The reason why I say "repeatedly" is that this is a readily confirmable observation in numerous laboratories throughout the country and it has been so for over 20 years.

Mr. GORDON. You say, "Moreover these carcinogenic agents frequently produce tumors in the same organs in animals as they do in man, hence there is distinct interrelation between animal and human carcinogenic responses."

Dr. HERTZ. That is my opinion with reference to chemical carcinogens generally.

Senator NELSON. Please proceed.

Dr. HERTZ. Women who have children are known to have less breast cancer than childless women. Breast feeding also reduces the frequency of breast cancer in the mother but to a lesser extent than pregnancy. Since estrogens are greatly increased during pregnancy, some observers have inferred that estrogens may even protect women from breast cancer. Others also conclude that since the pill produces some of the hormonal effects of pregnancy in the body that this medication would also protect women from breast cancer. These are oversimplified views of the hormonal complexity of pregnancy and lactation, which include numerous additional effects of ovarian, placental, fetal, and pituitary origin. These additional factors are lacking in women taking the pill but they probably play a vital role in reducing the frequency of breast cancer in childbearing women.

In evaluating any possible effect of the pill on breast cancer it must be appreciated that the protective effect of pregnancy is most marked in women who have their first pregnancy before age 20. Hence women who defer their first pregnancy by any means—whether it be the oral contraceptive or by any means, will have an increased risk of breast cancer. The inherent effect of such delay in having children must be taken into account in comparing the risk of breast cancer among pill users with that among women using other contraceptives or no contraception.

In other words, the effect of a delay itself is a factor in potentially increasing the frequency of the disease and that must not be counted against any particular medication but must be considered an inherent part of the biological system with which we are dealing.

About half the cases of breast cancer are first clinically detected in women who have passed the menopause. This had led some physicians to conclude that since such women have very low estrogen levels at this time of life, this hormonal factor plays no essential role in the development of breast cancer. This inference does not allow for the prolonged developmental phase of this disease process, altered as it obviously is for life by such earlier events as prior pregnancies.

Breast cancer occurs much more frequently among American and European women than among Japanese and certain other Asian and African women. There is also some increased risk of breast cancer among daughters and sisters of women with this disease. These observations suggest that genetic factors may play a significant role in the ultimate effect of oral contraceptives in women. Since we know that certain genetic strains of animals are more highly susceptible to the carcinogenic effect of estrogens than others, it would seem naive to expect a genetically heterogeneous population of women to respond in a uniform manner. It is already apparent that certain genetic determinants for specific blood groups can either protect or predispose