Four uracil derivatives (5-bromouracil, 6-hydroxyuracil, 6-methyl-2-thiouracil and 6-propyl-2-thiouracil) gave no inhibition in concentrations up to 10^{-3} *M*. Substances which are effective inhibitors are listed in Table 1. Inhibitory effectiveness appears to be a common characteristic of the 2-thiopyrimidines, although 2-thiothymine is somewhat less active than the uracil and cytosine derivatives. Two purine analogs, 2,6-diaminopurine and 8-azaguanine (5-amino-7-hydroxy-1H-v-triazolo [d] pyrimidine), which have been found to inhibit virus multiplication (*3–5*), are less effective than the thiopyrimidines. The results with 8-azaguanine confirm the observations of Mathews (*5*), who showed that this substance reduces the number of local lesions formed by lucerne mosaic virus-inoculated leaves of *N. glutinosa*.

TABLE 1

PYRIMIDINE AND PURINE DERIVATIVES THAT INHIBIT TOBACCO MOSAIC VIRUS SYNTHESIS

Compound	Concentration (*M*)	Percentage inhibition
2-Thiouracil	10^{-4}	90–100
2-Thiocytosine	10^{-4}	90–100
2-Thiothymine	10^{-3}	90–100
2,6-Diamino purine	10^{-4}	80
8-Azaguanine	10^{-3}	60

In order to ascertain the point of attack of the thiopyrimidines, attempts were made to reverse their inhibitory effect by adding uracil, cytosine, and thymine to the nutrient medium. It was found that of these natural nitrogen bases, only uracil is capable of suppressing the inhibition that is due to the thiopyrimidines (Table 2). This result suggests that the inhibitory effect of thiocytosine and thiothymine is not due to interference with cytosine and thymine metabolism. On the contrary, the thiopyrimidines appear to have a common point of attack, a process which requires uracil.

These data confirm the earlier conclusion (*1*) that TMV-synthesis is uracil-dependent. The observation that 2,6-diaminopurine inhibits TMV synthesis is in agreement with a recent report by Ryzhkov and Marchenko (*6*). These authors also find that thiouracil is an effective inhibitor and is reversed by uracil.

TABLE 2

EFFECT OF PYRIMIDINES AND THIOPYRIMIDINES ON THE BIOSYNTHESIS OF TOBACCO MOSAIC VIRUS IN TOBACCO LEAF TISSUE

(Virus Present—Percentage of Control)

Concentration (*M*) pyrimidine	Thiouracil $10^{-4}M$	Thiocytosine $10^{-4}M$	Thiothymine $10^{-4}M$
None	7	10	5
10^{-4} Uracil	15	82	37
10^{-3} "	88	140	103
10^{-2} "	88	90	60
10^{-4} Cytosine	3	10	4
10^{-3} "	5	12	5
10^{-2} "	—	15	10
10^{-4} Thymine	3	18	3
10^{-3} "	3	28	4
10^{-2} "	—	33	13

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A Snail Intermediate Host of the Rabbit Parasite *Hasstilesia tricolor* (Trematoda: Brachylaemidae)

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Hasstilesia tricolor (Stiles and Hassal, 1894) is a small fluke frequently found in the small intestine of certain species of rabbits of the genera *Sylvilagus* and *Lepus*. Around Ithaca, an infected rabbit may contain as many as 15,000 flukes, and reports of 30,000–40,000 occur in the literature (*1*). The occurrence of such heavy infections in wild rabbits has led to considerable speculation on the life cycle of this fluke. Several workers have attempted to determine the mode of transmission, and some have suggested that a direct life cycle may exist in this species (*2*). Flannery (*3*) attempted to feed eggs from *H. tricolor* to laboratory rabbits, but was unable to demonstrate direct development. Hendrickson (*4*) and Haugen (*5*) both found the fluke more prevalent in rabbits taken from low, marshy ground, and the latter author indicated that the most severe infections occurred in winter. Harkema (*6*), working in an area which showed a "paucity of fresh water," could find no correlation between type of habitat or season and the number of flukes per rabbit.

The writer has recently found that in the vicinity of Ithaca a small land snail belonging to the genus *Vertigo* serves as the intermediate host of *H. tricolor*. Henry van der Schalie compared the snail with specimens in the University of Michigan Museum of Zoology and provisionally identified it as *Vertigo ventricosa* form *elatior* Sterki. A series of these snails has been placed in the parasitological collection of the Department of Entomology at Cornell University. Of 47 snails collected in one survey area during the summer of 1952, 31 were found to be infected with motile branched sporocysts in various stages of development. Mature sporocysts contained hundreds of spinous,

unencysted brachylaemid metacercariae measuring 48 μ × 34 μ.

During the latter part of the summer a domestic rabbit was caged on the ground in a field of orchard grass and goldenrod where infected *V. ventricosa* form *elatior* were known to occur. This rabbit was returned to the rabbitry after 2 weeks; it began to pass eggs of *H. tricolor* 25 days after exposure. A second rabbit was maintained in the rabbitry and fed infected snails. Ten days after the last feeding of snails this rabbit was examined and found to contain a number of partially grown flukes measuring about 250 μ in length. This latter experiment was repeated, using two test and two control rabbits. These rabbits were maintained on a diet of prepared pellets, heat sterilized hay, and water. The test rabbits were fed infected snails for 4 consecutive days. Ten days after the last feeding the two test rabbits were found to be infected with numerous partially grown specimens of *H. tricolor*. The two control rabbits were negative.

The ecology of *V. ventricosa* form *elatior* has not been extensively studied. The snail is apparently capable of surviving in relatively arid habitats. In wet weather, at temperatures above 40° F, it becomes active and climbs to a height of a foot or more on vegetation. Since the snail is about 1/16 in. long it could readily be accidentally ingested by a feeding rabbit.

Further studies on the life cycle of *H. tricolor* are in progress and will be reported later.

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Polarograms of Oxygen in Lake Water

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The dropping mercury electrode was used to determine oxygen in lake water by Manning (*1*). The writer was introduced to the method by W. A. Spoor, of the University of Cincinnati and of this institute, with a view to determining the oxygen uptake of small aquatic insects. Although this objective was not attained, several aspects of the application were investigated.

Polarograms of oxygen at four levels of oxygen concentration are presented in Fig. 1, for Lake Erie water (90 ppm total alkalinity). The voltage-current relationship consists of two waves, one in the region up to about 0.6 v, and the second from about 0.8 to 2.0 v. These waves are indistinguishable at 1.4 ppm of oxygen because of the slight current flow. Above

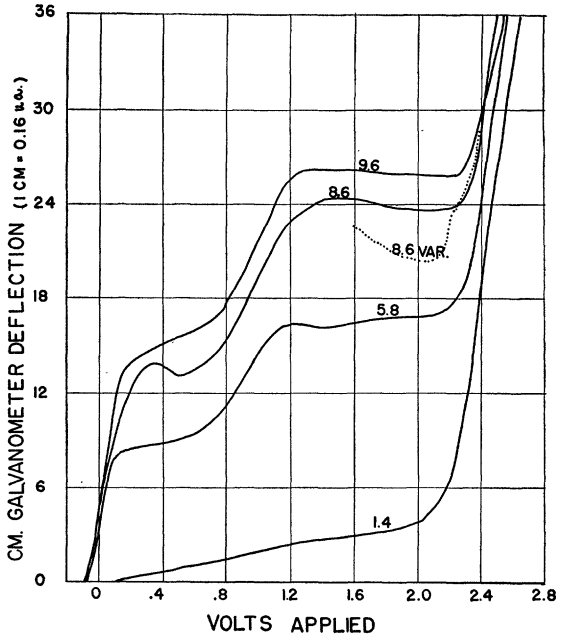

FIG. 1. Polarograms of Lake Erie water at 1.4, 5.8, 8.6, and 9.6 ppm concentrations of dissolved oxygen.

2.1 v the relationship followed was essentially that of Ohm's law at all levels of oxygen. At zero potential applied, a negative current is generally expected, as indicated by the extrapolation of the 1.4 curve. However, the calomel half-cell and external anode system was such that it acquired the polarity of the applied emf and could be made to register in either direction. The three upper curves had a basis of − 0.16 v vs. the saturated calomel electrode.

The existence of these oxygen reduction waves is well known. The points of interest here are (1) they were obtained with unmodified lake water in a flowing system, and (2) they indicate the best voltage at which to determine oxygen in such a system.

The flowing system was a plastic block drilled and fitted with 5 mm OD glass tubing. At right angles to this water line, holes were drilled in the plastic to receive the two electrodes: the cathode of marine barometer tubing; and the anode, a glass tube with a 5 mm diameter tip of Corning fine porosity, sintered glass filter. Mercury flowed through the capillary tubing, and saturated potassium chloride solution from a calomel half-cell seeped through the filter tip (0.16 ml flow/hr). Both these substances entered the water stream and were carried away in the effluent from the block. Voltages were applied across these electrodes and measured with a pH electrometer equipped with a voltage divider to increase its range. Electrical currents were measured with a moving coil, reflecting galvanometer. Water flow was controlled to within 1/10 ml/min by use of the Mariotte's flask principle in a constant-temperature room. The flow was 5 ml/min in the experiments presented in Fig. 1.

The usual procedure requires that the apparatus be