

than the skeletal muscles shows no significant change. The brain has not been routinely examined, but in sections of the spinal cord, the motor ganglion cells at all levels are normal in appearance. There are also no obvious lesions in the peripheral nerve trunks. The heart muscle, and the smooth muscle of the gastro-intestinal tract, bronchi, blood vessels and uterus are not affected.

Two young rabbits were examined on the 15th and 16th days after having been placed upon the experimental diet. At that time, they were extremely weak, lying flat on their belly, with limbs flaccid and outstretched. The head could not be raised from the table. The muscles were uniformly pale, grey and translucent, not stippled. Microscopically, the lesions were identical with those seen in the guinea pigs. Necrotic fibers were plentiful, but there had already occurred enormous multiplication of muscle nuclei, and active regeneration of new fibers was in progress. No other visceral lesions were detected.

The experimental diet thus brings about a universal dystrophy of the entire voluntary muscular system, and no significant lesions have as yet been found in any other tissue or organ. Inanition and scurvy may be excluded as possible factors.

4860

A Thermal Conductivity Recorder for Oxygen and Carbon Dioxide For Clinical Atmosphere Control.*

GRACE LUBIN AND JESSE G. M. BULLOWA. (Introduced by W. H. Park.)

From the Medical Service of Harlem Hospital, New York City.

Thermal conductivity instruments, which in the past 10 years have been increasingly applied in industry and in medicine, have hitherto not been available for the measurement of oxygen in air, since it was assumed that the thermal conductivity of oxygen was too close to that of nitrogen, and hence to that of air, for the practical application of the method to this type of mixture. Recent studies at Harlem Hospital have indicated, however, that the thermal conductivity instruments used to determine the carbon dioxide content of alveolar air are more sensitive to changes in oxygen concentration than has generally been assumed to be the case. Indeed,

* Research supported by the Committee for the Encouragement of Medical Research through New York University.

the galvanometer deflection caused by a 10% increase in oxygen concentration is about the same as that caused by a 1% decrease in carbon dioxide concentration. This observed effect is held to be consistent with the relation between the accepted thermal conductivity values for oxygen, air and carbon dioxide.

These preliminary experiments showed that a thermal conductivity instrument cannot be used for carbon dioxide measurement in the presence of a varying oxygen concentration, unless the thermal cell is rendered indifferent to these variations in oxygen by passing the gas stream to be tested through both the analyzing and the standard or reference compartments of the cell, the reference mixture being freed from carbon dioxide with a suitable scrubber.† The tests also suggested that the single-flow thermal cell, with normal air in the fixed reference mixture, which is used to measure carbon dioxide in air to within +0.05%, could be directly calibrated to indicate within 0.5% the concentration of oxygen in a stream of air mixture, freed from carbon dioxide.

Prompt and generous cooperation on the part of Chas. Engelhard, Inc., of Newark, N. J., and especially of Dr. W. F. Hamilton, research director, resulted in the construction and calibration of a 2-cell instrument, which yields on a single chart the quasi-continuous record of the concentration of carbon dioxide on the one hand and of oxygen on the other hand. The preliminary results obtained with this instrument on the oxygen and carbon dioxide enriched air of the atmosphere control room at Harlem Hospital have shown satisfactory agreement with independent chemical analyses. It is planned to continue these tests over a considerable period of time, and also to study the applicability of thermal conductivity indicators in connection with the administration of oxygen under a portable tent.

† When carbon dioxide analysers are applied to gas mixtures with a constant CO_2/O_2 ratio, as for flue gas control and under basal metabolism conditions, the disturbing effect of variations in oxygen concentration is practically eliminated by calibration of the instruments under the conditions for which they are to be used.