LETTERS TO THE EDITORS

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Tastes of Oxygen and Nitrogen at High Pressures

WHILST carrying out experiments on behalf of Admiral Sir M. E. Dunbar-Nasmith's Physiological Sub-Committee for saving life from sunken submarines, we and other subjects have had occasion to breathe oxygen, air and other gas mixtures at high pressures.

When oxygen was breathed at 6 atmospheres, several subjects noticed a peculiar taste, which was enhanced at 7 atmospheres. None of them noticed it at 3 atmospheres. The taste is both acid and sweet. Two subjects described it as "like dilute ginger beer", and "like dilute ink with a little sugar". It was felt unevenly, by one subject mainly on the back of the tongue, by another beneath it. In one case it persisted for some minutes after ceasing to breathe oxygen. It may be remarked that although oxygen is a convulsant at such high pressures, it can be breathed with complete safety for long enough to taste it.

In air at 10 atmospheres, and sometimes even at 8 atmospheres, a number of subjects reported a taste which is variously described as harsh, metallic, and indefinable. It is certainly not due to oxygen, and one subject who tasted it regularly in air did not do so when mixtures in which the nitrogen of air had been replaced by helium or hydrogen were breathed at 10 atmospheres. We therefore attribute it to nitrogen.

Not all subjects reported these tastes. This was probably often due to the fact that other sensations were distracting them, and to the narcotic effect of nitrogen at high pressures. However, one subject who was repeatedly on the look-out for both tastes has never tasted nitrogen, and only tasted oxygen very faintly at 7 atmospheres. His sense of taste is, however, poor as a result of cerebral concussion.

We conclude that the taste threshold for oxygen lies below 6 atmospheres and for nitrogen below 8, in about half of the persons tested. So far only one person has reported an abnormal smell, in compressed air, but perhaps oxygen and nitrogen may have smells at still higher pressures.

It is clearly inaccurate to describe a gas as inodorous and tasteless. On the contrary, most or all gases may be expected to display these properties at sufficiently high pressures, just as they liquefy at sufficiently low temperatures. Whether men can survive the pressure under which, say, hydrogen develops a taste or smell is, of course, as yet unknown.

We have to thank the Admiralty and Messrs. Siebe Gorman and Co. for making this research possible.

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Ascorbic Acid and Resistance to Low Oxygen Tension

IN an article published in the *Lancet* of June 28, Stewart, Learmonth and Pollock record experiments which show that the intravenous administration of ascorbic acid prolongs the life of cats after severe hæmorrhage. They suggest that ascorbic acid secures a more adequate supply of oxygen to the tissues.

Experiments which have been carried out in this Institute by Dr. B. G. B. Lucas, in an attempt to make oxygen more available to the tissues of animals subjected to low atmospheric pressures, have yielded similar results. Both methylene blue and ascorbic acid, administered intraperitoneally, have been found to increase the resistance of mice and rats to low oxygen tensions. A mouse, injected with methylene blue or ascorbic acid, may survive a number of consecutive exposures to atmospheric air at a pressure of 120 mm. mercury, while, on each occasion, an untreated companion succumbs.

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Pharmacological Classification of Steroid Hormones*

UP to the present, the physiological classification and terminology of steroid hormones was based either on one of their outstanding actions ('œstrogens', 'progestins') or on their source of origin ('corpus luteum hormone', 'adrenal cortical hormone', 'testis hormone'). Such a classification is no longer possible, since we know, for example, that 'testis hormones' may originate in the adrenal cortex and may exert 'œstrogenic' actions. In spite of the considerable overlapping between the physiological actions of the steroid hormones, they can and must be classified into certain groups. It is felt that the best solution of the problem is to *classify the steroid hormone actions according to the degree to which they are able to imitate or substitute for the function of a certain endocrine gland.* Accordingly these groups might be given names reminiscent of the glands and yet indicating that this does not imply that such glands are the only source of the hormone.

Thus progesterone imitates the action of a corpus luteum and œstradiol that of an active follicle even though these hormones may originate from cells other than those of the corpus luteum and the ovarian follicle respectively. The grouping of the steroids into œstrane, androstane and pregnane derivatives is a satisfactory basis for the classification of their

* Abridged.