TABLE I.
Comparison of Results Obtained in Present Method and Rehberg Method.

Subject No.	Observed Clearance This Method cc.	Observed Clearance Rehberg cc.	% Average Normal Clearance This Method	% Average Normal Clearance Rehberg	Difference in % Average Normal
1	128.9	125.0	87.1	84.5	+ 2.6
2	132.6	123.5	89.5	83.4	+ 6.1
	167.9	185.0	113.4	125.0	—11.6
	161.7	162.5	109.3	109.7	— 0.4
	163.1	167.0	110.2	113.6	— 3.4
3	103.6	107.7	69.9	72.7	— 2.8
	91.0	101.8	61.5	68.8	— 7.3
	81.7	85.4	55.1	57.7	— 2.6
	85.7	83.0	57.8	56.0	+ 1.8
	96.7	84.0	65.3	56.7	+ 8.6
	109.4	96.1	74.0	65.0	+ 9.0
4	35.1	33.8	23.7	22.8	+ 0.9
	41.1	45.0	27.8	30.4	— 2.6
5	143.1	153.0	96.8	103.4	— 6.6
	114.4	115.0	77.3	77.7	— 0.4
6	106.0	103.0	71.6	69.6	+ 2.0
	93.1	99.5	62.9	67.2	— 4.3
	90.1	96.5	60.9	65.2	— 4.3
	92.9	93.5	62.7	63.1	— 0.4
	101.7	96.5	68.9	65.2	+ 3.3
	87.8	86.5	59.3	58.4	+ 0.9
	98.5	101.0	66.5	68.2	— 1.7
7	10.5	11.6	7.1	7.8	— 0.6
	10.9	11.5	7.3	7.8	— 0.5
8	20.9	18.4	14.1	12.4	+ 1.7
9	138.5	136.5	93.5	92.2	+ 1.3
10	51.4	49.5	34.7	33.4	+ 1.3

employing a colorimeter with Burker optical system, and the other the present method.

Summary. A simplified method of obtaining the ratio of concentration of creatinine in urine and blood plasma for calculation of the creatinine clearance is described.

7298 C

Effect of Chlorides upon Distribution Ratio of Bromides in Blood and Cerebrospinal Fluid.

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It was found[1] that the quantitative determination of bromides by the Walter method was influenced by the variations in the chloride

[1] Malamud, W., Mullins, B. M., and Brown, J. R., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 1084.

concentration. In the presence of chlorides the bromides cannot be completely recovered by this test, and the loss is directly proportional to the degree of concentration of chlorides. It was pointed out that the use of distilled water in diluting the blood serum to be examined for bromides, introduced an error in that the loss of bromides in the blood was proportionally less than the loss in the cerebrospinal fluid. For this reason it was suggested that the blood should be diluted with a NaCl solution which will raise the concentration of chlorides in the serum to the degree found in the cerebrospinal fluid. Seeing that most of the reports on the distribution of bromides were made on the basis of investigations in which the blood was diluted with distilled water, we here report a series of cases in which this error was corrected.

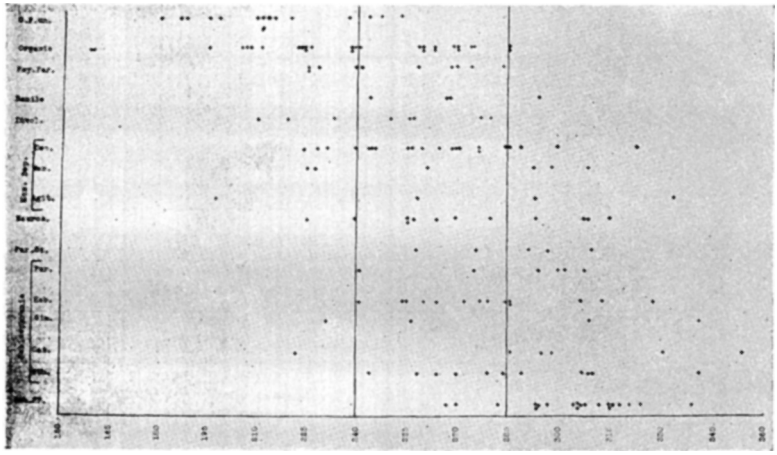

FIG. 1. Ratio of distribution of bromides in mental diseases.
Figures at the bottom refer to the permeability quotient (blood bromides: cerebrospinal fluid bromides). Designations along left-hand margin refer to different disease syndromes, *viz.:* general paresis, untreated; organic brain disease; psychopathic personality; senile psychoses; involutional psychoses; 3 subgroups of manic-depressive psychosis; neuroses; paranoid states; 5 subgroups of schizophrenia and schizoid psychopathies.

In Fig. 1 we have arranged the findings in 173 cases representing different forms of mental and nervous diseases on the basis of the distribution ratio of the bromides. The first thing that becomes apparent is that these ratios fall distinctly below those that have been reported previously.[2] The highest quotient in this chart is 354, whereas the low ones reach the level of 158. With this we

[2] Malamud, W., Fuchs, D. M., and Malamud, N., *Arch. Neurol. and Psychiat.*, 1928, **20**, 780.

also find that diseases such as psychopathic personalities, senile psychoses, etc., which have previously been shown to have a normal ratio varying between 280 to 320 in the present chart have fallen to a level predominantly ranging between 240 and 285. In other words, the absolute figures in determinations, where the error introduced by the distilled water is corrected, fall distinctly below the figures where this was not taken into consideration. Analysis of the chart shows, however, that the relative proportions of these figures and their relationships to different types of diseases remain practically the same as in previous publications. Thus we find that the untreated general paretics show consistently low figures; that is, the penetration of bromides into the cerebrospinal fluid is increased. This is also true but not quite to the same extent of the organic psychoses. On the other hand, the schizophrenias, schizoid psychopathies, and the paranoid states here too show a large proportion of increased figures (decreased permeability). A smaller portion falls within the new established normal limits, and only 2 of the cases are below the normal level. Similarly the manic depressive psychoses, the involutional mental diseases, and the neuroses show the same relative proportions as in previous investigations. This would justify the conclusion that although the true ratios in all of these cases are different from those obtained before, the characteristic deviations from normal and the interrelationships between the different types of diseases remain very much the same as before.

The chloride contents of the blood and cerebrospinal fluid in most of the diseases reported in the above chart do not differ very much from the normal. In the normal person the average blood chloride content is about 600 mg. per 100 cc., and that of the spinal fluid is about 720 mg. This ratio seems to hold true for a large proportion of mental diseases, varying between narrow limits. It was therefore felt that in most cases if the blood is diluted with a NaCl solution of a somewhat higher concentration than that of the spinal fluid, the resulting loss of bromides will be equal in both fluids and, therefore, will not influence the bromide ratio obtained. In some cases, however, especially of organic diseases, the chloride content either of the blood or of the cerebrospinal fluid is changed in a pronounced fashion, and in such conditions it is necessary to correct the findings before the ratio is obtained. For that purpose it was felt necessary to determine the exact amount of loss of bromides in different concentrations of NaCl and on this basis establish a set of figures that could be utilized in the determination of the bromide ratio in such cases. We have tabulated in a tri-dimensional

graph the relationships between the amount of bromides obtained to that actually present in solutions of NaCl of different concentrations. This graph to be used for purposes of correction in this method.

Known quantities of sodium bromide in the proportion of 20, 30, 40, and 50 mg. per 100 cc. were added to solutions of NaCl in water in concentrations of 400, 500, 600, 700, 800, and 900 mg. per 100 cc. The quantities obtained in each case were determined, and on that basis the above mentioned graph was prepared. With the aid of the above mentioned graph, given a certain figure representing mg. of bromide per 100 cc. and knowing the quantity of chlorides in that fluid, the amount of bromides actually present in the fluid can be computed. The graph was prepared on the basis of solutions of 20, 30, 40, and 50 mg., and as the loss seems to increase fairly regularly with the increase in chloride concentration we felt justified in assuming the figures between these quantities by dividing them into 10 parts. The error introduced up to about 50 mg. of chlorides in 100 cc. is so small that it was felt that in cases where the chlorides do not deviate from the normal in a very pronounced fashion the correction is not necessary, as the margin of error is not greater than the error usually introduced by colorimetric determinations.

7299 P

Skin Temperature Changes After Total Thyroidectomy.

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As a part of the careful study of patients submitted to the operation of total thyroidectomy for heart disease, we have conducted skin temperature observations before and after the operative procedure. We have utilized the method of Gibbon and Landis.[1] This method has been shown to produce adequate vasomotor dilatation and is far simpler than the other methods of injection of foreign proteins, the induction of a general or spinal anesthetic, or the blocking of sympathetic ganglia or peripheral nerves with novocaine or alcohol.

[1] Gibbon, J. H., Jr., and Landis, E. M., *J. Clin. Invest.*, 1932, **11**, 1019. Landis, E. M., and Gibbon, J. H., Jr., *Arch. Int. Med.*, 1933, **52**, 785.