

## News of the arts

### Stress and health — is stress regulated by the sun?

*Do electrical and magnetic phenomena in our atmosphere affect the general health of animals and people? New research in the relationship of solar activity and the mechanisms of the body are producing some surprising results.*

Anxiety, insomnia and indigestion have become the subject of serious medical study throughout the world, and in Canada, a National Research Council scientist may have some preliminary answers to the causes of these afflictions. Dr. Olivier Héroux of the Division of Biological Sciences suggests the causes of at least some of these problems may lie in natural cycles of existence and could become predictable in the light of further research.

More than a quarter century of research by Héroux led to these conclusions. Beginning with work in cold adaptation, he moved to studies of cold resistance, using body temperature as the basis of the study. "Maintenance of a normal body temperature is the integrated result of conditions of diet, heat production, resistance to stress and general health conditions," he notes. "The rate at which body temperature drops under severe cold conditions is a measure of resistance to cold." With this guideline Dr. Héroux examined generations of white rats in a cold chamber. Because these laboratory-grown animals can be clearly identified as to rate of growth, size, disease resistance and other factors, physiological changes resulting from environmental stress can be established.

#### The nervous system

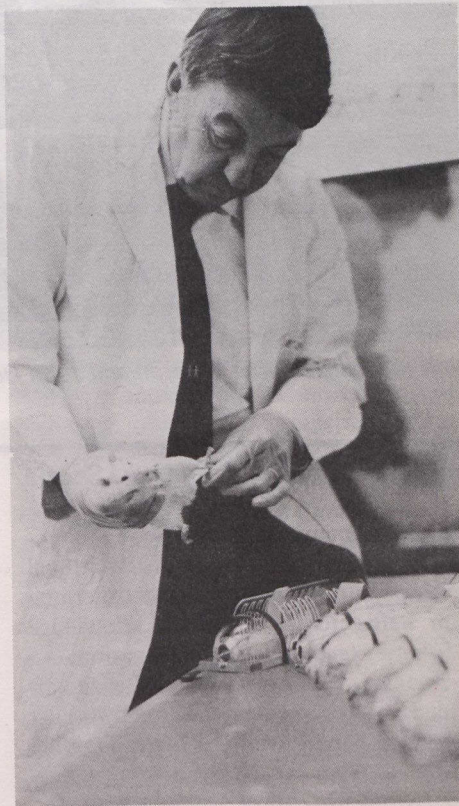
Dr. Héroux explains that the central nervous system has a dual nature — it both stimulates and inhibits body activities. To accomplish this it uses hormones as a messenger service from the brain. The effect of adrenaline, for example, has become the novelist's cliché. Less well known is the hormone serotonin, whose effects on the body are now being elucidated; it is one of the nerve or neuro-hormones responsible for the control of body temperature, sleep, mood, and sex. To complicate the problem, the researcher must consider "precursors" — dietary elements that prompt hormone synthesis. A precursor of serotonin is tryptophan, an amino acid sought by the intestinal bacteria that grow in response to a high fibre diet. For a time this appeared to be the clue to changes in cold resistance; but re-

sults proved inconsistent. Even when test animals were fed tryptophan directly, resistance to cold varied over a span of time.

The cold resistance of the rats, nocturnal animals, proved higher at night than during the day and it was greater on some nights than on others. Reviewing his records, Dr. Héroux correlated the information he had obtained over the years and observed a seasonal variation in cold resistance — it was stronger in summer and winter than in spring and fall.

#### Seasonal effects

In accounting for this fact, he was led to consider areas that might seem far afield to a biologist: sunspot activity, magnetic intensity on earth, and atmospheric ions. With help from Canada's Department of



*Dr. Olivier Héroux attaches a thermocouple to the body of a rat before it is placed in a restraining cage. This device will monitor the rat's body temperature continuously, enabling the researcher to record the information without disturbing the animal.*

Energy, Mines and Resources (EMR) and a fellow biologist in France, he tied together some of the loose threads of information remaining. EMR provided information on the fluctuations of geomagnetic activity, which also varies with season, like the ability to resist cold. These periods are most pronounced in spring and autumn when the earth's position allows maximum penetration of solar particles into the atmosphere.

Another phenomenon, the presence of ions in the earth's atmosphere, also varies with the season. The question of atmospheric ions and their effect on living organisms is a controversy that has raged for over 30 years. Among researchers, the question seems to have few fence-sitters — one accepts the idea that air ions influence human behaviour or else rejects the notion completely. Based on a comprehensive scan of the scientific literature, particularly reports of work carried out in France, Héroux suggests that there might be a link between air ions and the stress response of animals. He cites the work of biologist Dr. J.M. Olivereau of the University of Paris who undertook studies dealing specifically with aero-ionization. The work was confined to laboratory rats, however, and projecting the results to human conditions is not good science, Héroux cautions. "But many practising doctors are noting a higher incidence of stress-related illnesses during spring and fall." The cause of this, he thinks, may be the body's reduced resistance rather than higher incidence of disease. Diet, then, may only be a contributing factor to a larger, external cycle of disease resistance. But further research is clearly necessary.

#### Still a deep problem

After more than a quarter century of work Olivier Héroux concedes that the surface of the problem has only been scratched. Serotonin, its production and effects, continues to be the subject of scrutiny. Detailed knowledge of its functions in humans is still not well understood, nor are the relative effects of the atmosphere and magnetic fields. Perhaps the causes of so-called "killer diseases" like heart and liver ailments are hidden in yet undiscovered, seemingly unrelated, natural conditions, to be uncovered by researchers willing to ask probing questions.

*(By Stephen A. Haines for Science Dimension, Vol. 10, No. 2.)*