of the pyrochlore group (type $E\,8_1$) for which the formula $X_2Z_2(O,OH,F)_7$ has been written. In the case of ralstonite the X position (16c) is only partly filled by 2·7 Na. Water partly fills the 8*b* position which is occupied by O, OH or F in minerals of the pyrochlore group.

Ralstonite may be dehydrated without destruction of the crystal lattice.

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A Visual Phenomenon

MR. DARTNALL[1] has recently described an interesting visual phenomenon which, as has been pointed out by Mr. Wright[2], is connected with the after-images of different colours possessing different rates of development. A visual phenomenon possibly connected with this differential rate of development came to my notice some time ago, and no doubt must have been observed by others as well. A stroboscopic disk painted in black and white sectors is run under illumination from an (ordinary) Osram neon lamp connected to A.C. supply (60 cycles). At speeds such that the pattern is not stationary but somewhat shifting, the white sectors appear to be distinctly coloured (rainbow type)—one edge pink and the other green. The same effect is seen, though not so clearly, when the neon lamp is replaced by an ordinary incandescent lamp, provided the illumination is not high.

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[1] NATURE, 142, 1000 (1938).
[2] NATURE, 142, 1136 (1938).

Changes in the Water-Content of Organs and Tissues as a Result of Stimulation by Œstradiol

APART from its specific property of stimulating proliferation in the reproductive tract and in certain other tissues of the body, œstrogenic hormone has the more general effect of causing water and salt retention. This was clearly demonstrated in the follicular phase of the menstrual cycle in the pig-tailed monkey[1] and baboons[2], and in rhesus monkeys which had been injected with œstrogenic hormone[2,3]. In these animals, water-retention is most obviously related to swelling of the sexual skin, and it may be associated with a marked shift of body water (as shown, for example, by changes in erythrocyte concentration)[3,4]. Study of the renal excretion of electrolytes has shown that water-retention also occurs in male dogs after treatment with œstrogenic substances[5], while more recently Astwood[6] has reported that the water-content of the uterus of the rat undergoes a transient rise which reaches its peak six hours after a single injection of œstrogenic hormone, returning to normal about twelve hours after the injection.

A further study of immature rats shows that œstrogenic stimulation causes a rapid change in water-content not only in the reproductive tract but also in most organs and tissues.

Estimations of the water-content of nine selected tissues were made at six-hourly intervals after the subcutaneous injection of 0·1 γ of œstradiol in 0·1 c.c. of oil. Water-content was determined by comparing the weight of the fresh tissues with their weight after desiccation in an oven at 110° C. Ten rats were used for each six-hourly reading.

The tissues were divided by their responses into two clearly defined groups, the first being made up of the skin, uterus and vagina, and the second of striated muscle, heart, pancreas, brain and gut.

Water-content in the first group of tissues reached a high level by the end of the first six hours. It then fell (in the case of the skin and vagina to a lower level than normal) and remained down until the twenty-fourth hour, when it rose again to remain at a high level until the sixty-sixth hour. By the seventy-second hour, it had either resumed its normal level or fallen below it.

The changes in the second group of tissues (striated muscle, heart, brain, pancreas, gut) were in a sense reciprocal to those in the first. In the first twelve hours after injection, water-content either fell or remained unaffected. It rose to a level above normal during the period (twelfth to thirtieth hours) in which the water-content of the first group of tissues was low. It then decreased and reached a minimum about the middle of the second and more prolonged period in which the water-content of the reproductive tissues and skin was high. At the end of this period it underwent a sharp transient rise, before reaching its normal level, or a lower level than normal, at the seventy-second hour. Corresponding observations have been made on normal and castrated male rats injected with œstradiol, as well as on normal mice in œstrus and in dicestrus, the latter observations showing that cyclical changes normally occur in the water-content of the tissues referred to above.

These findings show that œstrogenic stimulation causes a much more widely spread change in the body than has been suspected hitherto. In the case of the skin, the total amount of water-shift amounts to almost one per cent of the total body-weight (estimation based on tables provided by Donaldson[7]). A change of this kind and magnitude cannot be regarded as secondary to changes in water-concentration occurring primarily in the reproductive tract, and presumably, therefore, œstrogenic stimulation has a direct effect on the water-content of many, if not of all, tissues.

In so far as œstrogenic substances lead to water- and salt-retention, they behave like the chemically related substances progesterone and testosterone, as well as like desoxycorticosterone. This general property of the sterol hormones does not, however, imply a similarity of action. Thus nitrogen-retention is associated with the water- and salt-retention stimulated by œstrogenic and androgenic substances, whereas it does not occur as a result of the action of progesterone and desoxycorticosterone[5]. Furthermore, it has been shown that the excretion of water which has accumulated in the sexual skin of monkeys under the influence of œstrogenic stimulation cannot be prevented by the administration of progesterone, testosterone, or cortin[8]. Preliminary observations on the effect of these substances on female and male rats, made in the course of the present study, suggest