transmission at the insect excitatory neuromuscular synapse. One of the products of the enzymatic destruction of glutamic acid by glutamic decarboxylase, GABA, is known to mimic the transmitter at the insect inhibitory neuromuscular synapse[2,4]. If neuromuscular facilitation at the inhibitory synapse is due to the action of GABA on the terminals of the inhibitory axon then the appearance of GABA as an end product of excitatory neuromuscular transmission could have far-reaching implications.

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Effect of Microwave Radiation on Birds

MUCH has been written over the past years on the effect of microwave radiation on body tissues and animals, but most of the experiments reported have been concerned with the production of heat and its associated behavioural and physiological effects[1–4]. There are very few references to 'athermal' effects such as muscular disturbances[5] and disorientation—phenomena which have not attracted the scientific attention that they merit. In fact, there appears to have evolved a body of opinion dismissing the existence of any effect other than a thermal one on the pretext stated in one report[4] that the photon energy in the frequency band of microwave radiation is insufficient by several orders of magnitude to produce ionization. Apparently no consideration has been given to the effect of induced electrical currents on the activity of the nervous system of an animal. Animal tissues absorb microwave radiation diffusely and since such tissues contain membrane interfaces which are semi-conducting, polarization can occur. If the microwave radiation is in pulsed form, the induced electrical currents will be modulated at the frequency of pulse repetition. It has been demonstrated experimentally that nerve conduction characteristics undergo a profound change when the nerve is subjected to a.c. excitation[6]. Therefore, it is to be expected that microwave radiation would have an effect on the nervous system of an animal depending on the depth of penetration.

Experiments have been conducted on chickens (Old English Games) fourteen weeks old at power levels in the range 10–30 mW/cm², at a frequency of 16,000 Mc/s and a pulse repetition rate of 8,000 pulses per sec. A horn antenna was arranged so that it could be mounted above, below or at the side of the cage. With the antenna mounted vertically above the cage it was observed, a few seconds after the onset of radiation, that sustained extensor activity of a wing and leg occurred—a reaction possibly due to the penetration of induced electrical activity to the spinal cord. Shielding first the head of the chicken, and then the body leaving the head exposed produced no significant change in the manifested extensor activity. Radiation from the antenna when mounted below the floor of the cage and pointing vertically upward produced no signs of muscular disturbance, although each chicken did register a startled reaction at the onset of radiation.

These experiments were repeated using pigeons and seagulls (ringbill) with similar but less dramatic results. The pigeons generally registered distress and unsteadiness of gait but not as pronounced extensor reactions. However, it was observed after the experiments that the wings of the exposed birds did not return to their normal fully retracted position for a period of an hour or more.

The seagulls registered considerable distress and unsteadiness of gait but shrugged off the muscular disturbance by repeatedly flapping their wings. There was no observable change in the retracted position of their wings.

Tests were made on the absorption characteristics of the feathers of each species, but the findings were negative.

It is suggested that the low field intensity and short exposure times (less than 60 sec) used in these experiments preclude the production of heat as the causal factor in the manifestation of extensor activity. Further experiments are planned to determine the phenomenological relationship between wave-length, pulse repetition rate and field intensity.

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Action of Mecholyl on the Respiration of Cardiac Muscle *in vitro*

UNTIL now relatively little experimental evidence has been acquired about the detailed regulative function of acetylcholine (ACh) on the metabolism of cardiac muscle. Earlier investigations using the heart–lung preparation showed the oxygen-sparing effect of ACh (ref. 1). ACh seems to increase the energetic efficiency and to preserve the energy sources of the heart muscle tissue[2]. This problem, however, has not been completely solved even by analysis of the direct action of ACh on the cardiac muscle fibre. There are only a few reports on the sparing effect of ACh *in vitro*. An increase of adenosine triphosphate (ATP) and glycogen content in cardiac muscle treated with ACh has been reported[3]. Changes in the oxygen uptake of slices treated with ACh have also been shown by some workers[4]. Recently, the application of ACh or eserine *in vivo* has been shown to decrease the fatty acid utilization of minced myocardial tissue[5].

To obtain further information about this problem, we have studied the effect on the respiration of the isolated rat auricle and tissue slices from both ventricles of mecholyl(acetyl-beta-methylcholine chloride) (MCh) and eserine salicylate *in vitro*. MCh was used instead of ACh because of its small sensitivity to the inactivating action of cholinesterases. The drugs were added to the tissue *in vitro*; the final concentration shown in the Tables refers to their salts. Metabolic activity was measured as oxygen uptake by the direct Warburg technique.

In the first series the action of eserine alone and in combination with MCh has been studied. The rate of respiration of the tissue was stimulated by sodium succinate in the atmosphere of pure oxygen. The results obtained are shown in Table 1. Only slices of left ventricle tissue showed any marked depression of metabolic activity during the second hour of incubation. The final effective concentration of the combined eserine–MCh action cannot, however, be considered a physiological one. It seems of interest that the oxygen uptake of the other myocardial parts remained largely unaffected. Eserine alone (even at concentrations as high as 200 μg/ml.) produced no effects.

In the second series the control respiration rate of the cardiac tissue specimens was diminished by omitting the