

THE PHYSIOLOGY OF PREGNANCY *

It is impossible to take any part in preventive medicine without understanding the natural science of life in all its activities. The chief aims of preventive medicine are to maintain normal function and to recognise the earliest aberrations from the normal. For a long time medical study has been directed to pathology, but it is coming back to physiology, and before long medical students may be taught on healthy people rather than sick ones.

LOCAL AND GENERAL EFFECTS

What really happens during pregnancy may be studied under two heads. Its effect on the reproductive system, that is, its local effects, and its general effect on the mother. The physiology of reproduction is a most entrancing study. The sexual organs are of great importance in determining the constitution of an individual, they produce internal secretions like the thyroid and adrenals, and in early foetal life these secretions determine the growth of the whole body. In very early foetal life there are two sets of reproductive tracts in the foetus; the female, Müllerian, set, and the male, Wolffian, set, the primary double set. When ovarian secretion is present the Müllerian organs persist and the other set atrophies, and when it is not present the Wolffian organs persist and the Müllerian disappear. In the broader ligament of the fullgrown female gridiron-like tubes may be found near the ovary which are the remnant of the Wolffian organs.

In certain rare cases where the ovarian secretion is deficient, the gonad does not develop, because not only will the internal female organs be undeveloped, but there will be a curious malformation of the long bones, which, owing to the growing ends uniting, will be unusually long in relation to the trunk.

THE CHIEF FACTOR

When a woman reaches puberty there is a periodic rupture of the blebs in the ovary containing the egg cells, and from this rupture secretion originates which governs the whole reproductive period. The structure of the empty bleb known as the corpus luteum, persists for the 10 days after the rupture and then degenerates, but if pregnancy occurs instead of degenerating it continues to grow throughout the pregnancy. Its degeneration is the chief factor in bringing on labour. This yellow body causes general changes in the body, and one of these is hypertrophy of the breasts. Other changes are an increase in the size of the uterus, each individual muscle fibre increasing in length ten times, and in width five times its original size, the number of fibres not being increased. This increase in size takes place whether the pregnancy is inside or outside the uterus, as in rare cases of extra-uterine pregnancy the uterus has been found to have grown to three-quarter the size it would have been had the ovum been inside it. There is also an enormous increase in circulation of the uterus and in the packing, or connective tissue, to meet the growth of the muscle, but the most remarkable change is in the lining mucous membrane, then called the decidua, in preparation for the new life. All these are brought about by the chemical influence of the secretion of the corpus luteum.

* Extract from "Nursing Mirror"

The next thing is fertilisation or union of the male and female element, usually in the outer end of the Fallopian tube. This is the most wonderful thing of all. Every cell in the body has in its nucleus (or heart) a certain number of bodies which take up colour readily—chromosomes. The number of these bodies vary with the different animals or plants. The human cells contain 24. When the male and female cells are ripe for fertilisation they each cast out half their colour-loving bodies, and with the junction of the male and female cells an entirely new body is formed containing a full number of the bodies, half from the male and half from the female, with a constitution different from either father or mother. Thus the mother has within her another individual altogether.

During the next ten days the fertilised ovum can remain loose and find nourishment from fluid within the cell; by this time it has reached the uterus and eaten its way into the thickened lining, where, just as plants do, it fixes itself by throwing out little roots. These human roots are called chorionic villi. Very early the foetal heart develops as a contractile bulb; it soon doubles on itself, and becoming a four-chambered heart pumps blood into the roots, and another set of vessels takes the blood back. The roots have opened up some of the maternal blood vessels in the uterus wall, and as they increase in size and number they are bathed in maternal blood. This is the growth of the after-birth which during the nine months the foetus is in the uterus takes on for it the functions of the lungs, kidneys, and liver, the physiology of the after-birth being very much the same as the physiology of digestion and respiration. Meanwhile the foetus is building up its organs, and all this growth may have a great effect upon the mother.

METABOLISM INCREASED

During pregnancy all the functions of the body are quickened up and metabolism increased. There is an increase in the production of carbonic acid, and in the later months there is a change in nitrogen balance. Normally nitrogen that is taken in is passed out as urea, etc. In pregnancy, especially in the later stages, the woman retains nitrogen. Some part must be utilised for the growing foetus and hypertrophy of the reproductive organs and still more is retained by the mother, possibly as a reserve for lactation. The pregnant woman wants little proteid diet but she needs carbo-hydrate diet for immediate use, and if starved of the latter may quickly go into a condition of acidosis with acetone in the urine, a condition very often associated with toxæmia. If the mother is deficient in any requirement the foetus will take from her even the little she has. This is specially seen in calcium deficiency because the baby needs often a good deal of calcium for its bones. In war time starved women have produced good big babies. Another thing is that, although the chorionic villi are very wonderful in keeping poisons away from the foetus, if the mother is badly poisoned by syphilis, malaria, lead, or some septic focus, the cells may become damaged and allow the poison to pass through, resulting in intrauterine death of the foetus, premature labour, or a delicate baby likely to die in neo-natal life.