gram-positive bacteria. The preparation of dibromsalicylaldehyde solubilized with borax was singled out for extensive *in vitro* and *in vivo* testing against both bacterial and fungal infections. The reports of these studies will be the subject of subsequent publications by our collaborators (*3*).

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Prediction of Speed of Performance by Muscle Action Potentials[1]

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By the use of a new electronic counting technique a rather remarkable relationship has been found between reaction time to aperiodic stimuli in a monotonous situation and frequency of muscle action potentials (recorded from bipolar electrodes placed above the eyes) during a 6-second interval before the onset of the stimuli.

The task was to respond by pressing a key as quickly as possible when occasional stimuli (simultaneous flash of light and sound of a buzzer) were presented. The subject was comfortably seated in an electrically shielded, sound-reduced darkroom. The schematic diagram (Fig. 1) shows the general relationships between the various electronic amplifying and recording units used in this study.

Presentation of the stimulus, occurrence of the response, frequency of action potentials from surface electrodes placed over the supraorbital muscles, low-frequency potentials from the same supraorbital electrodes, and muscle action potential rate from electrodes on the hand while responding were all simultaneously recorded on a Grass ink-writing oscillograph.

The electrodes were small solder discs attached to the surface of the skin with adhesive tape. Washing the skin with ether and applying a small amount of electrode jelly between skin and electrode served to make a satisfactory low-resistance contact (R = approximately 20,000 ohms). A ground electrode was attached to the subject's cheek.

Fig. 2 shows graphically the gradual transition from sleep to a condition of normal alertness as measured by the reaction time, associated muscle spike frequency, and low-frequency potentials from the supraorbital placement. At the point in the record indicated by the arrow, the experimenter knocked vigorously on the door of the shielded room. The stimulus before the knock had elicited no response, line #2 had shown no muscle activity for the previous 40 seconds, and line #3 showed alpha spindles at low amplitude only for the previous 5 minutes. The knock produced a "startle" reaction, with the immediate resumption of muscle spike activity, low-frequency activity, and a pressing of the response key in the absence of a stimulus. The second stimulus produced a response slower than normal, while the third stimulus, 6 seconds later, produced a normal reaction time. Both responses are shown on line #4 as active contractions of the finger muscles.

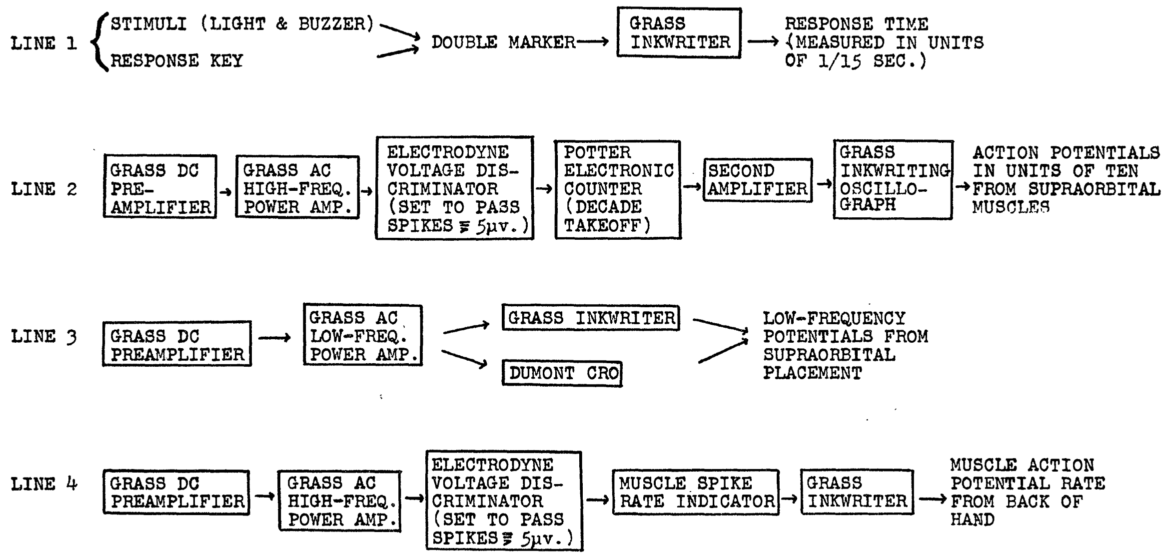

FIG. 1

It is feasible with this arrangement to achieve considerable versatility in studying a variety of muscle contraction problems under a variety of conditions of effort and work. Some specific data on one of these problems—the course of events in certain muscles only remotely involved in a long-continued task as the individual approaches a state of boredom and sleepiness—are presented here.

Fig. 3 shows the relationship between frequency of action potentials from electrodes placed over the supraorbital muscles and response time to a combined light and buzzer stimulus. The solid line represents the mean values; the vertical lines, the standard deviation above and below the mean. These data

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were obtained from reading lines #1 and #2, portions of which are shown in Fig. 2.

Two major observations may be made from these data. First, there was a definite and distinct reduction in the number of muscle action potentials as the response time became longer. This was due, we presume, to an increasing boredom, sleepiness, etc. on the part of the subject. Secondly, the absolute variability markedly decreased with decreasing motor efficiency. The slight variation in the level of muscle activity for the last four response-time values and the NR (no-response) category is not as important as it may appear, in view of the fact that the average muscle spike count is about three per second and indicates an almost completely relaxed status of

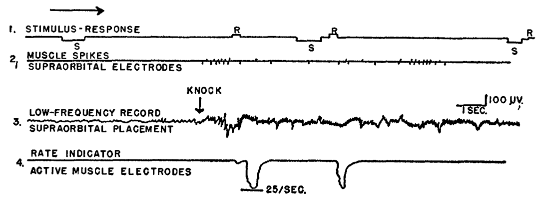

FIG. 2. Tracing of record showing transition from sleep to normal alertness.

the muscles involved. In the case of the NR category, the subject was asleep, and in most cases the stimulus served to awaken the subject on the first presentation, the response time rapidly approaching normal in subsequent presentations.

Recording line #3 (low-frequency record) in Fig. 2, although originating from the same supraorbital electrodes as line #2

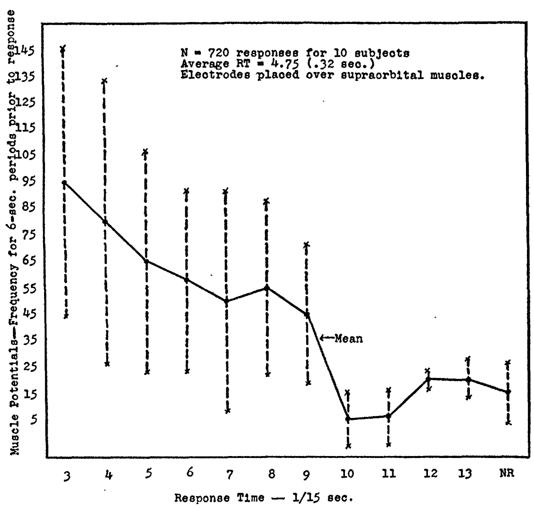

FIG. 3. Relation between response time and muscle spike activity from supraorbital electrode placement.

(muscle spikes), exhibited indications of brain activity (alpha waves). There is no doubt that muscle activity in this region of the forehead had a marked effect on the low-frequency record. On the other hand, the usual brain-wave phenomena were also exhibited along with the muscle activity. Sometimes line #2 showed great activity, with little or no activity on line #3, and line #3 showed considerable activity when line #2 was relatively inactive. It was evident that the low-frequency record gave valuable supplementary information, although the information is difficult to quantify. Furthermore, in all instances in which the subject had fallen asleep during a long, monotonous experimental session, both the high- and low-frequency records indicated a very "low-level" activity.

Line #4 in Fig. 2 indicates the effort put into the response by the subject in terms of muscle spikes per second of time from surface electrodes placed on the back of the hand over muscles involved in pressing the key. As the record shows, more effort was expended in the "startle" response to the knock on the door of the room than to the second stimulus.

It is believed that these techniques may make it possible automatically to warn personnel engaged in monotonous tasks, such as truck driving, before dangerous conditions of inalertness and approaching sleep occur.

Recovery of Western Equine Encephalomyelitis Virus From Wild Bird Mites (*Liponyssus sylviarum*) in Kern County, California[1]

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From the recently deserted nest of a yellow-headed blackbird, *Xanthocephalus xanthocephalus* (Bonaparte), in Kern County, California, approximately 1,000 mites were collected on June 21, 1946. These mites, which have been identified as *Liponyssus sylviarum* (Canestrini and Fanzago), were tested in four pools for the presence of a neurotropic virus. Each pool, containing approximately 250 mites, was ground in 3.0 cc. of 30 per cent rabbit serum-broth, centrifuged for 10 minutes at 3,000 r.p.m., and the supernatant fluid inoculated into 21-day-old mice by the combined intracerebral and intraperitoneal routes. None of the supernatant fluids contained enough bacteria to affect the animals. However, all the mice became ill or died between the third and sixth days after inoculation. Those observed while ill developed convulsions or other signs of encephalitis. Their brains were bacteriologically sterile. After three serial passages in mice were made of the agent isolated from each pool of mites, identification was undertaken. The

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