at right angles, measured with calipers.

From Table 1 it is apparent that the subcutaneous implantation of sarcoma-37 fragments into inbred male albino mice has resulted in a pronounced effect on their average liver catalase levels. From the sixth day after tumor inoculation, the enzyme content in the controls was progressively reduced to a marked extent, while the growth of the established tumors was steady and rapid. However, this depression of liver catalase was prevented, in large measure, by the oral administration of the urinary fractions, and, at the same time, the growth of the sarcoma-37 transplants was appreciably inhibited.

Of the smaller acidic molecules extracted from the urinary concentrates, many would have been able to pass through the dialysis membranes as their sodium salts, while proteins and similar large molecules would either have been precipitated by the additions of ethanol or else adsorbed upon the resultant precipitates. It might therefore be expected that the range of molecular weights contained in the extracts employed for these initial investigations would be restricted to comparatively narrow limits, although they were undoubtedly chemically diverse in nature.

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3. We are greatly indebted to R. F. Fleming for his supervision of the feeding of the mice.

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Water Taste in Phormia

The chemosensory hairs on the labellum of the blowfly *Phormia regina* have been studied extensively. Behavior studies indicate that there are at least two modalities of sensation: acceptable and unacceptable (*1*). Anatomical investigations have shown that there are two neurons associated with the receptor site at the tip of the hair (*2*). Electrophysiological techniques have demonstrated that the two neurons are differentially affected by salt and salt-sugar mixtures in water solution (*3*). Efforts to record the electric response to distilled water and to pure sugar solutions have been unsuccessful. These responses must be found in order to work out a complete theory of chemoreception in *Phormia*.

The present method of recording nerve discharges from single hairs makes it possible to study the response to distilled water and to many types of sugar and/or salt solutions (*4*). Basically, this method is a refinement of the earlier techniques, in which a 50-μ glass capillary, filled with the stimulating liquid, is brought into contact with the tip of the hair. A silver-silver chloride wire, in contact with the stimulating liquid and one input lead of the preamplifier, allows the capillary to be used as the recording electrode. The indifferent electrode is an uninsulated silver-silver chloride wire, which is inserted into the proximal end of the detached labellum of the fly.

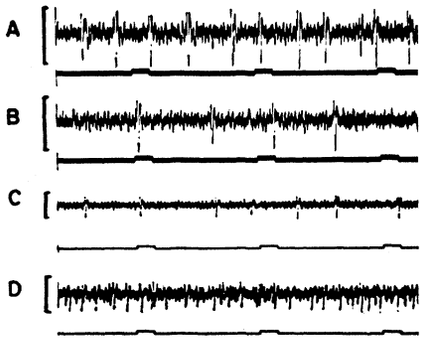

Fig. 1. (*A, B*) Response of a long hair to distilled water. (*C*) Response of a long hair to 0.1*M* *d*-fructose. This hair had no response to distilled water; (*D*) Response of a long hair to 0.1*M* *d*-fructose. This hair had a response to distilled water similar to *A*. In all records the time marks are 0.2 sec, and the voltage calibrations are 200 μv.

Because of the very high resistance (about 10^{10} ohms) of the recording electrode when it is filled with distilled water, a high impedance, negative capacitance preamplifier, designed by MacNichol and Wagner, was used (*5*). The output of this was fed into a conventional direct-current amplifier and oscilloscope for observation and photography. The response was occasionally recorded on magnetic tape, which was later played back and displayed on the oscilloscope for photography.

From behavior studies it is known that distilled water will produce a positive feeding reaction in a thirsty fly. The electric response to distilled-water stimulation consists of large and small impulses intermixed, with a high initial rate of discharge, as is shown in Fig. 1*A*. Adaptation to a lower frequency is rapid and at a different rate for each of the two neurons, as can be seen from a comparison of *A* and *B* in Fig. 1. These are portions of the same record, in which 30 seconds have elapsed between *A* and *B*. The final frequency of the small impulse may become zero in many cases. This response is similar to that obtained from a dilute salt-sugar solution. The character of the response is similar among hairs of the same type on the same labellum but varies from fly to fly. These variations seem to be dependent on the age and nutritional state of the fly. Experiments to explore this relationship are now in progress. Water-satiated flies may have little or no response to water—a single impulse every 5 or 10 seconds.

The response to a pure sugar solution may show a discharge from only one neuron or from two neurons, as is shown in Fig. 1*C* and *D*. In cases where only one neuron discharges, there is little or no response to stimulation by distilled water alone. A two-neuron response to pure sugar solution is usually found in a hair where there is a vigorous water response. This suggests that the sugar stimulates only one neuron and that the discharge of the second neuron is from the stimulation by water. In this way, the response to any solution can be analyzed into two parts: (i) the response to water and (ii) the response to the solute. Of course, if the hair has little or no response to distilled water, then its response to a solution will be almost entirely attributable to the solute. The question of whether or not the water stimulation sums linearly with that of the solute is being investigated in detail for different types of solutes.

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4. I wish to thank V. G. Dethier, for his help and suggestions, and E. F. MacNichol, Jr., for the loan of some of the equipment used. These studies were aided by a contract between the Office of Naval Research, U.S. Department of the Navy, and Johns Hopkins University. (N.R. 160–353).
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Equilibria as Origin of Differences in Spectra of Chlorophyll in Different Solvents

In the studies of the absorption spectra of solutions of chlorophylls from room temperature to the temperature of liquid nitrogen (*1*), the existence of several molecular species in equilibria became evident. These species were later (*2*) identified as solvates. It was surmised that the chief differences in the well-known spectra of a given chlorophyll from one solvent to another at room tem-