

## BIOLOGY

# Planetary Biology Soon

The possibility that some form of life exists on other planets is a strong one, one expert believes. Biologists should prepare now for comparing these forms of life.

BIOLOGISTS should start preparing now for studies they will make when rockets will carry equipment to the planets.

The rockets will be ready in less than ten years, a physicist told scientists at a conference in New York on the origin and nature of living matter. The biologist should be prepared by then for "comparative biology on Mars," Dr. Philip Morrison of Cornell University said.

Man may not be right on the spot to make the tests and take samples. Therefore, the biologist must design equipment and develop systems that will automatically make direct experimental comparisons of life on earth with life—or something akin to life—on the other planets. Dr. Morrison predicted reaching this epoch-marking point in four to eight years.

Studies of the solar system and other galaxies give a basis for understanding natural order in biology as well as physics. In fact, analyses of stars, supernovae and other astronomical bodies can help explain why living matter is composed of the same elements found in heavenly objects.

The proton can be considered the beginning of life, the physicist said. Subjected to

thermonuclear forces found in some stars, for example, heavier atoms are made from this beginning. About 60% of the atoms in living matter are hydrogen, the lightest atom consisting of only one proton and one electron. Furthermore, Dr. Morrison pointed out, there is no known indispensable atom heavier than iron in living matter.

The energy required to make a hydrogen or helium atom is tremendous. However, once the lighter elements are formed, the building-up of heavier elements requires less energy, he said.

In this connection, Dr. Morrison described the sun as a "second or third generation star." It began with a "legacy of heavy atoms" bequeathed it by its parent star. What is known of the sun's energy expenditure and its elements indicates it could not have had the energy reservoir to create the heavy elements which it contains and still survive. Given present understanding of the universe, physical principles and experiments support the idea of some form of life outside the earth, with Mars the likely candidate.

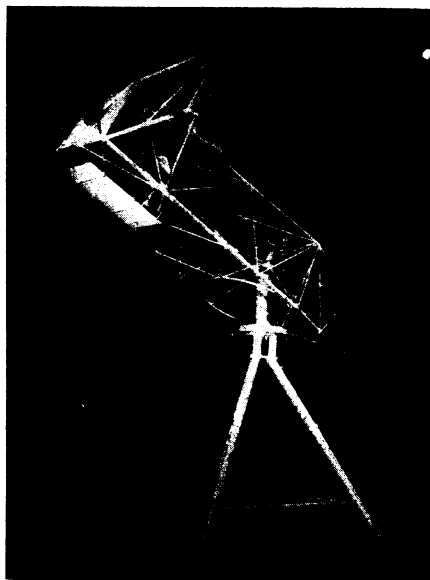
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that the entire reproductive cycle of the bee colony is dominated by the supply of queen substance. More tests and research are being made to discover what the substance is.

It may turn out to be a "steroid," one of a group of substances that seem to play a very fundamental part in the chemistry of life. The sex hormones of higher animals and man are steroids.

There are many details still to be investigated. Why does a shortage of queen substance sometimes cause swarming and sometimes only replacement of the queen within the hive? Dr. Butler believes the answer to that depends on whether the hive becomes overpopulated or if the queen is naturally aging. His team is seeking the explanation of how the queen substance actually stimulates such elaborate behavior.

Science News Letter, June 20, 1959



**SPACE FLIGHT "FEEL"** — A reaction-control simulator, developed by Boeing Airplane Company, can give a pilot the "feel" of a space vehicle in flight. Blasts of compressed gas from jet controls thrust the simulator slowly into various positions of pitch, roll and yaw.

## ENGINEERING

## Induction Coil Built for Hypersonic Wind Tunnel

See Front Cover

AN INDUCTION coil believed to be the largest ever built is under construction at the General Electric Company's Pittsfield, Mass., plant.

In the photograph on the cover of this week's SCIENCE NEWS LETTER the 36 reels of copper cable turn on their spindles as the circular platform in the center slowly revolves. Finished coil will weigh 60 tons.

The coil will store energy for an Air Force hypersonic wind tunnel at the Arnold Engineering Development Center, Tullahoma, Tenn.

Science News Letter, June 20, 1959

## BIOLOGY

# Gland Controls Beehive

A tiny gland that secretes a "queen substance," possibly a steroid, is believed to control the social organization in a bee colony.

THE HONEYBEE'S way of life seems to revolve round a tiny gland in the mandible of the queen bee.

At the bee department of Britain's Agricultural Research Council's Rothamsted Experimental Station near London, Dr. Colin Butler and his associates are steadily unravelling the astonishing role this gland plays in the social organization of the bee colony.

This work is of great practical importance to beekeepers, but it is also shedding light on the complicated and mysterious phenomenon of social life in insects.

Dr. Butler's team has now proved that the gland is the source of a "queen substance," which the queen spreads all over her body and wings when she cleans and grooms herself. Worker bees continuously surround the queen licking her body and examining it with their antennae.

In this way, they receive a constant supply of this queen substance. This is quickly distributed to the other workers throughout the colony as a result of the habit of sharing

food regurgitated from the bees' honey crop.

If the supply of the substance diminishes or disappears for any reason, the response is immediate. Emergency queen cells for rearing new queens are prepared, and the ovaries of the worker bees start to develop. Worker bees are undeveloped females.

Within two weeks, a new queen will have been produced and a fresh source of queen substance established. Immediately, the whole process of queen production stops and the ovaries of the worker bees revert to their normal rudimentary state.

If a hive gets too crowded, there will not be enough queen substance to go round and some worker bees will start queen-raising activities. Eventually, they may leave the old hive with a new queen in a swarm. Similarly, as a queen grows old, her supply of the vital substance diminishes, and the colony will quickly replace her.

A long series of very delicate experiments has been made at Rothamsted to establish the details of this process. It is now clear