

stain was due either to the presence of human or cat serum. (This conclusion can be drawn from the relationship values previously obtained.) The next step would be to test for human or cat blood. The investigators using the "trial and error" method would (if the reaction was not 100%) proceed to test for beef, sheep, horse and other bloods until they got a positive test. Certainly this latter method is laborious and indirect.

In experimenting with the value of the precipitin test in the identification of mixtures of unknown bloods 3 methods were tried, only one being successful. The successful method was that of specific absorption. Various antisera were absorbed with heterologous serum and this took out the antibodies for the heterologous serum and left only specific antibodies. This absorbed antiserum would then identify only a homologous serum in a blood mixture. By using several different absorbed antisera the components of a mixture could be positively identified for the "Mammalian Reaction" of Nuttall did not occur in the dilutions of antigen employed. Two controls, besides the usual antiserum control, are necessary in performing these tests. One control contains the absorbed antiserum plus the heterologous antigen used for absorption and the other contains the absorbed antiserum plus the homologous serum. Practice in diagnosis included, first, tests of known mixtures and, secondly, unknown mixtures prepared by Dr. Boyden. The individual bloods of 4 unknowns were identified and the quantity of each was closely approximated, thus showing the trustworthiness of the technique employed.

4651

Dietary Requirements for Fertility and Lactation: XXI. Further Studies of the Role of Wheat Oil in Lactation.*

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In the early attempts to prevent sterility on a skimmed milk powder reproduction-deficient diet, the addition of wheat oil resulted not only in fertility, but also in excellent lactation when that oil constituted as much as 3% of the ration. The reduction of the concentration of the oil to 1% did not produce any significant change in fer-

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tility but was followed by a greater infant mortality. Similar results were obtained by the addition of various concentrations of corn oil and of cotton seed oil to the sterility-producing diet.¹ That phenomenon was used as one of the arguments that vitamin E may be composed of 2 fat-soluble vitamins, one essential for fertility, and another indispensable for lactation. It was stated, however, in previous communications that convincing evidence for such an hypothesis was still lacking.¹ The inability to secure evidence for the existence of a specific fat-soluble galactagogic vitamin on a dietary regime composed of purified food substances² stimulated a further attack on the problem. In an attempt to secure more conclusive information, Sherman and Muhlfeld's diet³ (composed of whole wheat, 66.7; skimmed milk powder, 32; NaCl, 1.3) was adopted. This ration contains approximately 1.3% wheat oil as a source of vitamin E, furnished by the wheat,⁴ and if vitamin E plays a specific rôle in lactation, it was anticipated that the further increase of wheat oil to the extent of 3% in the total diet, after vitamins A and D have been amply provided for, should produce an appreciable increase in the lactation efficiency index. Accordingly, the above diet was first supplemented with a brand of cod liver oil found in previous trial in this laboratory to be entirely deficient in vitamin E.⁵ The cod liver oil was administered separately from the ration, in dosages of 0.1 cc., 0.2 cc., and 0.3 cc. daily to each animal. One to 2% wheat oil, and also one to 2% butter fat (the latter fat, being deficient in vitamin E,⁶ served as a control) were added to the diet, which was supplemented by the varying amounts of cod liver oil, as a source of vitamins A and D. The optimum results in lactation were secured with the daily dosage of 0.3 cc. cod liver oil, as a supplement to the Sherman Muhlfeld diet. It also became apparent that, in the presence of daily allowance of 0.1 cc. cod liver oil, the addition of small amounts of butter fat and wheat oil supplemented that diet. Since I have already demonstrated⁷ that wheat oil, in addition to being the most potent source of vitamin E, also contains appreciable amounts of vitamin A, it is quite possible that wheat oil supplemented the above diet by virtue of its vitamin A, and not by its vitamin E content. It is also quite possible that in previous

¹ Sure, B., *J. Biol. Chem.*, 1926, lxi, 29, 53.

² Sure, B., *Ibid.*, 1928, lxxvi, 659.

³ Sherman, H. C., and Muhlfeld, M., *Ibid.*, 1922, liii, 41.

⁴ Henry, W. A., and Morrison, F. B., *Feeds and Feeding*, 18th ed., 1913, 712.

⁵ Sure, B., *J. Biol. Chem.*, 1927, lxxiv, 45.

⁶ Sure, B., *Ibid.*, 1927, lxxiv, 71.

⁷ Sure, B., *J. Agr. Res.*, 1928, xxxvii, 93.

studies, involving additions of cod liver oil to skimmed milk powder diets, there has been considerable destruction of vitamin A, which is suggestive from the work of Anderegg and Nelson⁸ and from the studies of Mattill,⁹ and that wheat oil acted partly as a protective mechanism against vitamin A oxidation⁹ and partly as a vitamin A supplement, as indicated by the results of this investigation. That vitamin A is a limiting factor in the diet referred to from the standpoint of growth, reproduction and longevity has already been demonstrated by Sherman and MacLeod.¹⁰

4652

Phytopharmacological Reactions of Blood Serum from Leprosy, Tuberculosis and Syphilis.

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The author has called attention to the fact that by means of living plant-physiological test objects various toxins could be detected in the human blood which cannot be demonstrated by zoopharmacological methods. A marked toxicity was noted by Macht and Lubin in the blood of women at the beginning of the menstrual period.¹ Macht has demonstrated the presence of a toxin in the blood of pernicious anemia patients,² which led to useful clinical applications in respect to differential diagnosis and evaluation of therapeutic procedures.³ The author, in collaboration with Pels, has shown also a toxin to be present in the blood serum and in the contents of the vesicles of patients suffering from pemphigus.⁴ In the present communication, the results of an extensive study of a series of blood sera from patients suffering with tuberculosis, syphilis and leprosy, respectively, are reported.

A series of blood specimens from tuberculous patients were obtained, partly from the Tuberculosis Clinic of the Johns Hopkins

⁸ Anderegg, L. T., and Nelson, V. E., *J. Ind. and Eng. Chem.*, 1925, xvii, 451.

⁹ Mattill, H. A., *J. Am. Med. Assn.*, 1927, xci, 1505.

¹⁰ Sherman, H. C., and MacLeod, F. L., *J. Am. Chem. Soc.*, 1925, xlvii, 1658.

¹ Macht and Lubin, *J. Phar. Exp. Therap.*, 1924, xxii, 413.

² Macht, *J. Phar. Exp. Therap.*, 1926, xxix, 461.

³ Macht and Anderson, *J. Phar. Exp. Therap.*, 1928, xxxiv, 365.

⁴ Pels and Macht, *Arch. Dermatol. and Syphilol.*, 1929, xix, 640.