

PHYSIOLOGY

Lindbergh and Carrel Grow Organs Outside of the Body

Living and Functioning in a Glass Jar, Glands and Heart Will Add to Knowledge of Organic Diseases

COL. CHARLES A. Lindbergh, premier aviator, has written his name in the annals of experimental medicine, bracketed with that of Dr. Alexis Carrel, Nobelist of the Rockefeller Institute for Medical Research.

A new method of transplanting living glands or any other parts out of the body into a glass chamber, there to live for days artificially fed on a blood substitute by an ingenious Lindbergh-designed mechanical "heart," has been announced by the scientific team of Carrel and Lindbergh. (*Science*, June 21).

For the first time an entire organ has been made to live outside the body.

The Lindbergh apparatus for maintaining a sterile pulsating circulation, combined with the Carrel techniques for transplanting organs and keeping them free from bacteria, has been used in twenty-six recent experiments. The organs made to live in vitro were: thyroid, ovary, suprarenal, spleen, heart and kidney.

The organs not only continued to live but some grew and added new cells and tissues to themselves. One organ more than tripled its weight in five days.

In explaining their research on "the culture of whole organs," Dr. Carrel and Col. Lindbergh hint as to its ultimate purposes:

1. Manufacture in glass jars outside the body of the secretions of the endocrine glands.
2. The isolation of the substances necessary to growth.
3. The discovery of the differences and the functions of the body's glands.
4. The discovery of how organs affect one another.
5. The production and treatment of organic and arterial diseases in glass jars outside the body.

The suggestion that organic and arterial diseases may be first produced and then treated in healthy body parts kept alive outside the body will create great interest and hope in medical circles. Scientists find some of the most deadly of human diseases most difficult to study.

Heart diseases, kidney disorders, hardening of the arteries, and perhaps even cancer, are just a few of the "killers" among diseases that might be studied and combated by the new Carrel-Lindbergh methods.

Since glands and their secretions may create dwarfs and giants, or bring on a variety of diseases, the hope of better knowledge of the glands will also intrigue medical experimenters.

The Carrel-Lindbergh experiments mark the fulfilment of a 123-year-old hope, first expressed by the French scientist C. J. J. Le Gallois, who wrote in 1812 that "if one could substitute for the heart a kind of injection . . . of arterial blood, either natural or artificially made . . . one would succeed easily in maintaining alive indefinitely any part of the body whatsoever."

Only recently have surgical and mechanical procedures become sufficiently perfected to allow organs to be culti-

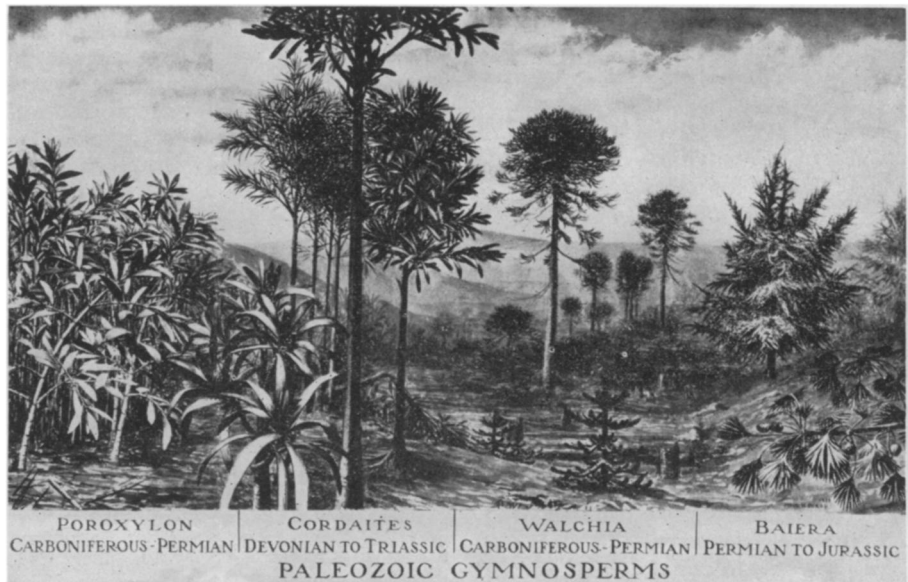
vated in vitro. In 1908, Dr. Carrel worked out methods in connection with organ transplantations for handling the arteries, washing the organ free from blood without injuring the cells and preventing blood clots. Then came the World War, and under the stress of necessity there were developed in Rockefeller Institute laboratories in France the antiseptic procedures that permit complete protection for tissues from bacteria in the course of surgical operations.

Then there was lacking only an apparatus capable of playing the role of heart and lungs and of keeping an organ free from infection indefinitely. Dr. Carrel began a long search for the proper apparatus.

Col. Lindbergh enlisted as Dr. Carrel's collaborator. After five years of work, during which many pieces of apparatus based on different principles were built and discarded, success was achieved.

Striking deep into the heart of medicine's great unknown areas, the Carrel-Lindbergh research follows Dr. Carrel's spectacular and important Nobel researches on tissue culture that have added much knowledge of bodily processes. Most widely heralded to the public was the achievement of keeping chicken heart tissue growing for over twenty-three years.

But the new "culture of whole or-



MILLIONS OF YEARS IN ONE PICTURE

Something rather out of the ordinary is achieved in a series of restoration paintings of ancient plants done for the Brooklyn Botanic Garden by Miss Maud Purdy under the direction of Dr. Alfred F. Gunderson. Instead of representing a mixed forest of one geologic age, Miss Purdy's paintings show plants of the same general botanical group from several different ages in one frame, making possible a bird's-eye view of a considerable sector of botanical evolution. In the above picture are shown representative paleozoic gymnosperms, grandsires and greatuncles of modern pines, spruces, ginkgos, etc.