cotton rat, the albino rat, and the guinea pig suggests that the cotton rat occupies a position midway between the other two species regarding its susceptibility to infection with pathogenic bovine tubercle bacilli. It is definitely more susceptible than the naturally resistant albino rat but not as highly susceptible as the guinea pig. Like the albino rat, the tuberculous cotton rat is insensitive to skin-test doses of tuberculin, and tolerates large amounts injected subcutaneously. Since the observations on tuberculin shock are based upon findings obtained from only one animal, further work is necessary to confirm this point.

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Hypoaminoacidemia in Patients with Pneumococcal Pneumonia.

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The observations by Farr and MacFadyen[1] and Farr[2] on the incidence and duration of hypoaminoacidemia in children with the nephrotic syndrome have reopened the question of the constancy of blood amino acid concentration in other disease states. Because of certain clinical similarities between the onset of recovery in pneumococcal pneumonia and that of children from nephrotic crises, as well as the prevalence of pneumococcal infections in nephrotic children, we believed that extension of studies on blood amino acids to diseases other than Bright's disease might profitably begin with pneumonia.

Studies of plasma amino acids on all patients admitted to the pneumonia service in this hospital have been made. While these are not yet completed, the results thus far have been sufficiently striking and uniform to warrant reporting them.

Methods. Blood was drawn from each patient immediately upon admission to the hospital and before any therapy was begun. Subsequently, blood was drawn at selected intervals, when possible after an overnight fast, otherwise after an interval of at least 4 hours had elapsed from the time when the last protein-containing food was given. The blood was drawn with care to prevent hemolysis, ox-

1 Farr, L. E., and MacFadyen, D. A., *Am. J. Dis. Child.*, 1940, **59**, 782.

2 Farr, L. E., *J. Ped.*, in press.

alated, and immediately centrifuged. The plasma was pipetted off and the sample kept in the icebox until the analyses could be run. Plasma amino acid nitrogen was determined by the ninhydrin-CO_2 method of Van Slyke and Dillon[3] as applied to blood by MacFadyen and Van Slyke.[4] Farr and MacFadyen[1] have already pointed out that

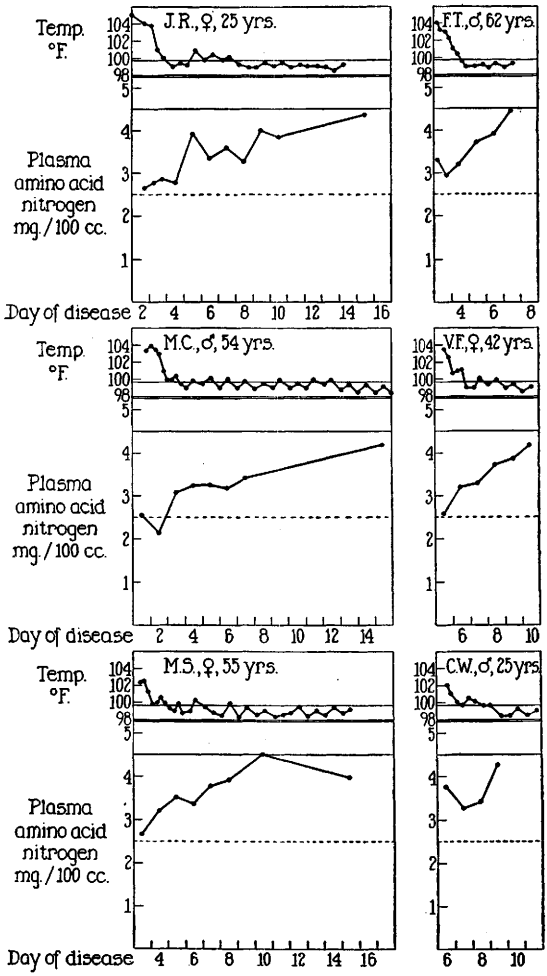

FIG. 1.

Graphic summary of results of serial plasma amino acid nitrogen determinations on 6 patients with pneumococcal pneumonia. The average normal value for plasma amino acid nitrogen is 4.50 mg per 100 cc. The critical value for nephrotic crises is 2.5 mg per 100 cc as indicated by the broken line. Note the pronounced hypoaminoacidemia during the acute phase of the disease followed by a rise during recovery. Temperature charts are included to briefly summarize the clinical course.

[3] Van Slyke, D. D., and Dillon, R. T., *Compt. rend. Lab. Carlsberg*, 1938, **22**, 480.

[4] MacFadyen, D. A., and Van Slyke, D. D., in preparation.

even the Van Slyke nitrous acid method[5] may be inadequate to permit detection and interpretation of small changes in plasma amino acid levels. For this reason the ninhydrin-CO_2 method was used in this study because of its greater specificity.

Results. The results on 6 patients are summarized graphically in Fig. 1. As early as the first day of disease a distinct drop in the plasma amino acid nitrogen had occurred. With recovery from the pneumonia all patients showed a rise of the plasma amino acid nitrogen to normal levels. Whereas the average concentration of plasma amino acid nitrogen in nephrotic children was about 3 mg % which decreased to as little as 1.2 mg % during nephrotic crises,[1, 6] the lowest value thus far observed in pneumonia patients was 2.17 mg %. Data at hand indicate the normal average plasma amino acid nitrogen to be 4.50 mg per 100 cc with the standard deviation ± 0.46.

All patients in the present series were treated with sulfapyridine. Unpublished data indicate that in therapeutic doses this drug has no effect upon the plasma amino acid concentration.

Studies are at present under way in this clinic on the plasma amino acid nitrogen concentration in a variety of acute infectious diseases and in a few selected metabolic disorders. Until additional data have been obtained, the physiological significance of hypoaminoacidemia cannot profitably be discussed.

Summary. Observations on the plasma amino acid nitrogen of 6 patients with pneumococcal pneumonia are presented. In each instance during the acute phase of the disease the patient showed a plasma amino acid concentration significantly below the average normal value. During convalescence there was a gradual rise in the concentration of plasma amino acid nitrogen, with a return to a normal level on complete recovery from the disease. Present data indicate the normal average value to be 4.50 mg per 100 cc.

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5 Van Slyke, D. D., *J. Biol. Chem.*, 1929, **83**, 425.

6 Farr, L. E., *Am. J. Dis. Child.*, 1939, **58**, 939.