augmented excretion within the first 2 days, which would indicate that there was no marked unsaturation of the body. No hemorrhagic skin manifestations were present. In 3 cases, the amount of hematuria remained the same or increased; in 2 cases there was a slight but not significant decrease, and in one case (M.W.) there was definite improvement, although the urine did not clear up by any means. This, however, may well have been coincidental since subsidence of hematuria in acute nephritis is the rule rather than the exception. Subsequent follow-up of these 6 cases showed that 3 of the 6, including this last one, finally cleared the hematuria. The amount of albuminuria was not altered during administration of ascorbic acid, except in M.W.

Our studies have been unable to confirm the benefits of ascorbic acid on nephritic hematuria reported in the literature. While this study was in progress, Walther[10] reported negative results similar to ours in 3 cases of hematuria and glomerulo-nephritis. It is our opinion that the administration of Vitamin "C" is not indicated for the hematuria of nephritis unless there is clear-cut evidence of Vitamin "C" deficiency.

Summary. In 5 patients with hematuria due to acute or subacute nephritis, the administration of ascorbic acid in massive doses over a period of 6 to 10 days sufficient to saturate the body stores had no significant effect on the amount of hematuria or albuminuria. In one case there was a definite decrease but coincidental spontaneous improvement could not be excluded.

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Diluted and Undiluted Diphtheria Toxoid as Immunizing Agents in Man.

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Hartley[1] observed that guinea pigs injected with diluted toxoid attained a higher immunity to diphtheria toxin than those receiving an equivalent amount of undiluted toxoid. These results were confirmed by Timmerman and Brandwijk.[2] The present study was

10 Walther, G., *Med. Klin.* 1938, **8**, 260.

1 Hartley, P., *Brit. J. Exp. Path.*, 1935, **16**, 468.

2 Timmerman, W. A., and Brandwijk, A. C., *Brit. J. Exp. Path.*, 1936, **17**, 252.

undertaken to discover the relationship of concentration of toxoid to antitoxin-production in human subjects.

Thirty-three medical students were selected in the spring of 1936, each of whom had less than 0.002 units of antitoxin per cc of blood serum. In the fall, each was tested for sensitivity to toxoid by the Moloney[3] test; 7 reacted positively and were eliminated. The names of the remaining 26 students were listed alphabetically and divided alternately into 2 groups; Group A students to receive diluted, and Group B, undiluted toxoid. The first injection was given on November 3, 1936, three weeks after the test for sensitivity. Each student was bled at this time. Two in Group A and one in Group B were found to show a rise in antitoxin on this bleeding, perhaps due to the [illegible] eliminated, leaving 11 in

ERRATUM

Article by H. B. Schmitz on Diphtheria Toxoid, Volume 39, p. 431, second paragraph should read: "The members of Group A received 2 injections of 0.5 cc and one injection of 1.0 cc of toxoid, diluted 10 times with normal saline. Those in Group B received the same amounts of undiluted toxoid." Also in line 6 of same paragraph, "14 Lf" should read "22 Lf."

[illegible] next 6 weeks; once a month for the next 3 months, and twice more at longer intervals. No Schick or Moloney tests were given during this period.

Antitoxin was titrated according to Fraser's[4] modification of the original Römer method. The sera were tested for 0.002, 0.004, 0.01, 0.02, 0.05, 0.1, 0.5, 1, 2, and 5 units of antitoxin.

Table I is sufficient to illustrate the results. All individuals showed a rise in antitoxin-level. In Group A, 3 showed increased titers after the first injection and 7 others after the second. In Group B, 4 showed increased titers after the first injection and 8 after the second.

Among those responding to the first injection, the intervals to first response were similar in both groups. In Group A one individual increased his titer within 2 weeks, one between the second and

[3] Moloney, P. J., and Fraser, C. J., *Am. J. Pub. Health*, 1927, **17**, 1027.

[4] Fraser, D. T., *Trans. Roy. Soc. Can.*, 1931, Sect. V, p. 175.

TABLE I.

Distribution of Medical Students According to Diphtheria Antitoxin Titers at Various Periods Following Toxoid-injections. All Titers at Time of First Injection Were Less than .002. Group A: Diluted toxoid 1:10. Group B: Undiluted toxoid.

Antitoxin level (units per cc)	4 wk after *first* injection		3 wk after *second* injection		4 wk after *third* injection		68 wk after *third* injection	
	A	B*	A	B	A	B	A	B
Less than 0.002	8	9	0	0	0	0	0	0
0.002-0.01	1	0	2	3	0	0	2	3
0.01-0.1	1	1	4	1	1	2	5	4
0.1-1.0	0	1	3	4	6	5	3	5
More than 1.0	0	0	1	4	3	5	0	0

*One serum not titrated.

fourth, and one between the fourth and sixth. All save 2 of those responding to the first dose of toxoid ultimately showed relatively higher levels of antitoxin, that is, over 2 units.

All 15 individuals who did not respond until after the second injection showed rises in titer within 3 weeks after the second dose of toxoid. After the third dose, all but 3 showed further increase. The highest levels reached by these 15 were on the average substantially lower than for those who responded to the first dose of toxoid, but there was no significant difference between the groups.

On the final titration, all members of both groups had fallen from the highest point, but retained significant amounts of antitoxin.

Two individuals who had been previously immunized with toxin-antitoxin were among those responding to the first injection of toxoid. Two others who had had diphtheria responded to the second dose and showed no significant variations in immune response from others in their groups.

Taken by and large, no differences were observed either in rapidity of response or in amount of antitoxin produced between a group of young adults treated with undiluted diphtheria toxoid and a comparable group given the same toxoid diluted 10 times with normal saline. Furthermore, the rate of loss of antitoxin from the blood stream was about the same in both groups although individuals varied greatly in this respect.