



*A wide range of activities was planned to keep subjects awake when they were not being tested - card-playing, chess, watching television, reading, etc.*

As the subject tracks the moving light, the probability of the movement he will have to make next varies continuously, and it may be unequivocally determined (that is, completely predictable), probable, equiprobable, or improbable. "This feature of the stressalyzer is a very important one, because we have discovered that the effect stress has upon performance depends on the probability of which way the light moves," Dr. Buck says.

#### MAN AS MACHINE

What happens when a subject works under stress or adverse conditions? If a machine is made to work under adverse conditions to the point where it develops faults, one can infer how the machine works. Similarly for humans - if they are subjected to stress so that they commit errors, one can infer from the errors what kind of machine they are.

Using sleep-deprivation as the stress, the Control Systems Laboratory tested a dozen paid volunteers, ranging in age from 15 to 18, who remained awake for 48 hours, from Friday morning to Sunday morning. They were tested on the stressalyzer to measure their reaction-time (the time taken to decide which way to move the wheel) and their movement time (the time actually taken in moving it).

Subjects got through the first day without difficulty, but as midnight Friday approached their performance deteriorated. This fact bears out the circadian rhythm effect, according to which performance fluctuates during a 24-hour period, with peak periods and low periods. Body temperature plays a part, reaching a peak in the afternoon and a low point about two in the morning.

During the night, the subjects kept each other awake with the help of their supervisors and were tested at four-hour intervals. The most difficult

period came with sunrise, about five o'clock in the morning. By seven the group had to fight to stay awake, by walking about, washing, talking, etc. They recovered about nine o'clock Saturday morning, and spent the remainder of the day being tested, playing chess, eating, reading and watching television. They were able to remain awake during the second night, but again, the most difficult period was at sunrise. By this time they were completely exhausted and, says Dr. Buck, "some of them later told me they went home and slept the clock around".

A second weekend of testing produced virtually the same results. On both weekends, it took the subjects longer to respond to an improbable situation than a probable one, but the effect of sleep-deprivation, which was to slow down their responses, was most obvious with respect to improbable events.

The performance of many extremely complicated systems - automobiles, aircraft, cranes, bulldozers, complicated industrial machinery, for example - is a function of the characteristics of the human operator combined with those of the mechanical system. Hence the practical aim of this research is the improvement in man-machine control systems. In addition to trying to assist management in industrial plants that employ shift workers who may be subjected to increased sleep-loss, the Laboratory is also attempting to obtain standards like those for materials, physical standards, structural standards, etc.

#### TRAVEL SEMINARS FOR NURSES

Mr. John Munro, Minister of National Health and Welfare, has announced the inauguration of the first of three seminar-type projects for the benefit of leading nurse educators in Canada. Representatives from 22 university schools of nursing have been invited to visit isolated and semi-isolated communities of the North to observe at first hand the programs for health care provided by the Medical Services Branch of his Department.

The first northern travel course, which began on January 18 with a two-day briefing session at the Northern Region office of Medical Services in Edmonton, Alberta, was taken by 11 nurse educators.

The group attended a one-day orientation session at Inuvik in the Northwest Territories before being flown to isolated nursing-stations to participate in the nursing activities of field programs. There they undertook such assignments as conducting medical clinics, assessing the condition of patients, and admitting them to the station, observing confinement; and planning with community health workers. They also met with local health committees or community chiefs and councillors.

This field experience will enable nursing teachers to interpret to their students the needs of Canadians living in the North and to adapt and expand the education of nurses to meet those needs.