

mations in a high percentage of exposed fetuses. The types of malformations observed in these infants are varied and multiple with no basic pattern of syndrome recognizable.

The second group of known human teratogens are the steroidal sex hormones, androgens, estrogens, and progestins. It is heartening to note that recent prospective studies of drugs taken by pregnant women suggest that the use of steroids in the first trimester of human pregnancy has been virtually eliminated. The decline in the use of steroids during pregnancy probably came about as the result of physician education that androgens and progestins masculinized females, while estrogens and progestins feminize males. Moreover, the primary use of progestins and estrogens to maintain pregnancies in threatened abortions has not proved to be effective. Thus, the benefits to risk ratio of these drugs for this purpose is quite low. The anomalies of sex differentiation caused by the sex hormones occur in a large per cent of fetuses exposed to these agents in the uterus.

The third teratogen known to affect the human is maternal alcoholism which produces malformations of a variety of organ systems in exposed fetuses. The risk of the fetal alcohol syndrome in exposed fetuses is only about 30%.

The last drug known to malform the fetus and perhaps the best known one is thalidomide. This drug illustrates the second principle of malformations applicable to humans. This principle is that a drug which is virtually harmless to the mother can be devastating to the development of the fetus. Thalidomide again is an example of a drug that is a very strong teratogen affecting nearly 80 to 90% of exposed fetuses. It causes a specific syndrome of absence of various joints and bones