THE INORGANIC ELEMENTS IN THE NUTRITION OF THE RAT

IN this laboratory it has for years been our practice to use in most of our experimental rations the usual yeast-casein-dextrin-butterfat mixture with the inorganic requirements provided by either salt mixture No. 185 or No. 51. The latter is simpler to prepare than No. 185 and gives excellent results when fed at 6.1 per cent.

Since 1933 we have been observing the results of lowering one or more of the inorganic elements on growth, reproduction and longevity. A preliminary report of our findings was presented at the Fifteenth International Physiological Congress in Moscow in 1935.

Subsequent investigations have revealed striking abnormalities in kidney structure. Of 152 animals examined grossly 70 showed hypertrophy, abnormal color and marked pitting of the surface. In several cases there were watery cysts of varying sizes on the surface of the kidneys. In all cases the capsule was easily stripped. Animals on the breeding stock ration of the same age seldom reveal such abnormalities and if so never to so marked an extent.

The nature of these changes is being studied by a pathologist and will be reported in detail at a later date along with the composition of the diets employed.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

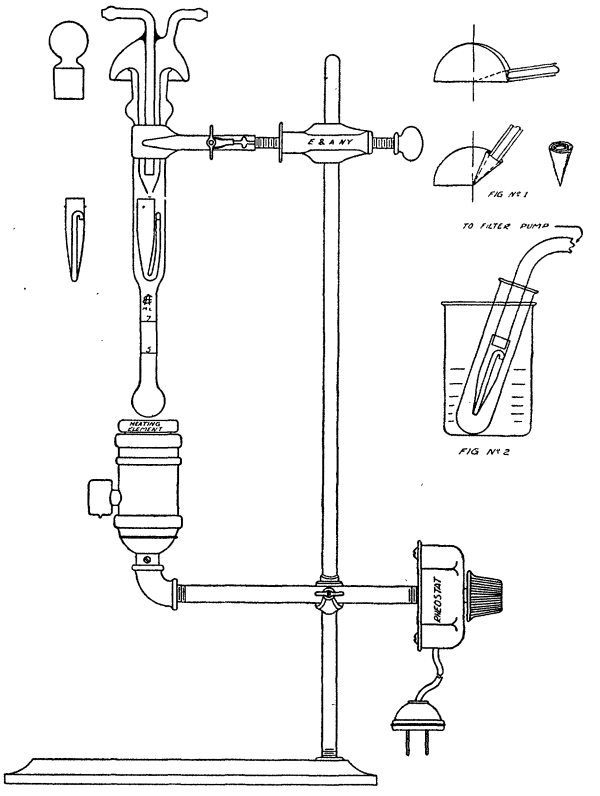
AN APPARATUS FOR THE MICRODETERMINATION OF CHOLESTEROL IN BLOOD

CHOLESTEROL is usually determined by adding acetic anhydride to a chloroform extract and comparing the color with that obtained from a standard solution. A very convenient apparatus for extracting the cholesterol and developing the color without transfer consists of an extraction tube, in the form of the usual Folin-Wu sugar tube, graduated at 5 and 7 cc and furnished with a glass stopper, a micro Soxhlet extractor, designed to fit within it, and a "mushroom" condenser.

The extractor also serves to dry the blood. A disk of filter paper, 5.5 cm in diameter, is folded in half. The pointed end of a pencil is placed between the two halves just at the folded edge, and then the paper is rolled into a narrow cone around the pencil (Fig. 1). This cone of paper is inserted into the wide portion of the extractor well into the taper. 0.2 cc of blood (which can be secured by finger prick[1]) are drawn up into a fine tipped pipette and then allowed to soak into the paper. The blood is dried *in situ* by connecting the extractor to a suction pump by means of a heavy-walled rubber tube that fits within the wide end snugly, and then placing the extractor in a dry test-tube immersed in boiling water (Fig. 2). A current of air is drawn through the extractor for fifteen minutes to dry the blood.

The bulb of the extraction tube is filled with dry chloroform, and then the extractor and condenser are placed in it. The extractor is conveniently inserted and removed by inserting a forceps with the jaws closed. On allowing the jaws to spring open, they will engage the extractor and permit its handling.

The apparatus is set up as shown in Fig. 3. The source of heat is a micro hot plate consisting of a cigar lighter element in series with a rheostat. The extraction is allowed to continue for half an hour or more. The extractor is removed, the level of the chloroform is adjusted to the 5 cc mark, and acetic anhydride is added to the 7 cc graduation. 0.1 cc of sulfuric acid are added and the color developed is compared in the usual way.



FIGS. 1–3

[1] SCIENCE, 86: 201, 1937.