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A Relationship Between Phosphorus, Creatinine and Acidity in Urinary Excretion.*

GILBERT J. RICH. (Introduced by Herman M. Adler.)

From the Illinois Institute for Juvenile Research.

The data in this study were obtained from 171 24-hour specimens of urine furnished by 57 university students, each of whom gave three such samples at intervals of about one week, and who did not control either their diet or their muscular activity. Every specimen of urine was analyzed for its content of phosphorus (inorganic and easily hydrolysable) and creatinine and its total titratable acidity (including the formol titration).

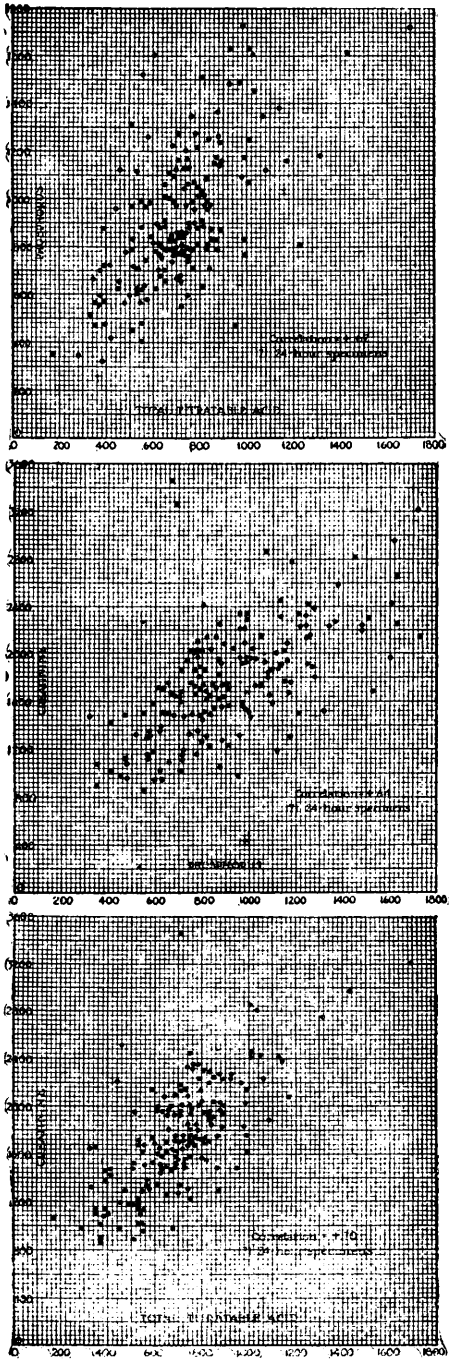
When any pair of the above determinations is plotted graphically, there is a marked tendency for the 2 to vary concomitantly from specimen to specimen, so that the values cluster about a straight line save for a few divergences. This tendency is best expressed in the statistical coefficient of correlation used in biometric and psychometric work. The coefficients of correlation between each of the three pairs of chemical determinations are given in the accompanying table under the head of "Total Correlation." The size of the coefficients, together with the fact they are obtained upon as many as 171 samples, is such as to make them statistically significant and beyond any reasonable probability that they occurred by chance.

Intercorrelations—171 24-hour Specimens.

	Total correlation	Correlation with remaining factor "partialed" out
Total Acid—Creatinine	+.70	+.50
Creatinine—Phosphorus	+.64	+.37
Total Acid—Phosphorus	+.62	+.32

With interrelationships of this type, the correlation between any two measures may depend upon their common relation to a third measure. This dependence may be eliminated in any given case by obtaining the partial correlation, that is, the correlation between the 2 measures with the third one held contant or "partialed" out. These values are shown in the last column of the table, where, for example, the correlation between total acidity and creatinine is computed with phosphorus held constant.

* Laboratory facilities and advice furnished by Prof. F. C. Koch of the University of Chicago are gratefully acknowledged.



It will be noted that the correlation between the total titratable acid and the creatinine content of the urine is the highest, and is relatively independent of concomitant variation with the phosphorus content. This means that, under diverse conditions, there is a marked tendency for these two elements in the urine to be either high or low at the same time. No explanation of this relationship is apparent at the present time. While, on the other hand, it is generally accepted that the acidity of urine depends largely upon the phosphoric acids that it contains, the correlation between acidity and phosphorus content is the lowest of the three and is in large measure dependent upon a concomitant variation in the creatinine of the urine. Moreover, there is a significant relationship between amounts of phosphorus and of creatinine in the urine. This relationship must be considered in the light of the evidence adduced by Fiske and Subbarow[1] that the creatine in voluntary muscle exists in the form of phospho-creatine, the presence of whose metabolic products in urine might in part explain our findings.

[1] Fiske, C. H., and Subbarow, Y., *Science*, 1927, lxv, 401.

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Effect of Diets High in Protein but Inadequate in Calories on Weights of Obese Patients.

ROBERT W. KEETON AND HELEN MACKENZIE.

From the Department of Medicine, University of Illinois, College of Medicine.

A patient (L. W.), female, weight 277 lbs., height 63.2 in., surface area 2.25 sq. m., age 21, with basal requirement of 2,000 calories was hospitalized and placed on a diet containing 90 gm. of protein and an inadequate number of calories varying between 802 and 1027. Over a period of 7 months, from Nov. 1, 1925, to June 1, 1926, she lost 65 pounds. All of this time the patient was allowed opportunity for daily walks and during a portion of the period she was given routine light work about the hospital. Then a second period followed in which she lived at home, weighed her food daily, but was actively working. At the opening of this period, June 1, 1926, she weighed 212 pounds and at the close, Feb. 10, 1907, 205 pounds. Thus her weight over this period of 8 months was stationary. Her basal metabolic rates were taken at regular intervals during this reducing period and found to be normal. Her nitrogen excretion showed a slight positive balance, indicating at least a nitrogen equilibrium. This patient was always found to be