Institute for Juvenile Research, being limited only by the technician's ability to obtain from the patient a sufficiently large sample of blood. They included intelligence levels ranging from the imbecile to the superior. Calcium of the blood was determined by the Clark-Collip modification of the Kramer-Tisdale method; inorganic phosphorus by the Fiske-Subarrow method, and total and lipoid phosphorus by similar procedure following digestion and alcohol-ether extraction, respectively. The intelligence quotient was obtained in each case by an individual mental test.

The coefficients of correlation obtained between the I.Q.'s and the chemical determinations are given below, together with the number of cases upon which each is based (in parenthesis).

	Correlation with I.Q.
Calcium	+.06 (69)
Inorganic Phosphorus	+.07 (245)
Lipoid Phosphorus	−.04 (77)
Total Phosphorus	+.06 (118)
Lipoid P ÷ Total P	+.19 (63)

Our results agree with those of Powers with respect to the calcium of the blood. There is no evidence that it bears any relation to the individual's intelligence.

With respect to the inorganic phosphorus of the blood, on the other hand, we differ markedly from Powers. The data obtained from 245 subjects show no relationship between intelligence, as measured by the I.Q., and the phosphorus content of the blood. There is, of course, a difference in method. We worked with persons *ranging from* subnormal to superior intelligence, instead of extreme groups, and did not include cases of idiocy. If, however, the difference obtained in such extreme groups is valid outside of the very lowest ranges of intelligence, a correlation will necessarily be apparent when a wide range of intelligence is considered. Although our subjects were children, age does not appear to be a factor, for we have found that it correlates with the inorganic phosphorus content of the blood only to the extent of −.14. Moreover, the determinations of lipoid and of total phosphorus show no higher relationships to intelligence than do those for inorganic phosphorus. The ratio of lipoid phosphorus to total phosphorus does, indeed, correlate more highly with intelligence, but, as this relation is vitiated by a correlation of +.30 between this ratio and chronological age, further work with controlled age groups is essential for its interpretation.

The relationship of phosphorus metabolism to mental phenomena is a problem which is as yet far from solution. We have noted elsewhere[3] a correlation of −.51 between intelligence and the excretion of phosphorus per unit of body weight. As the significance of this figure is lessened by the fact that it was obtained from only 28 subjects, it was suggested that verification was most desirable. This definitely positive result from a study of urinary excretion, the negative results mentioned above, and Powers' positive findings, taken together, suggest a complexity of relationship that urgently calls for further work. Our interest has been primarily in connection with certain non-intellectual traits, with which both the calcium and the various types of phosphorus in the blood likewise failed to show any significant correlations.

In his first paragraph, Powers makes reference to the lack of previous work on the relationships of body chemistry to mental phenomena, and characterizes the work that has been done as "vague." This broad statement can not be allowed to pass unchallenged. For example, the literature contains a group of studies, too numerous to mention in detail here, on the differential chemistry of the psychoses and neuroses.[4] In general, the procedures have been similar to that of Powers, save that psychotics or neurotics, instead of idiots, were compared to normals. Many of these studies have yielded negative results and they have often contradicted one another, but they have hardly been "vague." Such work as that of Starr[5] and Stratton[6] on stammerers likewise reached definite conclusions, and the writer[7] has published correlational values. One fears that Powers has been somewhat overhasty in drawing his indictment, for he has himself published nothing more definite than can be found elsewhere.

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[3] G. J. Rich, *Jour. Abnorm. and Social Psychol.*, 23: 172, 1928.

[4] Reviews of the earlier of these papers may be found in: A. Schaefer, *Monatschr. f. Psychiat.*, 2: 157–162, 229–242, 377–386, 443–451, 1897; F. M. Barnes, *Amer. Jour. Insanity*, 68: 431–472, 1912; and K. M. Bowman, *Amer. Jour. Psychiat.*, 2: 379–408, 1923.

[5] H. E. Starr, *Amer. Jour. Psychol.*, 33: 394–418, 1922.

[6] L. D. Stratton, *Jour. Compar. Psychol.*, 4: 325–346, 1924.

[7] G. J. Rich, *Jour. Abnorm. and Social Psychol.*, 23: 158–175, 1928; *Arch. Neurol. and Psychiat.*, 20: 589–594, 1928.

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