phys. Rev. **57**, 348 and 567 (1940).
[11] E. M. Lyman, Phys. Rev. **55**, 234 (1939).
[12] Stephens, Djanab and Bonner, Phys. Rev. **52**, 1079 (1937).
[13] Fowler, Delsasso and Lauritsen, Phys. Rev. **49**, 561 (1936).
[14] Kurie, Richardson and Paxton, Phys. Rev. **49**, 368 (1936).
[15] White, Delsasso, Fox and Creutz, Phys. Rev. **56**, 513 (1939).
[16] White (not published).

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Proceedings of the Southeastern Section of the American Physical Society

MINUTES OF THE CHARLESTON, SOUTH CAROLINA, MEETING, MARCH 22–23, 1940

THE sixth annual meeting of the Southeastern Section of the American Physical Society was held at The Citadel, Charleston, South Carolina, on Friday and Saturday, March 22–23, 1940. Approximately one hundred and sixty-five members and guests attended the meeting. Local arrangements were made by a committee headed by Professor N. F. Smith.

The regular program consisted of thirty-one papers, abstracts for twenty-four of which are appended hereto. Abstracts of the other papers will be found in the August issue of the *American Journal of Physics*. There was a special program of invited papers on applied physics as follows:

Gasoline, from the Point of View of the Physicist.—PAUL D. FOOTE, *Gulf Research and Development Company.*

Physical Methods ot Determining Atmospheric Contaminations.—A. H. PFUND, *Johns Hopkins University.*

Physical Problems in the Textile Industry.—K. L. HERTEL, *University of Tennessee.*

Home Insulation.—S. J. BRODERICK, *Southern Experiment Station, U. S. Bureau of Mines, Tuscaloosa, Alabama.*

Spectro-Chemical Analysis in Agricultural Research.—L. H. ROGERS, *Florida Agricultural Experiment Station.*

At the business meeting the election of the following officers for the year 1940–41 was announced: Chairman, F. G. Slack; Vice Chairman, Fred Allison; Secretary, E. S. Barr; Treasurer, C. B. Crawley; Members of the Executive Committee, F. L. Brown (4 years) and L. W. Morris (1 year).

The invitation extended by Vanderbilt University to hold the 1941 annual meeting at Nashville, Tennessee, was accepted.

E. S. BARR, *Secretary*

ABSTRACTS

1. Impulsive Electrical Discharge Through a Conducting Liquid. HUGH F. HENRY, *University of Virginia.*—The discharge which takes place between Cu electrodes in a $CuSO_4$ solution is produced in a manner similar to that previously described.[1] Impulsive potential is applied to the electrodes from a $\frac{1}{2}$-mf condenser with a series spark gap for a switch. Electrodes of various shapes were used and the discharge characteristics determined as a function of applied voltage and solution concentration. With one of the electrodes conical with a rounded end ($\frac{1}{2}$ mm radius) and the other flat, rotating mirror photographs show that luminosity first appears at the conical electrode regardless of polarity and then progresses across the gap. With each electrode pointed, luminosity appears at both anode and

cathode. To study the progress of the discharge, a circuit was placed in parallel with the discharge cell to remove the potential at times from 2 to 20×10^{-6} sec. after the spark gap switch closed. From Schlieren photographs the speed of progression from cathode toward anode was found to be approximately 180 m/sec. in fair agreement with rotating mirror determinations. The time lag between the application of potential and the appearance of luminosity at an electrode is decreased by forming very small bubbles on the electrode surface by electrolysis immediately before the discharge. With identical electrodes, luminosity appears first at the cathode.

[1] L. B. Snoddy and J. W. Beams, Phys. Rev. **55**, 879 (1939).

2. The Leader Process in a Long Discharge Tube. F. H. MITCHELL, *University of Virginia.*—Current and speed characteristics of discharges due to negative impulsive potentials applied to an electrode in one end of a glass tube 14 cm in diameter and 12 meters long, containing dry air, were determined with a high speed cathode-ray oscillograph. The average speed over a distance of 6.4 meters was found as a function of pressure (0.006 to 8.0 mm Hg) and applied potential (25 to 115 kv). Since the maximum current at the input circuit was limited under most conditions by the tube length, current measurements were made in a section halfway down the tube rather than at the input circuit. Cylindrical wire mesh cages 100 cm in diameter and 60 to 360 cm long, placed concentrically around the tube, were connected to ground through a low resistance. The potential difference across this resistance due to return current in the cage was used to compute the current in a short length of tube, independent of limitations due to finite tube length and without appreciable effect on the discharge itself. The current varied from 35 to 100 amperes, approximately the value necessary to charge a conducting tube of this size to the applied potential. The rate of increase of current in this section was obtained from the slope of these oscillograms.

3. A Theoretical Analysis of Surface Energy as a Cause of Phagocytosis. R. H. LYDDANE AND O. STUHLMAN, JR., *University of North Carolina.*—From a consideration of the free surface energy of a hypothetical cell it will be shown that conditions of equilibrium between a cell and a particle immersed in plasma about to be ingested can be completely described in terms of the contact angle between cell and body when immersed in a given medium. The mathematical analysis shows that the cosine of the contact angle equals $-m/n$ where m is equal to the difference between the surface tensions of the interfaces solid-cell and solid-plasma, and n is the surface tension of the cell-plasma interface. This also describes the relative position of the body with respect to the cell at all times. The cell continues to ingest the particle until the surface energy of the cell has sunk to a minimum.

4. The Construction of an Electron Microscope and Auxiliary Equipment. WM. HURST, *Duke University.*—A magnetic electron microscope is being constructed at Duke University for application to the study of viruses and other biological material. A description is given of the high voltage source, electron beam source, geometry and certain characteristics of the magnetic lens, method of photographing image, pump data, magnetic lens testing equipment and a general outline of the electron microscope assembly.

5. Composition of Mixed Vapors in Cloud Chambers. T. N. GAUTIER AND ARTHUR RUARK, *University of North Carolina.*—The composition of vapors in contact with a liquid mixture is in general not the same as the composition of the liquid; the discrepancy in fact may be large. Data on the composition of the vapor must be employed in getting cross sections for events occurring in cloud chambers. The interesting case is that of ethyl alcohol-water mixtures, because of their relatively large vapor pressures and their frequent use in cloud-chamber work. Curves based on data from the *International Critical Tables* will be presented, giving the vapor pressures of ethyl alcohol and water over mixtures containing various percentages of alcohol by volume. If the cycle of operation of the chamber is relatively short, it is both possible and probable that the evaporation of condensed vapor from the walls and floor of the chamber is not rapid enough to give a close approach to the equilibrium concentrations.

6. Methods of Increasing the Resolving Power of an Ultracentrifuge. J. W. BEAMS, *University of Virginia.*—Mason and Weaver and Svedberg have shown that the resolving power of an ultracentrifuge is proportional to $4\pi^2n^2rh$, where n is the revolutions per second, r the radius, and h the length of the column of solution that can be observed. For large molecular weight substances this resolving power is greatly increased by flowing the solvent through the cell from the periphery toward the axis at the same rate as the material sediments out toward the periphery. This allows the sedimenting boundary to be observed for long periods of time and thus h is effectively increased. If the material being centrifuged is not at the isoelectric point, the resolving power may be increased by passing an electrical current through it in such a direction that the centrifugal and electric forces acting on the particles or molecules balance, thus holding the sedimenting boundary in the field of view for a long period. The apparatus used in the above experiments will be described and the results obtained discussed.

7. X-Ray Diffraction in Cellosolves. THOMAS D. CARR AND A. A. BLESS, *University of Florida.*—X-ray diffraction patterns of methyl, ethyl, and butyl cellosolves have been obtained with an ionization spectrometer using monochromatic x-rays from molybdenum. The patterns show two peaks greatly different in intensity. The principal peak occurs at the same angle for the series, while the secondary peak shifts to smaller angles as the number of carbon atoms increases. The diffraction patterns of these liquids thus resemble the patterns of alcohols as obtained by Stewart

and Morrow,[1] and not those of the ethers, which show only a single peak.[2,3] The similarity of cellosolves to the alcohols thus agrees with the results obtained from dielectric constant measurements.[4] The thickness of the molecules, assuming that it is related to the main peak is found to be 5.26A, while the lengths of the molecules obtained from the secondary peaks are 5.11, 6.36, and 9.66A for methyl, ethyl, and butyl cellosolves, respectively.

[1] Stewart and Morrow, Phys. Rev. **30**, 232 (1927).
[2] W. Noll, Phys. Rev. **42**, 336 (1932).
[3] R. D. Spangler, Phys. Rev. **46**, 698 (1934).
[4] W. H. Byers, J. Chem. Phys. **7**, 175 (1939).

8. The Mechanical Characteristics of the Human Stapes. OTTO STUHLMAN, JR., *University of North Carolina.*—Recent work by the writer has shown that the stapes possesses a superior arch approximately classified as Gothic and an inferior arch of parabolic shape. The data to be presented will show that the superior arch is under tension and the two crura are symmetrical in curvature conforming to the curve y^2 proportional to $x^{1.15}$. The posterior arch is in compression and more parabolic with its posterior crus and anterior crus conforming to the curves y^2 proportional to $x^{0.84}$ and $x^{0.93}$, respectively. Their relation to the non-linear transmission characteristic and aural responses will be pointed out.

9. A Method for Measuring the Optical Rotatory Power of Crystals in the Ultraviolet. NEWTON UNDERWOOD AND CLIFFORD BECK, *Vanderbilt University.*—Light from a mercury arc passes through a monochromator, a Glan-Thompson polarizer, removable 45° glass plate (used in orienting the crystal), the crystal under observation, a Wollaston double-image prism, and falls on a photographic film. If the two images are made of equal intensities by adjusting the plane of polarization of the light incident on the Wollaston to 45° azimuth from an extinction point, the insertion of the crystal into the optical path will change the relative intensities; but the balance may be restored by a compensating rotation of the polarizer. Instead of attempting to make a photograph on a match-point with or without the crystal, exposures are made with the polarizer settings near the expected match-point, which point is then found by graphical interpolation. The microphotometer used to measure the relative density of the images consists of a photo-cell mounted over the eyepiece of a microscope having an illumination system designed for illuminating moving picture sound tracks. The less dense image is placed under the microscope, the amplifier adjusted until the galvanometer reads 100, then when the more dense image is moved into place the galvanometer reads directly its relative density.

10. Precision of a Photoelectric Spectrophotometer in Absorption Measurements. W. C. BOSCH AND K. D. COLEMAN, *Tulane University.*—A multi-range photoelectric spectrophotometer, utilizing electrometer tube amplification, was used to study absorption in various solutions in the 300 to 800-mμ region. The precision of the instrument in locating absorption bands, and in measuring intensity values used in the Beer-Lambert equation, was determined. For substances having sharp absorption bands, such as the dye light green SF yellowish which has a series of sharp multiple frequency bands, band positions were determined to within 1 or 2 mμ. Without observing precautions against stray light, specific and molecular extinction coefficients of materials which, in solution, follow Beer's law, were determined to within ± 2 percent of a mean value for the extinction range 0.1 to 0.8. With suitable selected filters in the incident light beam, stray light error was materially reduced. Extinction coefficients measured in the extinction range 0.1 to 1.0 then showed a deviation from a mean value of approximately ± 1 percent, and values in the 1.0 to 1.5 range were determined with a maximum error of ± 4 percent and an average deviation of ± 2 percent.

11. Infra-Red Absorption of Methyl Alcohol in the Liquid State. D. R. MCMILLAN, JR., *University of North Carolina.*—Recently the infra-red absorption of methyl alcohol vapor has been measured by Borden and Barker.[1] A series of bands was observed and attributed to the various CH and OH vibrations of the molecule. The present work was undertaken to observe the changes in various bands due to associational effects. The region studied has extended from 6μ to 16μ. In the region from 6μ to 8μ the absorption of the liquid is similar in appearance to that of the vapor and two maxima appear at 1467 and 1430 cm^{-1}. These frequencies correspond to 1477 and 1455 cm^{-1} observed in the vapor. The CO vibration that appears at 1034 cm^{-1} for the vapor, appears at 1029 cm^{-1} in the liquid showing that the frequency is practically the same in the two cases. An additional band in the liquid has been observed at 1120 cm^{-1} which is produced by the OH blending vibration. This band cannot be well observed in the vapor state on account of overlapping.

[1] A. Borden and E. F. Barker, J. Chem. Phys. **6**, 553 (1938).

12. A Device for the Preparation of Thin Absorption Cells. E. S. BARR, *Tulane University.*—The observation of infra-red absorption spectra of many liquids involves the use of cell thicknesses of the order of a few hundredths of a millimeter. For the comparison of spectra, it is highly desirable that cell thicknesses be reproducible and of known values. The use of washers between transparent plates, a common procedure, may involve an error due to the film between washer and plate. Furthermore, the preparation of washers of a desired thickness is difficult. In order to facilitate spectral measurements, a device has been constructed which permits the rapid preparation of such thin cells of any desired thickness. This consists of two fluorite plates mounted on heavy brass supports which are accurately parallel to each other and perpendicular to the direction of their motion. The separation of the plates is regulated readily and accurately by means of a calibrated micrometer screw and a small-angle wedge arrangement. The correlation of plate-separation and screw head reading was checked by means of a filar micrometer microscope. Constructional details and technique of use will be discussed.

13. Note on the Ultraviolet Absorption Systems of Benzene Vapor. H. SPONER AND G. NORDHEIM, *Duke University*, AND E. TELLER, *George Washington University*.—It had been shown[1] that the near ultraviolet absorption spectrum at 2700–2200A represents an electronic transition $^1A_{1g}\rightarrow{}^1B_{2u}$ which is forbidden by symmetry and is made allowed when vibrations of type ϵ_g^+ are excited. The transition can be described by the excitation of a double bond electron of character e_g^- into an e_u^+ level. The resulting electronic configuration yields, besides B_{2u}, molecular wave functions of symmetry B_{1u} and E_u^-. A forbidden transition $^1A_{1g}\rightarrow{}^1B_{1u}$ is now suggested for the bands at 2050–1850A and an allowed $^1A_{1g}\rightarrow E_u^-$ transition for the much more intense bands[2] at 1850–1650A. Structural regularities in the first system are discussed. The somewhat irregular vibrational structure of the latter may be due to a slight change in equilibrium configuration because of the degenerate character of the upper level. The continuous absorption underlying this region corresponds perhaps to another electronic transition involving a rupture of one C—H bond. It is assumed that this respulsive state is also responsible for the diffuseness of the $^1A_{1g}\rightarrow{}^1B_{1u}$ system and the predissociation in the $^1A_{1g}\rightarrow{}^1B_{2u}$ transition. The observed two Rydberg series[3] can both be assigned to allowed transitions of symmetry $^1A_{1g}\rightarrow{}^1E_u^-$.

[1] A. L. Sklar, J. Chem. Phys. **5**, 669 (1937); H. Sponer, G. Nordheim, A. L. Sklar and E. Teller, J. Chem. Phys. **7**, 207 (1939).
[2] E. P. Carr and H. Stücklen, J. Chem. Phys. **6**, 55 (1938).
[3] W. C. Price and R. W. Wood, J. Chem. Phys. **3**, 439 (1935).

14. A Linear Densitometer. JOHN A. TIEDEMAN, *Woman's College, University of North Carolina*.—The logarithmic circuit of Meagher and Bentley[1] is used in conjunction with a vacuum photoelectric cell. A bridge circuit employing two balanced amplifier tubes is arranged so that the zero and full scale deflections may be set rapidly. The logarithmic response is obtained from the emission of the hot cathode, with no plate voltage, and a fixed positive voltage on the several grids. The linearity of the device is fixed by the choice of this voltage, and other types of response, not linear, are possible. The device can be made linear within the limits of experimental error for a density range of 0 to 2.7 (which is a transmission range of 500 to 1), and is within 15 percent of linearity for a density range of 0 to 3.2 (which is a transmission range of 1600 to 1). Design considerations for rapid measurement, its use in measuring reflection density and considerations important in calibration are discussed.

[1] R. E. Meagher and E. P. Bentley, Rev. Sci. Inst. **10**, 336 (1939).

15. Discharges Through Oxygen Gas Flames. FREDERICK L. BROWN, *University of Virginia*.—Beams and Snoddy[1] have reported a high voltage discharge between two gas flames. The phenomenon suggested an investigation of the spectra shown in similar discharges. This is a preliminary report on such a survey. As would be expected the oxygen gas flame without discharge shows the OH bands strongly and with varying conditions bands of CH, CN and C_2, but in general, there are no atomic lines. When a discharge is passed through the flame the OH bands are strengthened in the flame and atomic lines of C, O, N, and H appear. Hα is generally strong, especially in a noisy spark, Hβ may be missing or weak, or else strong and partly reversed, depending on voltage, oxygen content and position relative to burner. The spark between the flames shows primarily the nitrogen second positive bands and Hα. Some direct photographs were made of the flames and discharges using a quartz fluorite lens with filters to differentiate between the red and the ultraviolet. These show marked differences.

[1] J. W. Beams and L. B. Snoddy, Phys. Rev. **57**, 63 (1940).

16. A Vibrationless Support for Galvanometers. DUDLEY WILLIAMS, *University of Florida*.—A support of the type described by Strong[1,2] has been constructed. The platform supporting the galvanometer has a 2.0-sec. period of vibration in a horizontal plane and a 0.3-sec. period of torsional vibration about a vertical axis. Since perfectly symmetrical support of the galvanometer platform is difficult to achieve, ordinary building vibrations with horizontal components sometimes produce torsional vibrations of the platform. This difficulty has been minimized by suspending from the galvanometer platform a metal ring with large moment of inertia. The period of torsional oscillation is thereby increased to 1.5 sec. The natural vibrations of the system are damped by oil pans as in Strong's support and also by a set of vanes submerged in an oil reservoir. Methods of suppressing vertical oscillations are discussed.

[1] J. Strong, *Procedures in Experimental Physics* (Prentice-Hall, 1938) pp. 590–592.
[2] R. Müller, Ann. d. Physik **1**, 613 (1929).

17. Probable Error for Poisson Distributions. ERIC RODGERS, *University of Alabama*.—It is shown for Poisson distributions that the probability of obtaining an arbitrary deviation from the average approaches rather rapidly the corresponding probability for normal distributions provided the deviation in each case is expressed in terms of the standard deviation as a unit. Some curves have been plotted showing the manner of approach.

18. Temperature Variation in the Specific Heat of Some Bases by a New Method. R. A. WEISS, *University of Virginia*.—Results using a new method of continuous flow calorimetry[1] are presented. Essentially the apparatus consists of two calorimeters connected in series through which the same fluid flows and the measurements give the relative variation of c_p under differing conditions. Absolute measurement of the fluid flow and the power input are unnecessary. Ratios of resistances only need be determined. The influence of errors is minimized. Application is here made to gases in which the changes in c_p, under varying temperatures from 42°C to 150°C and approximately atmospheric pressure, are compared. The essential features of the calorimeter design of Osborne, Stimson and Sligh[2] are incorporated. This relative method is applicable to other thermal properties of fluids and to varying pressures.

[1] L. G. Hoxton, Proc. Virginia Academy of Science, p. 28 (1931–32).
[2] N. S. Osborne, H. F. Stimson, T. S. Sligh, Jr., Nat. Bur. Stand. J. Research **20**, 119 (1925).

19. Graphs of Hypergeometric Functions Occurring in Continuous Hydrogen Wave Functions. JAMES G. BECKERLEY, *University of Georgia.*—The confluent hypergeometric function

$$ {}_1F_1(a, b, z) = 1 + \frac{a}{b}z + \frac{a(a+1)}{b(b+1)}\frac{z^2}{2!} \cdots $$

has been tabulated for certain real values of a and b, but not for complex values of these parameters. This is inconvenient for problems involving the numerical calculation of continuous hydrogen functions, since these latter contain hypergeometric functions of the type ${}_1F_1(i\alpha+n, 2n, ix)$, where $-1 \leq \alpha \leq 1$ and $n = 1, 2, 3, \cdots$. This paper shows that in order to calculate these functions it is only necessary to compute numerically the real part of ${}_1F_1(i\alpha+n, 2n, ix)$ and this only for two values of n. The imaginary part may then be computed by Kummer's formula. The functions for other values of n may be computed by means of recursion formulas. Numerical results are given in graphical form for ${}_1F_1(i\alpha+1, 2, ix)$ and ${}_1F_1(i\alpha+2, 4, ix)$ for $\alpha = 0$, 0.2, 0.4, 0.6, 0.8, 1.0 and for $-10 \leq x \leq +10$. Comparisons with various asymptotic formulas are given as well as some new formulas for shortening the labors of such numerical calculations. The numerical results can be used for calculating any of the continuous hydrogen functions in repulsive as well as in attractive Coulomb fields. It is also shown that the numerical results may be used in the calculation of any confluent hypergeometric function of the form ${}_1F_1(i\alpha+n, m, ix)$ where n and m are any positive integers and $m = 0$.

20. The Determination of Auroral Intensity by a Photometric Method. L. B. SNODDY AND V. C. SNODDY, *University of Virginia.*—The determination of sky brightness during auroral displays started in the summers of 1937 and 1938[1] were continued at Churchill in Northern Manitoba during this last summer. A visual photometer of the Lummer-Brodhun type was used. The positions of the standard lamp were recorded as dots on a moving paper tape. In this way quite rapid variations in brightness could be followed, since readings could be taken and recorded at less than five-second intervals. Sky brightness in isolated regions was determined as well as the illumination due to large auroral forms. The most important result appears to be the slow decay of sky brightness after all distinct auroral forms have disappeared. This method also enables exact correlation to be made between auroral intensity variations and any accompanying changes in the earth's magnetic field.

[1] L. B. Snoddy and V. C. Snoddy, Trans. Am. Geophys. Union, p. 368 (1939).

21. The Absorption of Cosmic-Ray Shower Particles. W. M. NIELSEN, *Duke University.*—Previous work[1] on the Rossi transition curves at large thickness (lead to iron and iron to lead) has shown that such cosmic-ray showers are electronic in character. G-M counter measurements have now been made of the absorption in lead and in iron of such shower particles. The character of the absorption curves gives new evidence for the electronic character of the showers produced under large depths of absorbing material.

[1] Karl Z. Morgan and W. M. Nielsen, Phys. Rev. **52**, 564 (1937).

22. A Thermionic Milliammeter for Radiofrequency Currents. J. C. MOUZON, *Duke University.*—The use of a filament type radio tube in conjunction with a low range d.c. milliammeter for measuring radiofrequency currents will be discussed. The r.f. current is used to heat the filament of a vacuum tube and the thermionic emission measured with a d.c. meter is used as an indication of the r.f. current.

23. Maximum Temperature Differences Obtained by Radiation to Space Through the Atmosphere. CHARLES M. HECK, *North Carolina State College.*—The average rate of radiation of terrestrial objects toward a clear sky at night (0.02 g cal. per sq. cm per minute) gives no hint as to the maximum temperature differences that can be produced between bodies so radiating but differently insulated from the direct radiation of the earth. The minimum temperatures observed over snow fields and on mountain peaks is compared with results the author obtained using various insulating means and with nested cones. The nested cones produced temperature differences as great as any recorded over snow fields during continuous northern nights. However, the temperature gradients produced with nested cones were some thousand times greater than those produced in nature by radiation to the sky.

24. Flow of Air Through Porous Media. R. R. SULLIVAN AND K. L. HERTEL, *University of Tennessee.*—The value of k, when Kozeny's equation is written,

$$ Q = \frac{2k}{9\mu}\frac{A}{\sigma^2}\frac{(1-c)^3}{c^2}\frac{\Delta p}{X}, $$

has been determined for the flow of air through a porous medium composed of small glass beads. Pressure difference across the bed was of the order of 10^{-3} atmosphere. Thus compression of the air was negligible. k was found to be unity with an uncertainty of less than one percent. It is recognized that this value is not in agreement with that indicated by Carman.[1] In the above equation Q = rate of flow of air in cc/sec., A = area of cross section of porous medium, X = length of porous medium, μ = coefficient of viscosity of air, σ = surface of beads per unit volume of beads, c = volume of beads per unit volume of medium, Δp = pressure drop across plug. All values are in c.g.s. units.

[1] P. C. Carman, Trans. Inst. Chem. Eng. **16**, 168 (1938).