

However, it may be that the electrode potential for the 2, 3-butyleneglycol-acetyl-methyl-carbinol system lies above that of the methylene blue-methylene white system. At the pH of these experiments the electrode potential of this methylene blue-methylene white system is 0.039 volts. There is a possibility that this potential might lie below that of the 2, 3-butyleneglycol-acetyl-methyl-carbinol system. Consequently, this experiment was repeated substituting for the methylene blue, o-chlorophenol-indophenol, the electrode value of which is 0.288 volts. The results of this experiment confirmed the results obtained with methylene blue.

It appears, therefore, under the conditions of our experiments that 2, 3-butyleneglycol and acetyl-methyl-carbinol do not constitute a reversible oxidation-reduction system.

## 6830

## Differentiation of Gonad Primordia in Kidney of Adult Rat.

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Transplantation of mammalian embryonic tissues to an adult environment has been more or less successful in the hands of several workers. Sites within the abdomen of the rat have not proven very successful as reported by Nicholas.<sup>1</sup> Nicholas has, however, obtained differentiation in 80% of grafts of 8 and 9 day rat embryos transplanted to the adult mammary gland. In the rabbit, Waterman<sup>2</sup> has demonstrated that the omentum of an adult animal serves as a suitable site for the differentiation of embryonic primordia.

In the present work various abdominal sites were tried with poor success. The kidney, however, as a site for the transplantation of embryonic primordia offers a number of advantages. Growth is unrestricted, the capsule interfering little with the graft, which is clearly visible and sharply differentiated from the host tissue. Rapid vascularization insures ready incorporation of the transplanted tissue. These advantages are demonstrated by the transplantation, in a subcapsular position, of a series of grafts of posterior halves of 11 day rat embryos, or the mesonephroi and gonad primordia of 12, 13

<sup>1</sup> Nicholas, J. S., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 188.

<sup>2</sup> Waterman, A. J., *Am. J. Anat.*, 1932, **50**, 451.

and 14 day embryos (sex is not morphologically differentiated until the fourteenth day), for periods of 7 to 28 days. In one series of 116 grafts, 80% of the grafts have become established. The number of grafts differentiating in a second series of transplantations of 64 cases has been 100%. Fourteen to 21 days is the period of optimum differentiation.

From posterior halves of 11 day embryos skin, nervous tissue, connective tissue, cartilage, bone, smooth and striated muscle, metanephros, gonad, adrenals and gut differentiate. When the mesonephroi and gonad primordia are transplanted alone there is subsequent development of metanephros and sexually differentiated gonad.

When morphologically indifferent gonad rudiments are implanted on the kidneys of adult male rats, they differentiate in the presence of the adult male sex hormone. Typically normal male gonads differentiate even to the establishment of rete tubules and vasa efferentia. The results are as follows: (1) Many more testes differentiate than ovaries, 60% of all cases. (2) Only 17% of the gonads differentiating are ovaries. Although very small, these are sometimes fairly normal, with developing follicles containing young growing oögonia and oöcytes. (3) 9.5% of the gonads differentiating in male hosts exhibit a bisexual structure. These gonads contain both medullary and cortical components. (4) Sex cannot be identified in 12% of the gonads differentiating. In these indeterminate grafts, sex cords are irregularly arranged adjacent to or in connection with the rete ducts.

A number of grafts classed as small testes should be considered as transformed ovaries. These cases exhibit medullary cords transforming into seminiferous tubules. This interpretation is also supported statistically. Of a series of 116 grafts in mature male hosts, 70 are testes. If all of the bisexual gonads, the sexually indeterminate grafts, and ovaries, be classed as zygotically determined females the number is but 46, and is still overbalanced by a preponderance of males. With the 70 testes have been classed a group of 9 small gonads which give evidence of a transformation from the female condition. If these be added to the female side of the series the ratio is changed to 61 males and 55 females, a ratio approximating the normal 50 to 50 ratio.

The results at first suggest inhibition, or a partial or complete reversal, of some female primordia through the action of a hormone; but this interpretation, though in agreement with the freemartin theory, must be abandoned after examination of a series of 64

grafts resident in mature female hosts. These gonads give approximately the same ratio as obtained in the male hosts, eliminating the possibility of explaining the results on the basis of a hormone action. Only one acceptable explanation can be advanced, namely that the developing gonad has the ability to differentiate according to its zygotic determination, even in the presence of adult sex hormones. This self-differentiating potency is not, however, equal for the medullary and cortical components. The medulla of the differentiating gonad has a greater capacity for self-differentiation in the experimental environment than the cortical area. Willier<sup>3</sup> by transplanting undifferentiated gonad primordia of chick embryos to the chorio-allantoic membrane of host embryos has observed self-differentiation of the gonad grafts independent of the hormones of the host.

## 6831

## Excretion of Estrin in Acne.

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On clinical grounds it has long been suspected that acne vulgaris is caused by some endocrine disturbance—presumably by disturbance of the gonads (Pick,<sup>1</sup> Hollander,<sup>2</sup> Schamberg,<sup>3</sup> Darier,<sup>4</sup> Bloch,<sup>5</sup> Stein,<sup>6</sup> and others). The appearance of acne usually coincides with the endocrine changes for the sexual maturity associated with puberty. Only in exceptional instances is there any evidence that these changes are abnormal as for example, the case cited by Bloch in which acne appeared in the first years of life when (owing to suprarenal tumor) sexual maturity was precociously developed.

It seemed to the writers that evidence of normality would be

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<sup>3</sup> Willier, B. H., *J. Exp. Zool.*, 1927, **46**, 409.

<sup>1</sup> Pick, *Arch. f. Dermat.*, 1921, **131**, 350.

<sup>2</sup> Hollander, *Arch. Derm. and Syph.*, 1921, **3**, 593.

<sup>3</sup> Schamberg, *Arch. Derm. and Syph.*, 1921, **4**, 293.

<sup>4</sup> Darier, *Precis de Dermatologie*, Masson et Cie, 1928, 508.

<sup>5</sup> Bloch, *Brit. J. Derm.*, 1932, **43**, 61.

<sup>6</sup> Stein, *Handbuch der Hautkrank.*, 1932, **13**, 81.