patterns on the EEG record. After such records were obtained Panparnit was administered intravenously in doses of 2–4 mg/kg. The cholinesterase values in percent of normal were determined in right cortex, left cortex, and right midbrain using Michel's method (7).

The therapeutic influence of Panparnit upon both brain waves and heart is shown in Fig. 1. This drug effectively abolished the grand mal-like patterns produced by DFP in each of ten instances. Panparnit was given in doses of 4.0 mg/kg in seven cases, 3.0 mg/kg in one case and

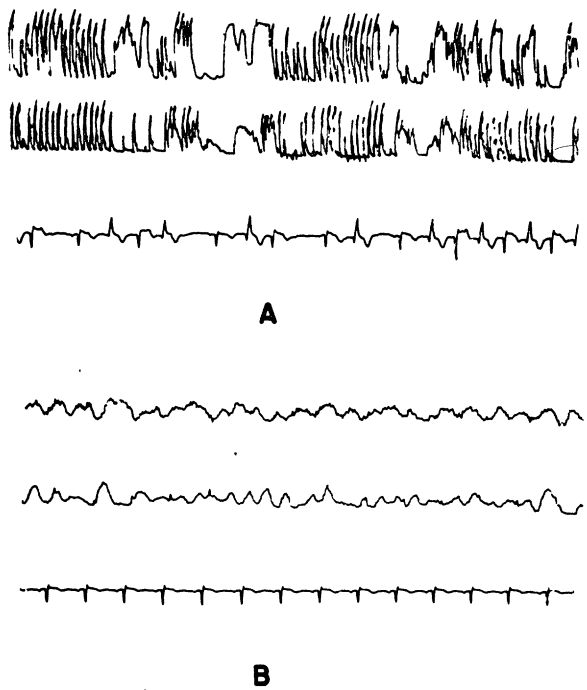

FIG. 1. Effect of Panparnit in abnormalities of brain and heart. A—After intracarotid injection of DFP (1.5 mg/kg). Grand mal-like electroencephalogram and profound disturbances of cardiac function. Top tracing from right cerebral cortex. Middle tracing from left cerebral cortex. Lowest tracing electrocardiogram. B—After intravenous injection of Panparnit (4.0 mg/kg). Elimination of abnormalities in electroencephalograph and electrocardiograph. Same order of tracings.

2.0 mg/kg in two cases. All spiking ceased within 3–4 min and was supplanted by patterns characterized either by delta-like waves or somewhat low potential aperiodic activity, resembling the control EEG. Although Panparnit abolished the abnormal EEG activity the cholinesterase levels of both cerebral cortices and right midbrain remained depressed. The cholinesterase values varied from 0.4% to 2.9% of normal, which is the expected range following the administration of DFP in doses of 1.0–1.5 mg/kg. The influence of Panparnit on the heart was manifested in those instances where the cholinergic action of DFP produced bradycardia and altered electrocardiogram (ECG) patterns concomitantly with convulsive-type EEG records. Panparnit appears capable of restoring such ECG records to normal pattern and rate.

Because Panparnit resembles atropine pharmacodynamically, in some respects, additional therapeutic explorations should be made to determine the influence of Panparnit in conditions associated with overactivity of the parasympathetic system, as well as on the convulsions produced by anticholinesterase drugs.

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Development and Viability of *Drosophila melanogaster* on a Medium Containing DDT

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It has been reported (*1, 3*) that the wild *Musca domestica* L. have become resistant to DDT in certain localities. With this in mind the author has attempted to increase the DDT resistance of *Drosophila melanogaster* by selection. The experiment is still in progress, but the incidental observations described here seem sufficiently interesting to warrant separate publication.

Technical DDT was dissolved in CCl_4 (C. P. Baker's Analyzed) and mixed thoroughly with a boiling cornmeal-agar-molasses medium. To insure evaporation of the solvent the resultant medium was boiled 5 min. The concentration used in these experiments was DDT 5 ppm of culture medium. Controls were cultured in normal medium for each experiment. In addition, a series of tests were conducted to ascertain the effects, if any, of CCl_4 added to normal medium. These cultures developed at the same rate and in the same manner as did the normal controls.

Wild-type adult flies 4–6 days old were introduced into 4-oz. bottles containing the experimental medium. All cultures were kept at 24° ± 1° C. Frequent comparisons were made of the experimental and control bottles. Altogether, 11 experiments of this type were run.

All controls were normal, the adults emerging in 10 days. The adults of the DDT cultures were unaffected by the altered food. Egg production, hatching, larval development, and the early stages of pupation were normal, but development was somewhat slower than in the control bottles. The later stages of pupal development, however, were abnormal, since the imagoes usually failed to emerge; in some cases, however, adults did emerge but immediately exhibited symptoms of DDT poisoning.

[1] The author wishes to thank Dr. E. H. Slifer for her suggestions and criticisms.

Extreme weakness, marked tremors, and an ataxic gait were evident. Such a fly was unable to spread its wings and hopped about erratically, frequently falling on its back. There was a decrease in ability of the insect to rise, until finally it could no longer right itself. A subsiding of activity accompanied by intermittent twitches followed. This continued for approximately 24 hr until death occurred. An attempt was made to save some of the flies by transfer of pupae from the experimental medium to a DDT-free medium. All of the flies which emerged from these pupae died, as did those already described.

Recent reports (*2, 4, 5, 6*) indicate that in mammals during starvation, DDT stored previously may be mobilized and have a harmful effect. The condition in *Drosophila melanogaster* appears to be analogous. DDT absorbed with food by the larvae is probably stored in the fat body. Later, during histolysis of the fat body in the pupae, DDT may be released in sufficient quantities to produce toxic effects.

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Microscopic Observation of the Living Tooth Pulp[1]

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There are centain advantages in being able to observe a living tissue microscopically while it retains its normal relationship within the animal. Even though by this method many structural and cytological features may be less clearly seen than in fixed and stained tissues, there is the distinct gain of being able to observe spatial and temporal changes as they occur either naturally or in response to experimental treatment. The pulp of a tooth, although protected by dense hard tissues, may readily be exposed to view in the rat incisor by the excavation of an "observation window" through these protective layers. By means of such a window it has been possible, especially with the use of appropriate vital dyes, not only to study characteristics of the blood flow, but to observe activities of certain of the cells composing the pulp.

[1] This investigation was supported by a research grant from the U. S. Public Health Service.

Since grinding of the window must be done under magnification by a dissecting binocular microscope, it is necessary to hold the tooth steady in the field. This was done by placing the anesthetized rat on its side and inserting the incisors into notches cut in a suitable block of wood that had been attached to the animal board. With the teeth thus firmly held, the distal (lateral) surface of one incisor was ground away with a size ½ dental burr. In order to facilitate adequate illumination of the pulp, the excavation was made to extend from labial to buccal margins and from the gingiva for a distance of 2–4 mm toward the incisal edge.

Grinding was done under the low power objective until the pink color of the pulp vessels became clearly visible through the remaining dentine. The exposed dentine was then flooded with a drop of mineral oil to prevent desiccation of the dentinal fibres and filling of the dentinal tubules with air. Under higher magnification (45× or 90×), the cutting was then continued, with great care to use progressively lighter pressure on the burr as the remaining dentine became thinner. Grinding was stopped while a thin layer of dentine still remained in tact over the delicate pulpal tissue. Some practice was necessary in judging the thickness of this layer and in avoiding any break-through into the pulp which would cause rupture or occlusion of the blood vessels. This layer could be reduced to a thickness of about 30 μ with careful grinding and, although not perfectly transparent, it permitted observation of individual corpuscles in the capillaries and movements of macrophages through the pulp after injection of methylene blue into the blood stream.

Through such an observation window the effects upon the flow of blood in the pulp were observed after various experimental manipulations. Retracting stress applied to the incisor was found to retard or stop the flow of blood. Electrical stimulation of the cervical sympathetic chain also slowed or stopped the flow, depending upon the duration of the stimulus. Stimulation of the distal stump of the severed inferior alveolar nerve or of the otic ganglion produced no observable effect. The manner in which the sympathetic impulse alters the blood flow is not as yet clear, since no change in caliber of arterioles within the pulp was detected. Furthermore, venous flow appeared to cease before arterial flow. These and other facts suggest that there may exist some special mechanism for the control of blood circulation in the teeth.

Observations can be made through the same window on successive days if no injury has been done to the pulp. However, in the rat incisor, which is continually erupting and wearing off, the window will move toward the incisal edge and will pass beyond the living pulp within 3 or 4 days. Attempts to study the pulp in teeth of cats, dogs, and monkeys have not met with the same success as in the rat, although in favorable cases the rate of blood flow through single vessels could be determined. Probably the difference in structure of the odontoblastic layer and arrangement of pulpal vessels accounts for the difficulty of observing them in these animals by the method which was successful in the rat.