Boulder, Colorado on Wednesday, November 5. Psychonomic Society meets in Denver on Thursday, Friday, and Saturday, November 6-8. The University of Colorado will act as the host institution for the Computer Conference. Daniel Bailey and Peter Polson of the Psychology Department, University of Colorado, are co-chairmen of the Conference. A call for papers, symposia, etc. will be issued in 1975; August 1, 1975 is the deadline for receipt of same.

Microcomputer

Scientific Micro Systems (Mt. View, Calif.) formerly Signetics Memory Systems will make available a proprietary "MicroController" that will be a complete microcomputer system incorporating a bipolar Schottky microprocessor with a 300-nsec cycle time. The system will allow control sequences to be executed up to 100 times faster than many currently available microprocessor systems.

Computer Eye

Computer Eye 108 is a peripheral input device. Any picture that can be sensed by a television-type camera tube can be input for computer processing. A 48-page Computer Eye Handbook is available free.

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NOTE

The grid test: A measure of alcohol- and barbiturate-induced behavioral impairment in mice

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A number of procedures have been reported for the production of physical dependence in laboratory animals to drugs of the sedative-hypnotic class. These include alcohol (Mello, 1973), phenobarbital (Belknap, Waddingham, & Ondrusek, 1973; Freund, 1971), sodium barbital (Crossland & Turnbull, 1972), phenobarbital (Ho, Sutherland, and Loh, 1973) and others (Schuster & Thompson, 1969). These methods are also advantageous in the study of acquired functional tolerance, since this usually develops maximally under conditions where physical dependence production is maximized. This is of interest since most theorizing about physical dependence

has implied that acquired functional tolerance and physical dependence share common neural mechanisms (Kalant, LeBlanc, & Gibbins, 1971).

Since acquired tolerance refers to a change in response to a drug, the measurement of acquired tolerance requires at least two separate assessments of behavioral impairment (intoxication) at different points in time. This also requires that the degree of drug-induced behavioral impairment be readily quantifiable and sensitive to varying levels of the drug. There is a need for a wider variety of methods that possess these attributes. The present report describes one such method.

As noted by Kalant et al. (1971), the most useful methods for assessing drug-induced behavioral impairment are reliable and reproducible, and they are sensitive to small dose increments over a wide range of drug doses. The sleep-time test (a frequently used measure based on the duration of loss of the righting reflex) is sensitive to small dose increments, but it is limited to only the highest dose range where "sleep" can be induced (Damjanovich & MacInnes, 1973). A third desirable attribute is that a measure yield continuously variable scores rather than scores based on discrete or quantal (all or none) events. A fourth attribute is that a measure of behavioral impairment be amenable to scoring large numbers of animals in a rapid and efficient manner. Measures that possess these four attributes should readily lend themselves to the construction of dose-effect curves to serve as the basis for monitoring drug intoxication and acquired tolerance.

Several published methods appear to meet these criteria. The rota-rod test as modified by Jones and Roberts (1968) involves placing an animal on a rotating rod which is then subjected to a constant acceleration. At the moment the animal falls, the speed of rotation attained is then recorded, as well as the duration of the trial. In the inclined-plane test (Arvola, Sammalisto, & Wallgren, 1958), an animal is placed on a board that is tilted at progressively greater angles until the animal slides off. When this occurs, the angle of inclination is then recorded as the animal's intoxication score. The treadmill test (Gibbins, Kalant, & LeBlanc, 1968) is based on the total time an animal can remain upon a moving belt suspended above an electrified grid during a 2-min trial.

THE GRID TEST

The grid test is a measure of neuromuscular impairment that is sensitive to drug-induced staggering or stumbling. A mouse is required to walk upon a ½-in. wire-mesh grid along a 1-1/8-in.-wide square track (see Figure 1). Intoxicated mice frequently stumble with one or more feet passing through the wire grid and contacting an underlying Plexiglas plate suspended 14 mm below the grid. An error is counted whenever contact is made with the underlying plate, which in turn

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Figure 1. The grid test apparatus consists of a 6 x 6 x 6 in. box constructed of 1/4-in. plywood with a 1/2-in. wire-mesh bottom and a clear-plastic front. The box is suspended 14 mm above a Plexiglas plate that rests on the pan of a top-loading balance. A removable 3 1/4 x 3 1/4 x 6 in. block (shown in black) is placed in the center of the wire grid.

is resting on the pan of a top-loading balance (Torbal Model 800). Contact with the underlying plate causes the pan balance to move downward, thereby preventing the plate from supporting the animal's body weight. The measure of intoxication (grid test score) is the number of mean errors per unit distance traversed (12 cm) during a 2-min trial. This score is derived for each trial by dividing the total errors by the total distance traversed (in units of 12 cm). Twelve centimeters is the distance along one side of the apparatus in the middle of the track. During each trial, animals are prodded occasionally and very gently with a pencil if ambulation ceases.

Thirty-two DBA/2J and 32 C57BL/6J male mice were purchased from the Jackson Laboratories, Bar Harbor, Maine, and tested at 14 to 16 weeks of age. Each animal was injected IP and tested once. Dose-response curves

for phenobarbital and ethanol in both strains showed a monotonic function from 1.2 to 2.5 g/kg of ethanol and from 25 to 100 mg/kg of phenobarbital.

The described method is simple and inexpensive (about \$6.00), yet it provides an index of behavioral impairment that is useful for a wide range of doses and sensitive to relatively small changes in dose of sedative-hypnotic drugs. Large numbers of animals can be screened fairly quickly and easily. This advantage can be further increased by the use of drinkometer circuits to tally the error scores automatically. Also, the distance traversed can be simultaneously monitored by photocell beams.

One disadvantage is that practice effects can be considerable. An animal that has been tested once 24 h earlier performs about 5% to 20% better than an animal tested for the first time. This effect is most marked in the DBA/2J mice. The problem can be overcome by testing each animal only once, or by giving practice trials (two or three is usually sufficient) until stable performance levels are achieved.

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