sheath contour are present throughout the peripheral nervous system. Furthermore, this additional evidence suggests that it is incorrect to imply that the presence of extensive infoldings of the myelin sheath should be interpreted as an indication of early degenerative change[7].

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PSYCHIATRY

Macroglobulin Elevations in Functional Mental Illness

THIS communication reports the results of analytical ultracentrifuge analyses on sera of 50 acutely mentally disturbed patients. Sera were taken within 24 hr. of admission to hospital and prior to institution of definitive therapy. Phenothiazine, monoamine oxidase inhibitor or electroshock therapy had not been given to any patient during the three months prior to serum collection. The diagnoses were varied; but all patients had an acute mental disturbance of sufficient severity to warrant hospital admission. Consecutively admitted patients were used excluding only those with known organic brain disease, alcoholism and those known to have had drug or electroshock treatment during the previous three months. Sera of 48 blood bank donors were used as controls. Sera were stored at −15° C. until analysis, which was usually within 8 weeks of collection. (Analytical ultracentrifuge examinations were made by the Institute of Medical Physics, Belmont, California.)

Table 1 shows that the mean level of S19 class proteins was significantly elevated in the patients as compared with controls. This finding confirms the previous suggestion[1,2] of such an elevation, and, being present in this group of patients, denies the argument that it is secondary to drug or electroshock therapy or prolonged stay in an institution.

Table 1. ANALYTICAL ULTRACENTRIFUGE DATA

	No.	Mean levels of protein fractions (S_{20}) in gm. per 100 ml. serum ($\pm$ 1 S.D.)		
		S_4	S_7	S_{19}
Controls	48	5·4 ($\pm$0·51)	1·5 ($\pm$0·28)	0·234 ($\pm$0·083)
Patients	50	6·1* ($\pm$0·73)	1·6 ($\pm$0·34)	0·316* ($\pm$0·111)

* These values differ significantly from those of the controls ($P < 0.001$).

The mean value for S4 class proteins was also significantly higher in the patients. This might be thought strange since most investigators have found that the albumin-levels, as determined by electrophoresis, are low in psychotic patients[2-4]. However, those molecules sedimenting in the ultracentrifuge at the rate of S4 are not completely comparable with those migrating electrophoretically as albumin because the S4 class molecules, although mostly migrat-

ing electrophoretically as albumin, are widely distributed among the electrophoretic globulins[5]. High levels of S4 molecules are therefore compatible with low levels of electrophoretic albumin. The rise in S4 class protein could also contribute to the general rise in globulins that some authors have found by electrophoresis[3,4].

The meaning of these abnormal proteins in the sera of psychotic patients is still not clear. The possibility was previously raised[2] of an auto-immune pathogenesis in some functional psychoses, partly because the S19 class macroglobulins are known sometimes to have antibody-like activity. More evidence along these lines is being obtained in this laboratory and will be published soon[6]. Other possibilities are: that the brain has some regulatory activity over protein synthesis; that the abnormal proteins directly reflect abnormal cerebral metabolism; and that the abnormal serum proteins represent infective particles of small virus size. Elucidation of the cause of the serum protein disturbance in mental illnesses might provide an important clue to their ætiology.

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STATISTICS

An Iterative Method for obtaining Statistical Frequency Distributions from Limited Experimental Data

IN the determination of statistical mean values of randomly distributed tin cans in a thermal ballast system required for the air receiver of a blowdown wind tunnel, the iterative process outlined here has been found useful.

Initially twenty determinations were made of the average number of tin cans (open at both ends) of diameter $2\frac{3}{8}$ in. and height 3 in., made out of 28 gauge sheet, required to fill a cubical box of dimensions 1 × 1 × 1 ft. in a random distribution. These numbers ranged from 77 to 84 as shown in Table 1. It was found difficult to draw a distribution curve connecting the rather limited number of experimental points obtained, as may be evident from Fig. 1, which shows the experimental values of the frequency F. The corresponding Gaussian distribution curve was also derived in accordance with the procedure shown in Table 1 using the formula $Y = \dfrac{1}{\sigma\sqrt{2\pi}}e^{-\frac{x^2}{2\sigma^2}}$

(refs. 1 and 2) as shown by curve (a) of Fig. 1.

By carrying out another series of a hundred experimental determinations, a satisfactory curve