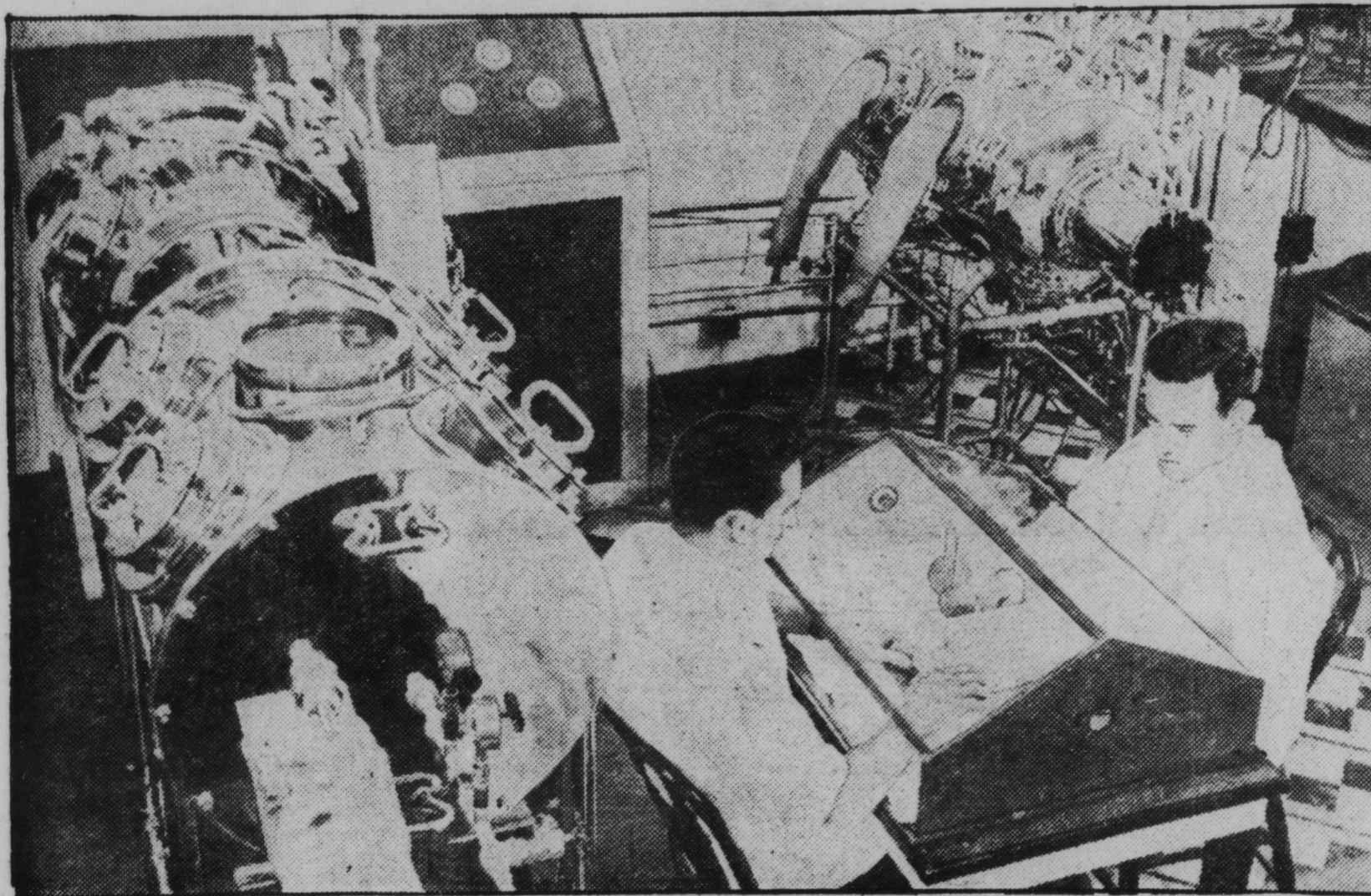
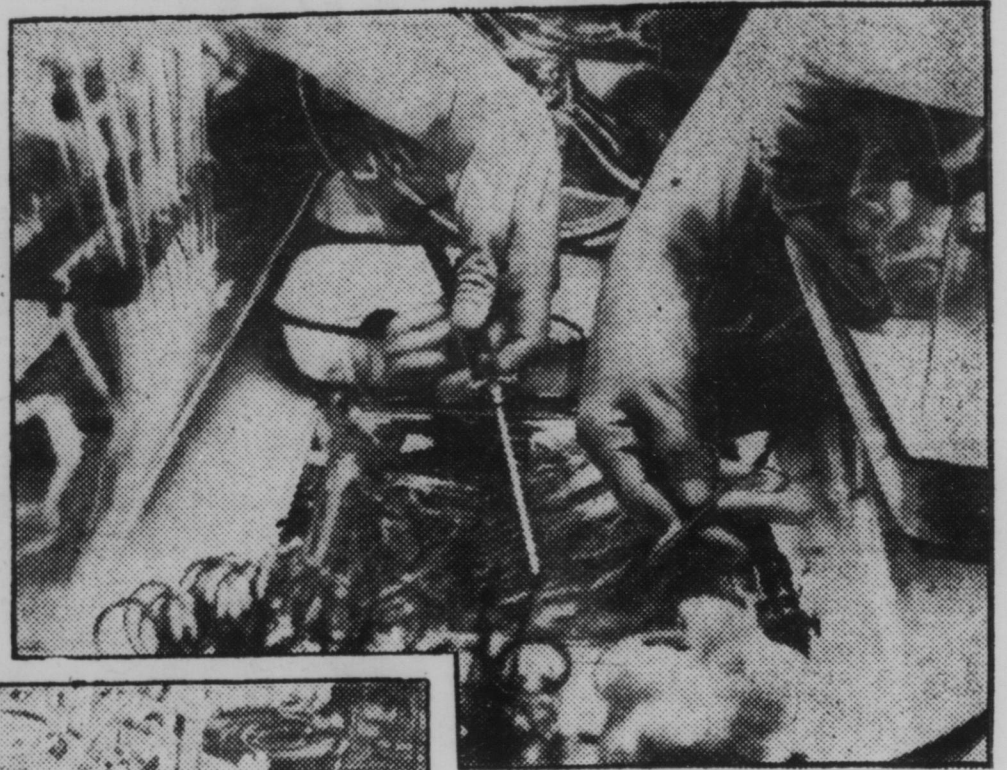
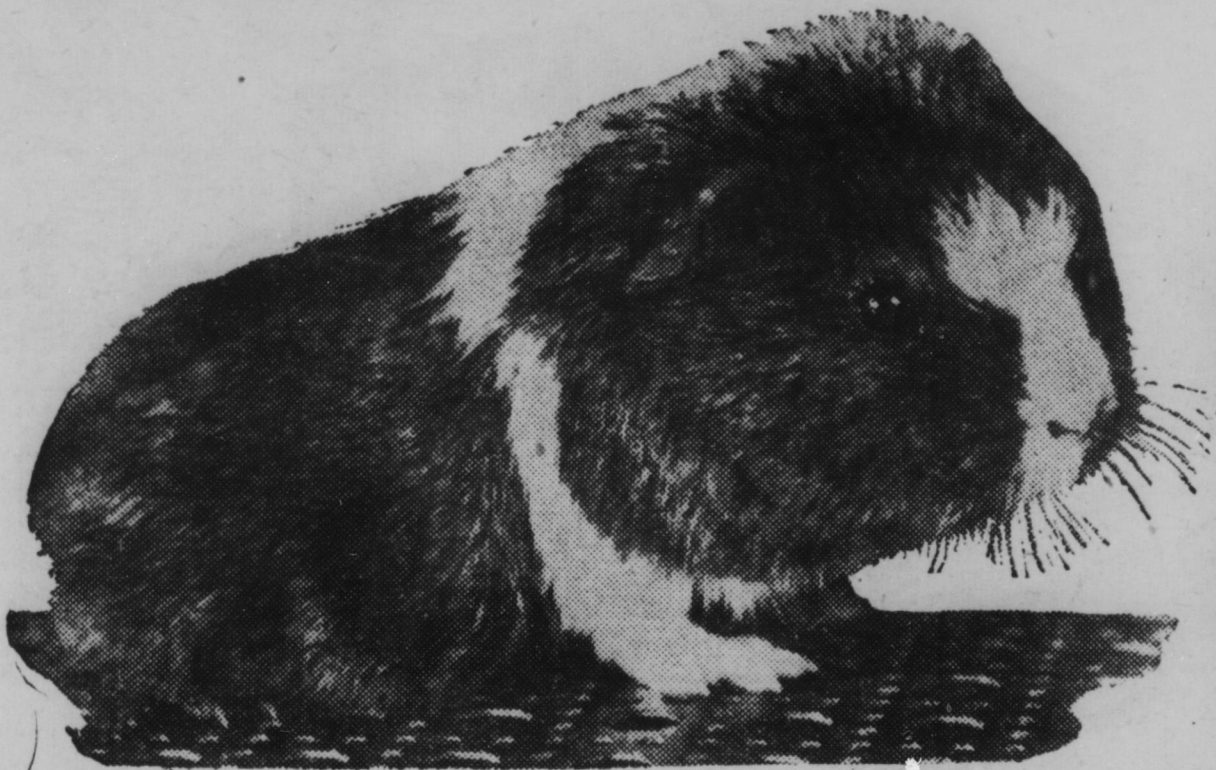


GIVING SCIENCE ITS FIRST GERMLESS GUINEA PIGS



Using an electric cautery, within the germ-free machine, the scientists make an incision through the Cellophane covering into the guinea pig. . . . Upper left, one of Dr. Reynier's germ-free guinea pigs.

By Dr. Frank Thone

A STANDARD thing for bacteriologist or parasitologist to do, when he has a one-celled plant or animal suspected of mischievous tendencies, is to try it on a guinea pig. These docile little martyrs of science give up their lives in thousands every week, that our own lives may last the longer and be the more free from aches and ills.

Yet whenever a scientist with a culture of germs decides to "put it through a pig," he is up against a dilemma. For his "pig" is already full of germs, in a most amazing variety, exercising effects so completely unknowable by present methods of research that the scientist simply has to shut his eyes to them and pretend they are not there at all.

Scientists are due to be relieved of this dilemma very soon. A young member of the Notre Dame faculty, Prof. James A. Reyniers, has developed a set of elaborate mechanisms, and perfected a technique, that will bring guinea pigs or any other experimental animals, within reason, into the world free from any taint of microbial contamination, will keep them germ-free through their whole lives, and will even permit germ-free parents to mate and bring forth germ-free offspring.

Professor Reyniers starts with the fact, long known to biologists, that unborn animals are usually germ-free. They receive their initial contamination while they are being born, and with the first air they breathe, and in

the operating board. All of this is done under a glass case, with careful aseptic precautions.

Then the real operation begins. It takes place in a specially constructed metal cylinder, with an opening underneath through which the animal can be introduced. Cellophane covers this opening also.

On opposite sides of the cylinder are pairs of arm-size openings, each with a pair of long surgeons' rubber gloves tightly gasketed in. This permits two operators to work, each of whom can watch through a glass-covered porthole on the upper side of the cylinder. The air inside is filtered free of germs, and the whole interior can be sterilized at any time by means of sprays admitted through permanently attached pipes. Everything is checked carefully for leaks before the operation starts, for a leak means contamination.

When the anesthetized guinea pig has been thrust up through the trap in the bottom, and lies under the stretched sheet of transparent cellulose, Dr. Reyniers makes his first incision. Instead of scalpels, electric needles are used. Because they automatically sterilize the tissue they separate, and stop bleeding. The edges of the protecting sheet are sealed to the incision.

First, a pregnant female guinea pig known to be within two or three days of delivery is selected. All her hair is removed with a depilatory, for hair is notorious as a lurking-place for contaminating germs. She is scrubbed clean, disinfected, sealed in a sterile Cellophane-lined envelope, placed on

the first food they take. Bring them to birth in completely germ-free surroundings, and they will remain innocent of germs as long as you guard them well.

That sounds simple, but it is terrifically difficult to turn into accomplished fact. Yet Professor Reyniers has turned the trick. Already he has reared, in his laboratory at the University of Notre Dame, more than 2000 germ-free guinea pigs, as well as germ-free chicks, rats, mice, rabbits, cats, insects, and several plant species.

To get germ-free guinea pig infants from ordinary germ-infested mothers, you cannot let them be born in the natural way. They would become contaminated at once. Therefore they must be brought into the world by means of the well-known Caesarean operation, performed under aseptic precautions that even human patients never experience.

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amnion, and absolutely germ-free.

In turn each amnion is opened, the little guinea pig slipped out, its umbilical cord clamped and severed, a germicidal bath administered, normal breathing stimulated if necessary. The little "pigs" have been born.

At every stage during the operation, bacteriological tests are made: of the amnion as it is opened, of nose, mouth, all body openings of the young as they are brought forth. If signs of germ life appear at any stage, the whole laborious procedure is ruthlessly set down as unsuccessful, and a new experiment is begun.

After the whole litter, usually three or four little guinea pigs, has been born, a final drastic test for germlessness is made. One of the newborn animals is instantly killed and its body reduced to hamburger in a meat-grinder attached to the inside of the operating machine. Samples of this guinea pig hamburger are put into 22 tubes, each containing a different kind of germ food.

If any germ is present anywhere in the animal, this test is calculated to show it up. If the "hamburgered" guinea pig passes this test, it is assumed that its brethren are all right also.

Then the remainder of the litter is removed, through an opening in the end of the operating cylinder, into a second cylinder somewhat like it, but fitted out as a rearing cage. Again all air is made germ-free, and all water and food given to the young animals is kept rigidly sterile.

They must be hand-fed, every hour, day and night, on a sterilized milk mixture, during the first five or six days of their lives. Every day a bacteriological test is made of every accessible body cavity.

At the end of several weeks another member of the litter is sacrificed on the altar of bacteriological precaution, via the meat grinder. If all these tests still show no germs, the remainder of the litter are removed into still another cylinder, the storage machine.

There, still on a regimen of absolutely germ-free air, water, and food, the young guinea pigs grow up. At six months of age they are mature, ready for use in research experiments, or they can be mated for the production of germ-free young.

Of course, if both parents are germ-free, there is no likelihood that the mother will cause the contamination of her own young at birth. The serious Caesarean operation can therefore be dispensed with and the young born in the natural way.