LETTERS TO THE EDITORS

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Excretion of Ketosteroids in Human Pregnancy Urine in Relation to the Sex of the Fœtus

IT has long been known that when a cow gives birth to calves, one a male and the other a female, the male will grow into a normal bull while the female may be a freemartin. The freemartin is zygotically a female and the external genitalia and mammary glands, though modified, are usually of female type, but the gonads histologically resemble testes rather than ovaries and there is a tendency for the Wolffian ducts to persist whereas the oviducts are absent or incomplete. Fusion of the placentæ with anastomosis of their blood vessels is an essential factor in producing the freemartin. Because of the common blood supply the testicular hormones of the male have free access to the female twin and cause her reproductive organs including her gonads to conform towards the male type. Parabiosis experiments in animals and also histological examination of embryonic gonads in several species seem to show that in embryos the androgenic cells of the male gonad begin to secrete before the ovary has become completely differentiated, and that the ovary does not produce secretion until a much later stage of development. It seems also that the androgens produced in early embryonic life are abundant enough to cause profound and permanent changes in the ovaries of a female twin.

These considerations suggested that it might be of interest to examine the urine of women in the early stages of gestation to discover whether the testes of a male embryo might produce enough androgen to cause a recognizable increase of androgen in the mother's urine. The most likely time for a positive result in such a test would be in early pregnancy, since involution of androgenic tissue in late pregnancy has been observed in some species.

Samples of pregnancy urine were obtained from twenty women and the ketosteroids estimated colorimetrically. Collection of complete 24-hour specimens proved impracticable and the estimations were carried out on samples of morning urine. All urines were collected 8–12 weeks after the last menstrual period. It was afterwards determined that fourteen women were bearing a male fœtus; their average ketosteroid excretion was 26·2 mgm. per litre. The six women bearing female fœtuses had an average excretion of 14·6 mgm. per litre. When account is taken of the wide range of the individual values in these two series, it is apparent that the difference between the mean excretions is not significant ($t = 1{\cdot}8$). The highest value observed in a female pregnancy was 19·8 mgm. Seven of the male pregnancy values exceeded 20 mgm., the highest value being 80 mgm. per litre. Assays carried out at later stages of the pregnancies showed that initially high ketosteroid contents tended to fall whereas moderate assays remained substantially unchanged.

Details of these experiments will be published elsewhere. We are unable to continue this work at the moment and the purpose of this note is to suggest that it would be interesting to examine a larger series. We realize fully the limitations imposed by the smallness of the present series, but the facts that (*a*) the seven very high values reported above all occurred in male pregnancies, and that (*b*) in the later stages of pregnancy these values tended to fall to the general average for all the cases, are in agreement with the hypothesis that the source of the extra excretion lies in the gonad of the fœtus. The possibility that the fœtal adrenal cortex plays some part cannot, of course, be excluded.

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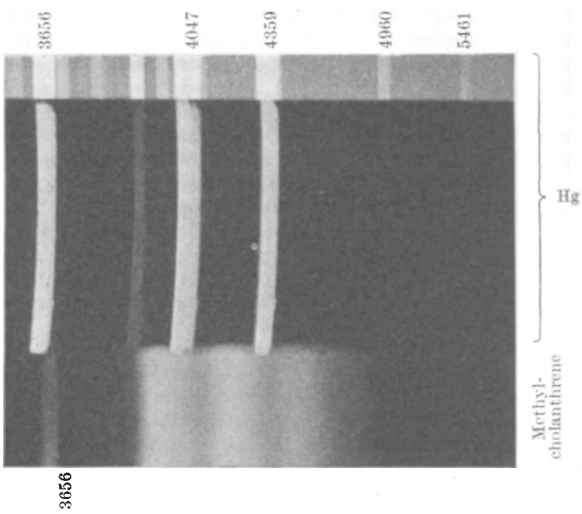
Fluorescence of Methylcholanthrene

THE letter on "Fluorescent Lipoidal Spectra of Human Tissue" in NATURE of February 14, p. 193, requires comment upon several points.

Dr. Penn's statement that I reported . . . "that most of the carcinogenic hydrocarbons studied were highly fluorescent and they produced characteristic bands in the regions 4000, 4180 and 4400 A" . . . is, I regret to point out, incorrect. The regions of the spectrum quoted referred to the bands shown by the carcinogenic tars and tar fractions, and by the complex carcinogenic mixture prepared from tetralin by Prof. Kennaway. Further work has only emphasized



HG SPECTRUM AND FLUORESCENCE SPECTRUM OF METHYLCHOLANTHRENE.

that the various carcinogenic hydrocarbons have different fluorescence spectra and that there is sufficient correlation between their chemical structure and spectra to make identification by this means a very useful experimental aid. Thus 1 : 2 : 5 : 6-dibenzanthracene and the "1 : 2 : 7 : 8-dibenzanthracene" prepared by E. Clar certainly gave the same fluorescence spectrum, but Prof. Cook proved that the compound which Clar thought to be 1 : 2 : 7 : 8- was really 1 : 2 : 5 : 6-dibenzanthracene. When Cook did synthesize 1 : 2 : 7 : 8-dibenzanthracene, its spectrum was found to be completely different from that of the 1 : 2 : 5 : 6- isomer.

Dr. Penn finds that cancer tissue lipoids produce a far stronger fluorescence than do the lipoids of