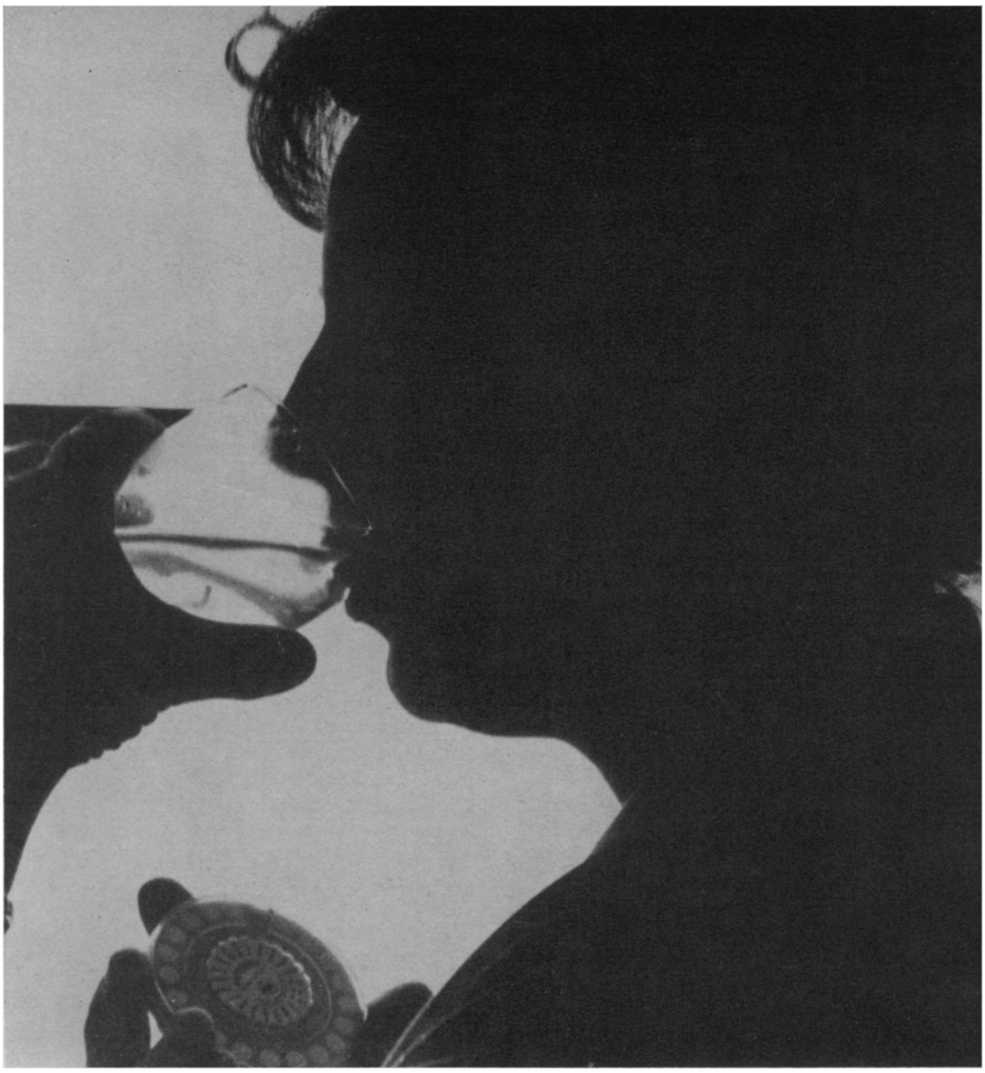
Next in Birth Control

Beyond 'the pill' science foresees a range of new contraceptive possibilities.



When two sex hormones were mixed together in a pill, a new era in birth control came into being. Since 1960 when the first estrogen-progesterone pill became available, more than five million women have adopted a regimen of pill-taking to prevent pregnancy.

The pill has been hailed as the liberator of women, the answer to the population explosion, the salvation of the hungry and the poor.

But the pill is a sledge-hammer approach to contraception.

It works by suppressing ovulation and thereby alters the normal course of events in the hypothalamus and pituitary glands as well as in the uterus.

Ovulation is such a complex and delicate process, it should not be necessary to turn it off completely in order to prevent a woman from having a child, Dr. Harry Rudel of the Population Council, New York, told the American Association of Planned Parenthood Physicians meeting in Atlanta. Minor interference ought to do the trick, he believes.

A second-generation family of contraceptives is being designed to do the job without upsetting a woman's normal cycle of ovulation and menstruation.

"Minidose" contraceptives that can prevent pregnancy from three months to a year, maybe longer, are slated for human trials within six months, says Dr. Sheldon Segal, also of the Population Council.

Minute microspheres or pellets may be injected or implanted beneath the skin where they would release small doses of a progesterone at a relatively constant rate over a long period.

In a normal monthly cycle, estrogens are secreted during phase one and progesterones during phase two. When progesterones are continually present, they somehow inhibit pregnancy without stopping ovulation from taking place. Minidose compounds probably work in the uterus or the Fallopian tubes, Dr. Segal observes.

Although minidose or microdose contraceptives are likely to be the first of the second generation agents to mature, they are by no means the only new compounds in the researcher's armamentarium.

Fundamental studies of human reproductive physiology—its glands, its hormones, its enzymes, its action and inaction—are pointing out new roads for anti-fertility research.

The pituitary once was considered the gland that controlled reproductive processes, with the hypothalamus as its helper. Now, says Dr. George Langmuir of the Planned Parenthood Federation, an impressive body of evidence has accumulated to support the theory that the hypothalamus is really directing the whole show.

The pituitary is the receptor, so to speak, of follicle stimulating hormones —FSH—and luteinizing hormones—LH—he explained. FSH is associated with the development of the ovum or egg; LH is associated with its rupture and release from the ovaries. This short sequence, then, is between pituitary and ovary. However, at a higher level of control, the hypothalamus is now known to be the site of FSH and LH releasing factors. Thus, the hypothalamus tells the pituitary to release the hormones and the pituitary hormones tell the ovaries to get to work.

If researchers are able to synthesize or extract these releasing factors from the hypothalamus, Dr. Langmuir says, they will be able to start thinking about developing agents to block selectively the release of the releasing factors. Although the work is still highly experimental—there is no estimate of when it might be translated into clinical

studies—it suggests a possible way to achieve contraception without jamming all of the natural activities of the reproductive system.

Control of FSH and LH releasing factors could have double applications in family planning, according to Dr. Gordon W. Duncan of the Metabolic Diseases Research Division of the Upjohn Company, Kalamazoo, Mich.; it may offer a means of selectively inducing ovulation, "perhaps at will." This could be used to help barren women conceive as well as to help fertile women avoid conception.

In another area of contraceptive research, a contraceptive that is administered to the man but acts in the woman is being used as a tool to study reproductive events, Dr. Duncan reported. Studies carried out by Dr. R. J. Ericsson of Upjohn recently demonstrated that certain natural or synthetic estrogens can be given to a man without impairing his fertilizing ability, and can prevent conception by interfering with reproductive events in the woman. The estrogens are carried by the semen to the uterus where they appear to alter the rate of ova transport through the Fallopian tubes.

Such a contraceptive can be given only for a short time without actually affecting the development of sperm in the male testes and, therefore, is not being considered for actual clinical use at any time, Dr. Duncan explains.

Studies Dr. Ericsson is making of capacitation—the capacity of sperm to penetrate and fertilize an egg—however, may lead to a new contraceptive applicable for human use. Sperm cells are not able to fertilize an egg as soon as they enter a woman's body. They must reside in the warm estrogenic environment of the female for four to six hours before they develop the capacity to penetrate the ovum. Although it is too soon to say when or how, Dr. Duncan believes it is possible to think of developing a drug that could be given to a woman to somehow alter the estrogenic environment in which sperm cells finally develop their potency. If this could be done, contraception would be achieved at a local level and would not necessarily significantly affect the total physiological processes of either the man or the woman.

IUD Report in May

Contraception by the double coil, hailed a few months ago as one of the most promising new intra-uterine devices, has not lived up to its promise.

Studies of 732 women during the last four months show preliminary evidence that the double coil is no more effective than any other IUD and is the second most likely to be expelled from the uterus.

The double coil, known as the Saf-T-Coil, was either expelled or removed from 90 of the 732 women; two accidental pregnancies occurred among the rest.

Dr. Christopher Tietze of the Population Council, whose work was reported in Atlanta (see p. 349), found in comparative studies of six types of IUD's that the large bow is least likely to be expelled.

A comprehensive study of IUD similar to the recent report on "the pill" is being prepared for the Food and Drug Administration and may become available sometime in May.

Thousand-Inch 'Scope For Infrared Scan

A beginning is now being made on a new way of studying planetary atmospheres in the infrared spectrum. Knowledge of what chemicals are found in what amounts in the atmospheres surrounding planets, especially the two closest to earth, is necessary for designing instrument packages to explore their surfaces.

The largest telescope used so far for infrared studies of Mars and Venus is the 200-inch Hale instrument atop Mt. Palomar, although it was designed for optical astronomy.

Now a proposal is being made to build a 1,000-inch telescope specifically to exploit the new technique in scanning the infrared region of the spectrum.

Three scientists writing in the April SCIENCE JOURNAL urge international funding for the instrument. But the idea is so new that neither the National Science Foundation nor the National Aeronautics and Space Administration—source of any U.S. contribution—has yet heard anything about the proposal.

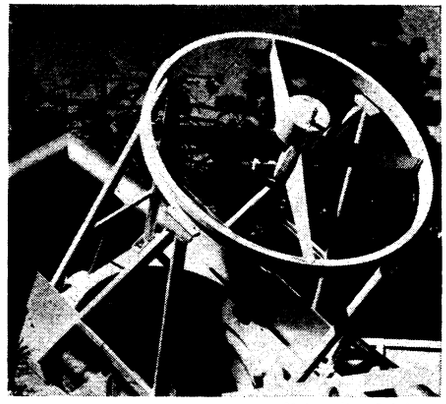
Scientific support for such a giant instrument has already come from scientists who have worked with the three in developing the new technique for infrared astronomy, known as multiplex interferometric Fourier spectroscopy, or MIFS.

Linking an MIFS system with a 1,000- telescope would be a "very good bargain," especially if built and operated internationally, the three scientists contend. The telescope would cost an estimated $15 million, which is about the same cost as soft-landing an instrument package on Mars.

A launched instrument package, however, would be a "once-and-for-all experiment," out of the researcher's hands from the moment of launch. Actually, control over the design of experiments carried on the planetary probe would be minimal for at least two years before launch.

A 1,000-inch ground-based instrument, on the other hand, could provide "a whole gamut of investigations" concerning planetary atmospheres, Drs. Peter Fellgett, Pierre Connes and James Ring Stress. The three scientists are from, respectively, the University of Reading in England; France's National Center for Scientific Research, and England's University of Hull.

The reason the 1,000-inch would be



University of Arizona

Possible unit of 1,000-inch 'scope.

such a bargain is that its components would not have to be as precisely aligned as the 200-inch. The new instrument would be constructed specifically for infrared observations, which have a much longer wavelength than visible light. This allows building the telescope with considerably less precision than would be required for visible wavelengths.

The three scientists propose building the telescope in increments of 120-inch instruments. They could thus be made on an assembly line basis, with the added advantage that the first 120-inch device could be put into operation while the next was being completed.

Even that would be half again as large an instrument as the 80-inch, the largest normally used for MIFS studies of planetary atmospheres.

Testing Issue: A Straw Man

Not so many years ago, personnel directors discovered something called the personality inventory—a paper and pencil test that by probing personal attitudes, sexual and religious feelings, and family relationships reveals the mark of an abnormal personality.

Though the test was originally designed for medical use, Government and industry quickly saw its utility and the Minnesota Multiphasic Personality