stitute for quantitative measurements of specific attributes of responses, but it can point the way to attributes that deserve more detailed study. The display also presents a very reasonable, though qualitative, estimate of the variability in average evoked responses.

A PDP-4 computer (*4*), with a digital magnetic tape unit, was used to obtain the sliding averages shown in Figs. 1 and 2. The large storage capacity provided by the digital tape offered a number of conveniences that made the computations rather easy, but so much storage is not necessary for such computations. The sliding average itself is not a requisite for use of the photographic display, although it appears to have several advantages over averages computed from nonoverlapping, contiguous blocks of evoked potentials. The additional "smoothing" that it provides may in some instances yield a more satisfactory display. Transient phenomena and transitional forms of evoked potentials may be given added weight, an advantage in studies in which such phenomena are of interest.

The analog outputs from the PDP-4 were used as the inputs to a special-purpose digital-display device that added a small d-c voltage to the *X* and *Y* inputs of the oscilloscope with each sweep, and modulated the *Z* axis in accordance with the amplitude changes in evoked responses. The device, which also performs other operations, will be described in detail elsewhere (*5*); its resolution is sufficient to permit the superposition of as many as 256 average responses in a single photograph. Figures 1 and 2 were obtained by combining two (Fig. 1) or three (Fig. 2) photographs, each containing 256 average responses.

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LSD: Injection Early in Pregnancy Produces Abnormalities in Offspring of Rats

Abstract. *One of five rats given a single subcutaneous injection of lysergic acid diethylamide (LSD) early in pregnancy appeared to abort early; two delivered stunted stillborn offspring at term, one delivered a littler of seven healthy and one underdeveloped young, and the last one delivered an apparently normal litter. All five matched controls, given saline injections, went to term and delivered healthy litters of 11 to 16 offspring; there were no abortions and no stillbirths. In a replicate experiment, one of five rats given LSD on the 4th day of gestation aborted, two delivered some stillborn offspring, one gave an abnormally small litter of four, and the last one produced an apparently normal litter of ten. All matched controls delivered healthy litters, totaling 66. Some surviving offspring treated with LSD failed to develop as well as control animals. Treatment of five additional rats with LSD late in pregnancy had no obvious effect on the offspring.*

As part of a continuing investigation of toxic effects of psychotropic drugs (*1*), we have studied the influence of subcutaneous injections of "psychedelic" doses of lysergic acid diethylamide (LSD) on the course of pregnancy. Here are some preliminary results.

Obtained several years ago (*2*), the LSD was kept dry in the dark pending solution in saline at 5 μg/ml. Ultraviolet and fluorescence analyses revealed no significant degree of oxidation of the material. Healthy female rats, Wistar strain, 250 g, were mated with selected healthy males weighing 450 g. Pregnant females were divided into matched groups: one group received saline subcutaneously; the other, LSD at 5 μg/kg of body weight. This dosage was selected to correspond in rats to the human hallucinogenic dose which is said to range from 100 to 400 μg pr person—1.7 to 6.7 μg/kg for a person weighting 60 kg (*3*).

In the first experiment five rats received a single injection of LSD on the 4th day of pregnancy, with no further treatment (Table 1). Of these, one produced no young; autopsy showed that pregnancy had presumably terminated in abortion; ovaries and uterus were somewhat irregular and enlarged, one horn of the uterus being markedly constricted, with no trace of fetuses. Two rats that received LSD on the 4th day of pregnancy produced abnormal young: six of a litter of 13 were stillborn, as were all nine of the second litter. One rat injected with LSD delivered a litter of eight of which seven appeared normal, one being definitely stunted. The last injected rat delivered a normal litter of 16. Matched controls, given saline, delivered 11, 11, 13, 13, and 16 offspring, all apparently normal and healthy.

In the second experiment one animal that received LSD on the 4th day of gestation did not come to term. The weight curve indicated that pregnancy was interrupted during the 3 days following treatment with LSD. Another treated animal delivered a litter of 14, three of which were stillborn, with one more dying within 24 hours. A third rat delivered a litter of 11 including one stillborn. A fourth animal gave an unusually small litter of four normally appearing offspring. The last one delivered a healthy litter of ten. Again, matched controls produced apparently healthy normal litters averaging 13.

In the third experiment, five animals received similar single injections of LSD late in pregnancy (Table 1). There was no obvious effect on the apparently healthy offspring totaling 51—against 65 for the controls.

Table 1. Effects of prenatal treatment of rats with LSD. Each rat had a matched control, which was injected with saline; all controls delivered normal litters of 8 to 17 offspring. The day of gestation on which each rat was treated appears in parentheses.

Rat (No.)	Offspring	
	In litter (No.)	Nature
	Experiment 1	
2-3-2 (4)	0	Fetuses resorbed
2-5-2 (4)	9	All stillborn (2 stunted)
2-2-1 (4)	13	Six stillborn, remainder normal
2-6-2 (4)	8	Seven normal, one small
2-1-2 (4)	16	Normal
	Experiment 2	
1-2-1 (4)	0	Presumed abortion
2-6-1 (4)	14	Three stillborn, one died within 1 day
2-4-2 (4)	11	One stillborn
1-1-1 (4)	4	Normal; litter unusually small
2-4-1 (4)	10	Normal
	Experiment 3	
1-3-2 (7)	10	Normal
1-4-2 (8)	11	Normal
1 2-5 (10)	13	Normal
1-1-5 (13)	9	Normal
1-1-4 (16)	8	Normal

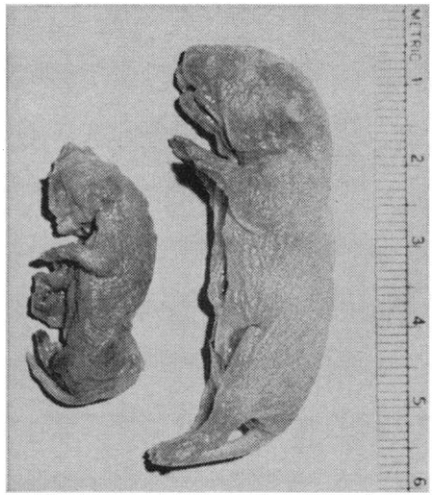

Fig. 1. Two stillborn fetuses of a rat (No. 2-5-2) injected with LSD early in pregnancy: one is fully developed; the other, immature.

Gross examination of the young from all experiments revealed some overall stunting of development in the case of three stillborn and one that survived for 6 weeks (Fig. 1), but no other abnormalities. Offspring from rats treated with LSD weighed at birth as much on the average as the controls; later some of them grew as well, but others failed to develop at the same rate. For example, average control offspring weighed 64 g at 10 days, while an average offspring of treated rat No. 2-4-1 weighed only 44 g; of treated rat No. 2-4-2, 44 g; and of treated rat No. 2-6-1, 46 g. The stunted offspring of treated rat No. 2-6-2 weighed only 54 g at 36 days, while his apparently healthy littermates weighed 80 to 106 g, averaging 96.5 g.

Our results possibly may be explained by the recent finding of chromosomal abnormalities in cultured cells grown in the presence of LSD (*4*).

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Diets for Rearing the Ambrosia Beetle Xyleborus ferrugineus (Fabricius) in vitro

Abstract. *Female ambrosia beetles placed on media containing sucrose, yeast extract, casein, starch, wheat germ, cottonseed oil, salt mixture, agar, water and cacao sawdust or powdered cellulose excavated galleries, oviposited, and produced progeny that developed to maturity. Several generations have been raised in the laboratory on media inoculated with ambrosia fungi by the beetles.*

The Scolytidae is one of the most destructive families of insects in the world. Although much research on important species of this family has been conducted (*1*, *2*), the means by which they nutritionally utilize their natural woody substrate are essentially unknown. The associations of microorganisms with Scolytidae in wood were reported in early studies of this family (*1*, *3*), but the nature of any nutritional symbiosis between the microorganisms and the beetle remains obscure (*4*).

Study of the nutrition of this family has lagged behind similar studies of many other important families of insects largely because it is difficult to investigate Scolytidae within intact woody tissue. Efforts to rear scolytids through their entire life cycle have failed, although various media have permitted larval development for several bark beetles (*5*).

We report here successful techniques for rearing *Xyleborus ferrugineus* (Fabricius) and *X. posticus* Eichhoff on several artificial media under laboratory conditions. These are two ambrosia beetles that attack cacao, *Theobroma cacao* Linnaeus, in tropical areas of the Western Hemisphere.

Most of the experiments on rearing scolytids on artificial media involved *X. ferrugineus*, but *X. posticus* was studied on diets containing cacao sawdust. Five media were used (Table 1); these will be referred to as diets A, B, C, D, and E.

The ingredients of diet A were mixed in a Waring Blendor, placed in tubes (approximately 15 ml per 20- by 150-mm culture tube), plugged with cotton, and autoclaved. For the other diets, all ingredients, except water and the aqueous extract of cacao bark, were mixed dry in a beaker, and then the liquid ingredients were added to make a uniform slurry. The extract of cacao bark (diet D) was prepared by macerating 100 g of air-dried cacao bark in 1 liter of distilled water in a Waring Blendor and filtering the resulting liquid through six layers of cheesecloth. Diets B through E were placed in tubes (approximately 12 ml per 20- by 150-mm culture tube) and the tubes were plugged with cotton and autoclaved. Most tubes of media were then used immediately after cooling.

In studies with diet A, female beetles, newly emerged from the host tree, were introduced (one per tube) and observed daily for activities and development of progeny. The cultures were held in a laboratory at 24.5°C until eggs were observed; then the tubes were divided into two groups (72 and 77 tubes, Table 2). One group (77 tubes) was continued under the uncontrolled light conditions of the laboratory, and the other (72 tubes) was held in continuous dark, except during observation. After 60 days the medium was carefully removed from each tube and the progeny were counted.

In studies with diets B through E, two female beetles were released in each tube. The beetles used on diet B had emerged from cacao trees, and were held in fresh cacao sawdust for 4 days during transport from Costa Rica to Wisconsin. Beetles used on diets C through E were progeny from rearings on diet B. All cultures were maintained in the dark at 22°C except during observations.

As progeny matured in diet B, the tubes were unplugged and inverted as a group over a beaker containing four sheets of moistened filter paper in the bottom. The group of culture tubes (17 tubes, Table 2) was wrapped tightly in aluminum foil to stimulate emergence of progeny from the darkened tubes into the lighted beaker. The beaker was held in the laboratory at 22°C under uncontrolled light.

The culture tubes containing maturing adults on diets C through E were unplugged, wrapped with foil, and each attached mouth to mouth to a similar tube containing a moistened plastic-foam disc. The progeny were removed and counted twice each week.

Beetles mined extensively through each diet. In most tubes, major portions of the brood galleries were excavated adjacent to the tube wall, thus facilitating observations of insect activity and development. The total numbers