Dr. S. L. Simpson: In severe anorexia nervosa a degree of adrenal insufficiency and a generalized downy growth of hair all over the body together with stronger hair on the lips is sometimes met with.

In the potato famine of the nineteenth century in Ireland, long fine hair, several inches in length, grew all over the body and face, especially in children but also in adults, and in women there was in addition coarse hair on moustache and beard regions.

Vitamin deficiency diets in animals produce enlargement of the adrenals together with degeneration of cells and hæmorrhages. He had described secondary pellagra in this country (*Quart. J. Med.*, 1935, **4**, 14), the food intake being small but poor absorption making it of even less nutritive value after gastrectomy or gastro-jejunostomy. Virilism or pseudo-hermaphroditism in children might be associated with adrenal insufficiency and a craving for salt.

He was inclined to the view that the features in the case were probably a sequel to the gastrectomy, rather than coincidental or causal to the ulceration.

Gastroduodenal ulceration had been described secondary to a parathyroid adenoma but this was unusual and was only mentioned in passing.

Dr. Le Marquand, in reply to Professor Gray, said that the patient had had no diarrhœa at any time.

Male Hypogonadism with Unexpected Response to Testosterone Therapy.—G. I. M. SWYER, D.M., M.R.C.P.

The patient, a carpenter aged 27, was first admitted for investigation on 21.6.47 (when 24 years old) complaining of high-pitched voice, lack of necessity to shave, embarrassment on account of youthful appearance, physical weakness, underdeveloped genitalia and a complete absence of seminal emissions though erections did occur. He wished to get married but felt doubtful regarding his ability to fulfil the functions of husband and parent.

Past history.—Mumps before the age of 9. In 1944 he was treated with methyl testosterone for five months, without effect.

Family history.—Three brothers and sisters living, and apparently normal. One brother had tuberculosis of which he died at age of 19, and father also died of tuberculosis.

Physical examination.—Height 67½ in., upper measurement 32½ in., lower measurement 35 in., span 70 in., weight 126½ lb. Poor muscular development. Chest, heart, abdomen, C.N.S. were within normal limits. Downy hair on upper lip; has never shaved. Axillary and pubic hair present but rather scanty; no hair on chest. Penis short, testicles descended but small and with diminished sensation. (The genitalia were about what would have been expected for a boy of 15 years.)

Investigations.—B.M.R. + 16. 17-ketosteroids 10 mg. per twenty-four hours. Blood glucose curve normal. Chest X-ray normal. Ununited epiphyses at distal end of radius and ulna. Sella turcica small but within normal limits; metopic suture present.

Treatment.—July 1947 : Implantation of 200 mg. testosterone, together with testosterone propionate 25 mg., three times weekly for three months. 800 mg. testosterone implanted on 22.4.48 and again on 2.9.48.

Re-examination (6.10.50).—Height 69½ in. Weight 160 lb. Average normal muscular development. Face and body hair present in normal amounts. Penis and testicles normal in size though the latter were of soft consistency. Voice still a little high pitched. Thus, although no androgenic treatment has been given for more than two years, the effects of androgenic stimulation have persisted. He has been shaving about every other day and seminal emissions have occurred. A seminal specimen examined on 9.10.50 revealed the following: Volume 4·3 ml.; density 268 million sperms per ml. Activity and viability satisfactory (motility index at three and a half hours 3, at ten hours 2½—maximum 4); 34% abnormal forms. Urinary gonadotrophins less than 5 mouse units per twenty-four hours; 17-ketosteroids 7·4 mg. per twenty-four hours.

Comment.—This patient resembles some of those described by Hurxthal *et al.* (1949). As those authors point out, it is impossible to be certain that the observed improvement would not have occurred in the absence of treatment, but it would clearly be wrong to regard this case as one of delayed puberty with eventual puberal changes occurring spontaneously, or even as the result of treatment, because puberty had already begun though it had not progressed to completion. Mid-puberal arrest, rather than delayed puberty, would be the more appropriate description, and since it is difficult to see why the puberal process, having once been arrested, should re-commence spontaneously, it is not unreasonable to conclude that the treatment given may have played a part in bringing about the changes observed, including spermatogenesis.

That testosterone may affect the testis directly is clear from the work of Krohn and Zuckerman (1950), Simpson and Evans (1946) and others; that it should determine the continued normal functioning of the pituitary-gonad axis, even after its administration has been stopped, is less easy to comprehend, and to ascribe to it a "priming" action (Hurxthal

et al.) does not seem to be an altogether satisfying explanation. If we accept as a working hypothesis the scheme of interrelationships between pituitary and testis as suggested by Howard *et al.* (1950) (*see* Fig. 1a) and postulate further a stimulating effect of testosterone on the pituitary production of follicle-stimulating hormone (F.S.H.) (and an inhibiting one on that of luteal hormone, thereby making the relationship symmetrical, Fig. 1b), it becomes possible to see why the administration of testosterone to a patient with delayed or arrested

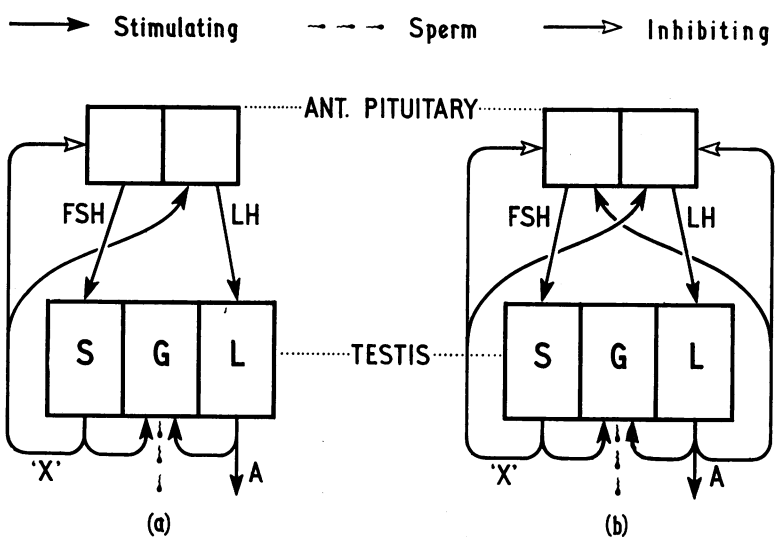

FIG. 1.—The relevant part of the schematic diagram illustrating the pituitary-testicular interrelationships as envisaged by Howard *et al.* (1950) (a) and the suggested additional effects of testosterone (b).

F.S.H. = follicle-stimulating hormone; L.H = luteinizing hormone; S = Sertoli cells; G = germinal epithelium; L = Leydig cells; "X" = "X" hormone; A = androgenic hormone (presumably testosterone).

puberty due to insufficiency of F.S.H. secretion might restart the normal pituitary-gonadal train of activity. That activity, once started, might well be expected to persist on stopping the treatment, since the induced increase of F.S.H. production would lead indirectly to further testosterone elaboration which, in turn, would maintain the level of F.S.H. production. Such an explanation, it is felt, might account for the results in this patient and in some of those reported by Hurxthal *et al.*

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Dr. A. W. Spence: It is well known from experimental work on hypophysectomized animals that testosterone is essential for the maintenance of spermatogenesis. In the case in question I doubt very much whether a course of testosterone, given over a limited period, could permanently re-establish normal sexual function, because I consider that androgenic treatment in hypogonadism is merely a replacement therapy and that the hypogonadal state recurs on discontinuing treatment. I am of the opinion that this patient was a case of delayed puberty and that his genital development would probably have occurred without any androgenic treatment.

Dr. P. M. F. Bishop described a case of a man of 23 who was a typical eunuchoid with hypoplasia, lack of pubic hair, a high-pitched voice and who did not shave, nor experience erections or emissions. A six weeks' course of testosterone propionate 25 mg. three times a week was given and the patient was not seen again for six years, by which time he had developed into a completely normal male adult with a moustache. A seminal specimen shows a sperm count of 25,000,000 per ml. Dr. Bishop considered that this was a case of delayed puberty and that the androgenic treatment was probably of no consequence in the final development of the patient.