Bull., 1956). This free amine is present in dogfish plasma in trace amounts and in some cases is not detectable in plasma by the method of analysis.

We attempted to identify this volatile amine in the urine by the paper chromatographic method of Bremner and Kenton (1951). The volatile primary and secondary amines may be identified positively by this method; the volatile tertiary amines cannot be identified.

The volatile amine in dogfish urine was chromatographed and compared with standard solutions of various amines run simultaneously.

No primary or secondary amine in dogfish urine could be identified in spite of the presence of a volatile amine found in the urine by microdiffusion analysis. Thus by exclusion, the voltile amine has been assumed to be trimethylamine. Definitive chemical identification of this amine is planned.

This study was carried out in a laboratory maintained by the New York University College of Medicine.

Studies of Trimethylamine Oxide Excretion In The Dogfish I. The Renal Excretion Of Trimethylamine Oxide (TMAO) By The Dogfish, Squalus acanthias.

Julius J. Cohen, Marcus A. Krupp, Charles Chidsey, and Susan Hook,
University of Cincinnati College of Medicine, Palo Alto Medical Research Foundation, Columbia University College of Physicians and Surgeons, and Mt. Holyoke College.

The study of the renal excretion of TMAO by the dogfish was confined to: 1) A study of the extent to which the plasma TMAO is filterable at the glomerulus and the completeness of reabsorption of this TMAO by the elasmobranch renal tubule; 2) A study of the effect of some substances which are known either to affect tubular reabsorption generally or else may be related specifically to TMAO synthesis or degradation.

The protein binding of TMAO was determined at 12° C. by the dialysis technique using a Visking membrane. Binding of endogenous TMAO to the endogenous protein only was studied. Under these circumstances all the plasma TMAO was found to be freely filterable, with the concentrations of TMAO on both sides of the membrane being essentially equal (Mean Pf/P - 1.01 in 6 freshly drawn plasmas).

In a series of 21 dogfish studied under control conditions, the reabsorption of TMAO was almost complete, varying between 95 - 100% of the amount filtered.

In a group of pilot experiments performed to either change general tubular reabsorptive mechanisms or to affect the metabolism of TMAO, the following substances were given: 1) Phlorizin, 10 mgm./Kgm., I. M.

2) Choline chloride, 5 mMo/Kgm., I. M., 3) Trimethylamine MCl (TMA), 5 mMol/Kgm., I. M.

Phlorizin had no effect on TMAO reabsorption; choline resulted in the death of the fish; TMA resulted in an increased excretion of TMAO as well as of TMA. Therefore, the effect of TMA was studied further.

Observations made on 6 dogfish during clearance experiments after a single I. M. injection of TMA revealed that in 5 of the 6 fish, TMAO reabsorption decreased markedly. Thus, the per cent of TMAO reabsorbed fell to between 27% and 82% of the filtered load without any significant change in plasma TMAO or GFR.

Associated with this change in reabsorption of the oxide was a rise in the (TMA) in plasma. The rise in excretion rate of this free amine was such that net secretion of TMA occurred. This has been assumed to be due to the constant pH gradient between plasma and urine in the dogfish which allows the free amine to diffuse into and be trapped in the acid urine as the trimethyl - ammonium ion.

The increase in TMAO excretion following TMA is to be further investigated from the standpoint of: 1) Possible synthesis of TMAO from TMA by the kidney, 2) Formation of an intermediate product from TMA which competes with or blocks TMAO reabsorption.

This study was carried out in a laboratory maintained by the New York University College of Medicine.

Development of Esterase in the Egg of Marinogammarus (Amphipoda)

William L. Doyle and R. Rappaport
University of Chicago and Union College

Marinogammarus finmarchicus (brown eggs) and *M. obstusatus* (red eggs) were collected from beneath Fucus on the Laboratory beach and kept in mesh trays in the laboratory in running sea water at 14° - 17°C. Eggs were removed daily from ovigerous females and raised in watch-glasses. Both species develope at essentially the same rate and hatch in 19 - 21 days.

Esterase activity was measured in terms of hydrolysis of 0.02 M alpha naphthyl acetate at pH 7.25 and 40°C. Eggs were placed in micro reaction vessels and all but 1 - 2 µl of sea water was removed. Fifty µl of 0.05 M tris buffer pH 7.25 (at 40°C) was added. The preparation was frozen and the plug of frozen buffer was rotated with a needle using the ice as a pestle to rupture the eggs. Frozen eggs retained full enzymatic activity for several weeks. To the buffer 100 µl of substrate 0.03 M was added and the tube placed in the water bath at 40°C. for 15 to 30 minutes. The napthol released was measured by a modification of Gomori's procedure. Two hundred µl of a freshly prepared mixture consisting of 5ml of 3%