

needed in meeting the operating expenses of the institute shall, on July 1, be returned *pro rata* to those who have contributed to it.

President Compton emphasized that this is a precautionary measure to prepare for contingencies which are not now in sight and which it is hoped will not arise.

The definition of "need" for this fund is understood to be the running of a deficit which is larger than the average deficit of the past ten years in which deficits have been incurred. In other words, the staff are not called upon to meet a "normal" deficit but only a deficit which runs beyond this. The fund will

not have to be used at all unless income from investments falls significantly below the present estimates.

There has been no reduction in salaries at the institute and this action is not considered as such a reduction. The corporation has made every effort to maintain salaries on the present basis, especially in view of the fact that the outside income of the staff, through various professional contacts, comes from a type of work which is very greatly reduced during times of business depression. The staff as a whole has already suffered a considerable reduction in income from such work, even though the institute salaries have remained unchanged.

SCIENTIFIC NOTES AND NEWS

DR. WILLIS RODNEY WHITNEY, retiring director of the General Electric Research Laboratory; Dr. William David Coolidge, who succeeds him, and Dr. Irving Langmuir, associate director, were tendered a luncheon on November 23 by representatives of the professional, industrial and commercial interests of Schenectady. Dr. Frank Parker Day, president of Union College, made the principal address. Dr. Langmuir was the guest of honor at a dinner given by the Chemists' Club on November 29, just prior to his sailing for Sweden to receive at Stockholm the Nobel prize award in chemistry.

DR. W. J. V. OSTERHOUT, of the Rockefeller Institute for Medical Research, has been elected a member of the Academy of Sciences at Halle.

DR. FRANK B. MALLORY, professor of pathology, emeritus, at the Harvard Medical School, has been elected a corresponding member of the Royal Medical Society of Budapest.

At a recent meeting of the Berlin Society for Anthropology and Ethnology there were elected as corresponding members Dr. Charles B. Davenport, of the Carnegie Institution of Washington; Professor Fabio Frassetto, of Bologna, and Dr. Lindblom, director of the Ethnographic Section of the Reichsmuseums, of Stockholm.

THE Sedgwick Medal of the American Public Health Association has been awarded to Dr. William H. Park, director of the laboratory of the New York City Health Department, for distinguished service to public health.

THE Royal Aeronautical Society has awarded the Taylor Gold Medal to Dr. G. V. Lachmann for his paper entitled "Control beyond the Stall," and the Busk Memorial Prize to H. Constant for his paper entitled "Aircraft Vibration."

THE Chemical Society of Washington elected the following officers at a meeting held on November 10: *President*, Paul E. Howe; *Secretary*, James H. Hibben; *Treasurer*, Orville E. May; *Councilors*, H. T. Herrick, H. G. Knight, E. W. Washburn, E. Wiechers, R. E. Gibson and M. X. Sullivan; *Managers*, J. A. Ambler, N. Bekkedahl, J. F. Couch, R. E. Gilchrist, A. T. McPherson and A. R. Merz.

DR. IAN M. THOMPSON has been appointed to succeed Professor Herbert M. Evans as chairman of the department of anatomy of the University of California. Dr. Evans is spending the year in New York City as a guest of the Rockefeller Institute for Medical Research.

CREIGHTON UNIVERSITY SCHOOL OF MEDICINE has announced the appointment of Dr. Eugene F. Noonan and Leo P. Clements as assistant professors in the department of micro-anatomy and Dr. Zeno N. Korth as professor of pathology.

DR. SAMUEL M. MAYFIELD has been called from Berea College to Intermountain College, Helena, Montana, as professor of geology and forestry.

DR. E. B. POULTON, for forty years Hope professor of zoology at the University of Oxford, has presented his resignation, to take effect on January 1.

E. E. AUSTEN, keeper of the department of entomology in the British Museum of Natural History, retired on October 19, having reached the age limit of sixty-five years.

HAROLD SIDEBOTHAM, who has been acting director of the Santa Barbara Museum of Natural History since the death of Ralph Hoffman in July, has been made director.

PROFESSOR FLOYD R. WATSON, of the University of Illinois, has been named chairman of a committee of

the American Standards Association to develop standard methods of measuring the absorption and transmission of sound. The committee will work in co-operation with a similar committee of the Acoustical Society of America.

Dr. H. A. GLEASON, head curator of the New York Botanical Garden, has been asked to prepare an article on the family Melastomataceae for the new Flora of Surinam, now in course of publication in Holland under the editorship of Dr. A. Pulle.

Dr. P. LECOMTE DU NOÛY, head of the department of biophysics at the Pasteur Institute, Paris, has been put in charge of the exhibit which the Pasteur Institute will send to Chicago in 1933 for the Century of Progress Exposition. Dr. du Noüy will accompany the exhibit and will stay for some time in Chicago and New York.

PROFESSOR ERNST WALDSCHMIDT-LEITZ, director of the Institute of Biochemistry of the Technical High School in Prague, has arrived at the cancer research laboratories of the Graduate School of Medicine, University of Pennsylvania, to spend a year there in work on the relation of enzymes to cancer research. Dr. Waldschmidt-Leitz is accompanied by Drs. Arnulf Purr, Franz Koehler and Leopold Weil, three of his assistants who were associated with him in research work in Prague and who will continue to assist him here. They will be joined in February by Dr. Anton Schaffner, also of the Prague laboratories. Virtually all the technical apparatus with which the laboratory at the University of Pennsylvania will be equipped is being transferred from Prague.

Dr. N. L. BRITTON, director emeritus of the New York Botanical Garden, sailed for Puerto Rico on December 1.

Dr. CHARLES W. GREENE, professor of physiology and pharmacology in the medical school of the University of Missouri, has been granted a sabbatical leave for the second semester of this year.

Dr. THOMAS S. BAKER, president of the Carnegie Institute of Technology, has accepted an invitation of the Carl Schurz Memorial Foundation to pass two months in lecturing at German universities.

Dr. KARL T. COMPTON, president of the Massachusetts Institute of Technology, delivered on November 19 the Steinmetz memorial lecture at Union College, Schenectady, New York, under the joint auspices of the college and the General Electric Company. His subject was "The Battle of the Alchemists."

Dr. WILLIAM K. GREGORY, professor of paleontology at Columbia University and curator of comparative anatomy and ichthyology at the American Mu-

seum of Natural History, will speak on "Fish Skulls: A Study of the Evolution of Natural Mechanisms" before the American Philosophical Society, Philadelphia, on the evening of December 2.

Dr. DAVID EUGENE SMITH, professor emeritus of mathematics at Teachers College, Columbia University, gave a report on his experiences at the International Congress of Mathematics at Zurich before the recent dinner meeting of the New York Society for the Experimental Study of Education.

Dr. WILLIAM WALTER CORT, professor of helminthology and head of the department, School of Hygiene and Public Health of the Johns Hopkins University, delivered the annual address of the Alpha Alpha chapter of Alpha Epsilon Delta at the University of Alabama, on November 16. His subject was "The Hookworm Problem in the United States." Following the lecture, honorary membership in Alpha Epsilon Delta was conferred upon Dr. Cort.

Dr. ERNEST C. FAUST, professor of parasitology at the department of tropical medicine, Tulane University, delivered an address under the auspices of the Sigma Xi Club of the University of Alabama on November 18. His subject was "Use of the Experimental Method in the Study of Human Parasitic Infections."

THE December meeting of the De Paul University Chemistry and Physics Society will be held in the Administration Building of the Century of Progress Exposition, when Dr. Eben J. Carey, director of medical exchange for the exposition, will be the guest of honor and the speaker of the evening.

Dr. C. G. SELIGMAN, professor of ethnology at the London School of Economics, delivered the Huxley Memorial Lecture of the Royal Anthropological Institute, London, on November 29.

THE fourth Liversidge lecture, founded in accordance with the will of the late Professor A. Liversidge, of the University of Sydney, was given before the Chemical Society, London, on November 25, by Dr. F. W. Aston. The title of the lecture was "Physical Atomic Weights."

SIR CHARLES SCOTT SHERRINGTON, Waynflete professor of physiology at Oxford, has been appointed Bede lecturer at the University of Cambridge for the year 1933.

THE Royal Swedish Academy of Science has decided to add the prize money for physics for 1931, for which no award was made, to the Nobel reserve fund for physics, and to defer the physics prize for 1932 to next year.

THE *Journal* of the American Medical Association

states that the chiropractic practice act, submitted to the voters of Massachusetts at the recent election on the initiative of the chiropractors of the state, was, according to the latest available report, defeated by 140,000 votes. A chiropractor who desires to practice in Massachusetts now must conform to the standard of fitness imposed on all other practitioners. The act just defeated proposed to establish an independent board of chiropractic examiners, authorized to license chiropractors on the basis of the usual qualifications required of such practitioners.

THE herbarium of Field Museum of Natural History has been presented by the University of Chicago with more than 51,000 botanical specimens, assembled by the late John M. Coulter, for many years head of the botanical department of the university. It includes hundreds of type specimens of new plants, historic collections made by early botanists who explored the western and southwestern regions of the United States and thousands of rare plants from widely scattered parts of the eastern hemisphere. With this addition, the herbarium of the museum now consists of more than 656,000 specimens from every part of the earth. Students will continue to have access to the entire study collections of the museum.

At the meeting of the American Society of Tropical Medicine held in Birmingham, Alabama, from November 16 to 18, the following officers were elected for the ensuing year: *President*, Major G. R. Callender, Medical Corps, U. S. Army, Fort Sam Houston, Texas; *First Vice-president*, Dr. A. W. Sellards, Harvard Medical School; *Second Vice-president*, Dr. W. A. Sawyer, Rockefeller Foundation, New York; *Secretary-treasurer*, Dr. Henry E. Meleney, Vanderbilt Medical School, Nashville, Tennessee; *Assistant Secretary*, Dr. Dámaso de Rivas, University of Pennsylvania; *Councilor*, elected for five years, Dr. Alfred C. Reed, University of California Medical School. The society voted to hold its next meeting in conjunction with the meeting of the Southern Medical Association in Richmond, Virginia, in November, 1933.

At a recent meeting in Chicago, the directors of Alpha Omega Alpha Honor Society adopted the following resolutions in recognition of the eminent services of the late Dr. William W. Root, Slaterville Springs, New York, the founder of the society and secretary-treasurer since its organization in 1902: (1) That all stationery and official documents of the society bear the words, "Founded by William W. Root, 1902," and (2) That the annual lecture presented each year by a leading medical authority be known as the "William W. Root Alpha Omega Alpha Lecture." The present officers of the society are Walter L. Bierring, Des Moines, *president*; Austin A. Hayden,

Chicago, *vice-president*; Josiah J. Moore, 55 East Washington Street, Chicago, *secretary-treasurer*. Mrs. Root will continue as *assistant secretary*. In addition to the officers, the directorate includes: Ray Lyman Wilbur, Washington, D. C.; Waller S. Leathers, Nashville; Louis B. Wilson, Rochester, Minnesota, and Willard C. Rappleye, New York City. The committee on extension and policy comprises Elias P. Lyon, Minneapolis, *chairman*; William Pepper, Philadelphia; Irving S. Cutter, Chicago; Frederick C. Waite, Cleveland, and Thomas C. Routley, Toronto.

THE annual meeting of Delta Omega, the honorary public health society, was held in Washington on October 25, with the largest attendance in the history of the organization, including three honorary members, Colonel F. F. Russell, of the Rockefeller Foundation; Dr. S. Josephine Baker, and Dr. M. P. Ravenel, editor of the *American Journal of Public Health*, and also General M. A. DeLaney, acting surgeon general of the U. S. Army. The officers elected were: *President*, Dr. A. W. Freeman, professor of public health administration at the Johns Hopkins University; *Vice-president*, Professor Ira V. Hiscock, Yale School of Medicine, and *Secretary-Treasurer*, Dr. W. G. Smillie, professor of public health, Harvard University. Dr. James A. Tobey, of the Massachusetts Institute of Technology Chapter, was the retiring president. Among other activities, the society, with the cooperation of the American Public Health Association, has republished Budd's classic work on Typhoid Fever.

THE American Medical Association has announced that application blanks are now available for space in the Scientific Exhibit at its Milwaukee Session from June 12 to 16, 1933. The final date for filing applications is February 13, 1933; the regular application forms must be used. Exhibits cover subjects dealing not only with the practice of medicine, but also with the basic sciences and research. There is no charge made for space, but the Committee on Scientific Exhibit requires personal demonstration by exhibitors. Application blanks and further information may be obtained from the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

THE Board of Directors of the Bache Fund of the National Academy of Sciences, E. B. Wilson, W. J. V. Osterhout and Heber D. Curtis, chairman, made the following grants from this fund at the November meeting of the Academy: Dr. Rhoda Erdman, Berlin-Wilmersdorf, Germany, for researches in experimental cytology; Frank A. Perret, St. Pierre, Martinique, F. W. I., for the equipment and support of his volcano laboratory on the slopes of Mt. Pelée; Dr. Regi-

nald H. Painter, Kansas State College, Manhattan, for taxonomic researches on the family Bombyliidae; Dr. G. B. Kistiakowsky, Harvard University, for researches on the rate of thermal isomerization in disubstituted diphenyl compounds.

DR. M. M. WINTROBE, of the Johns Hopkins Hospital, has received a grant from the Committee on Scientific Research of the American Medical Association. The object of this study is to measure the volume and hemoglobin content of the red blood corpuscles throughout the animal kingdom. Some of this work has already been done through the courtesy of the Mt. Desert Island Biological Laboratory and the National Zoological Park in Washington, D. C., with the aid of funds available to the Department of Medicine at the Johns Hopkins Medical School.

AN arrangement has been made between the Yerkes Observatory of the University of Chicago and the Perkins Observatory of Ohio Wesleyan University whereby half of the observing time of the 69-inch Perkins reflector will be available for extending the spectroscopic program of the Yerkes Observatory.

The Yerkes Observatory has provided the necessary spectrograph, and will add a part-time observer to the staff of the Perkins Observatory for this purpose.

THREE years ago a grant was made by the Rockefeller Foundation to the University of Chicago for the support of biological research. The grant yields an income of \$30,000 a year. It is administered by a committee of which Dr. Taliaferro is chairman and Dr. Carlson, Dr. Kraus, Dr. Lashley and Dr. Lillie are members. The grant has permitted some twenty investigations to be made, some of them extending their research over a period of three years. These investigations included Dr. F. C. Koch's study of the occurrence, physiological action and purification of the male sex hormone; Dr. W. H. Taliaferro's study of the immunology of parasites; Dr. G. K. K. Link's serological studies of fungi and viruses; Dr. A. J. Carlson's investigation of anemia of marked hyperthyroidism; Dr. Ralph S. Lillie's study of visible irradiation of the respiration of micro-organisms; Dr. R. W. Gerard's study of chemical changes in nervous tissue; Dr. H. H. Newman's efforts to collect data on left-handed individuals.

DISCUSSION

A CORRELATION CURIOSITY

IF three variables are correlated, how much more likely is it that the three correlation coefficients will be positive than that they will be negative? Dr. L. J. Henderson raised this question as interesting rather than important. It is well known that r_{xy} , r_{xz} , r_{yz} may be all large and positive, as near 1 as you please. If all three are negative, they can not all be numerically larger than $-\frac{1}{2}$. Setting $r = r_{yz}$, $s = r_{xz}$, $t = r_{xy}$, the conditions on r , s , t are that they shall lie between +1 and -1 and that

$$1 - r^2 - s^2 - t^2 + 2rst \geq 0. \quad (1)$$

Let r , s , t be interpreted as rectangular coordinates in space. Then if (1), taken with the equality sign, be regarded as a surface inclosing the volume defined by (1) taken with the double sign, we have a cubic which passes through the four vertices, $A(1, 1, 1)$, $B(1, -1, -1)$, $C(-1, 1, -1)$, $D(-1, -1, 1)$ of the cube of volume 8 with vertices at $r = \pm 1$, $s = \pm 1$, $t = \pm 1$, and which contains the six lines AB , AC , AD , BC , BD , CD , as (double) lines of the surface. In the four octants in which the vertices A , B , C , D are diagonally opposite the origin, the surface bulges out further (reaching those vertices) than in the opposite four octants. As (1) is not altered by two changes of sign in the three values r , s , t , it is clear that the volumes cut off by the surface from the octants $+++$, $+-$, $-+-$, $--+$ are all equal, and likewise the volumes in

the octants $---$, $-++$, $+-$, $++-$. The problem therefore reduces to finding the volumes in two octants such as $+++$ and $+-$.

Equation (1) may be solved as

$$t = rs \pm \sqrt{(1-r^2)(1-s^2)}. \quad (2)$$

The distance between the upper and lower naps of the surface is $2\sqrt{(1-r^2)(1-s^2)}$ and this, integrated over the quadrant $0 < r < 1$, $0 < s < 1$, gives $\pi^2/8$. The total volume (1) is therefore $\pi^2/2 = 4.9358$ or about $\frac{5}{8}$ of the cube whose edge is 2 and within which all points representing (r, s, t) must lie. One value of t in (2) will be negative, r and s being positive, when the representative point (r, s) lies within the quadrant of the circle $r^2 + s^2 = 1$. If (2) be integrated over this circular quadrant, the result is, numerically, $\pi^2/32 + \frac{1}{8} = .4334$; subtracting this from $\pi^2/8$ we find $3\pi^2/32 - \frac{1}{8} = .8003$. The probability of three positive correlation coefficients is therefore .1622, which is also that of one positive and two negative coefficients; the probability of three negative or of one negative and two positive correlation coefficients is .0878; and the relative frequency is about as 1.85 to 1. The solution of a problem in geometrical probabilities such as this requires an assumption as to the density of distribution of the points, *i.e.*, as to the variables which are to be taken as independent. The coefficients r_{xy} , r_{xz} , r_{yz} have been assumed to be the independent variables. Some assumption as to how these coeffi-