

## PHYSICS

## Anti-Matter Galaxies May Exist Somewhere

► UNIVERSES of anti-matter, long fixtures in science fiction plots, were suggested to the American Physical Society meeting in Washington.

Possible existence of galaxies of negative matter was proposed by Dr. Clyde Wiegand of the University of California, Berkeley, one of the scientists who participated in discovery of the anti-proton last October.

Although Dr. Wiegand emphasized his idea of anti-worlds is purely speculative, he said the anti-proton's discovery suggested the possibility, which appeals to physicists because nature tends to be symmetrical.

Where there is one atomic particle, for instance, there is often another of identical mass but opposite properties. The anti-proton is the proton's twin, except it has opposite electrical charge.

The universe may consist of equal parts of matter as we know it and anti-matter, Dr. Wiegand speculated. If so, however, it probably cannot be verified one way or another.

A collision between galaxies of matter and anti-matter probably would be difficult to distinguish from collisions of two ordinary galaxies, which astronomers have recently discovered and are now studying.

Energy in enormous quantities would be released in the annihilations resulting from matter and anti-matter galaxies clashing. If nearby, the explosion would be spectacular.

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## Better Combination of X-ray and Microscope

► AN X-RAY-MICROSCOPE combination of simpler design and less expensive than those presently in use has been designed at the National Bureau of Standards.

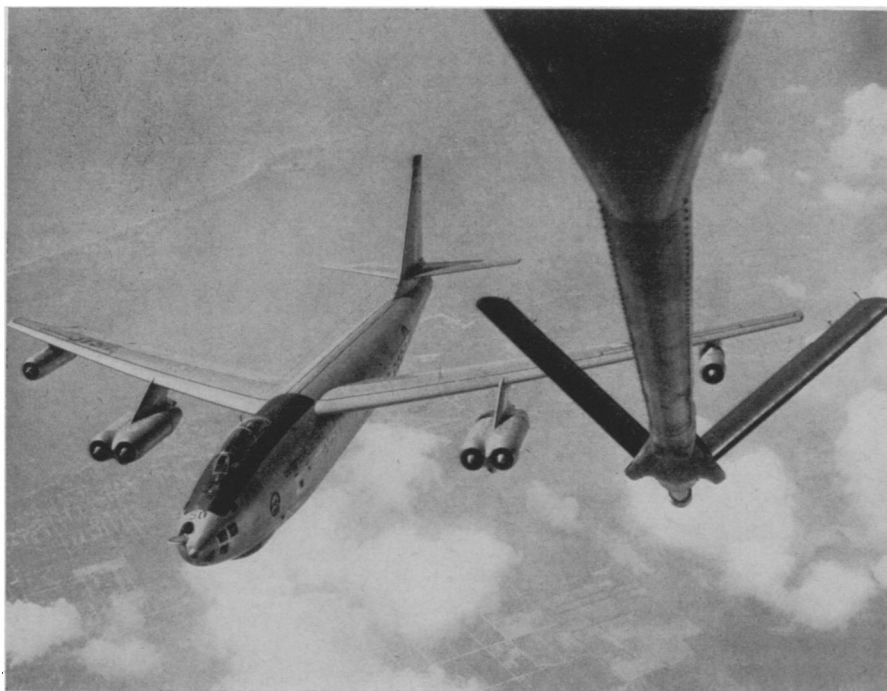
An X-ray microscope, Drs. R. A. Schrack, R. C. Placius and L. Marton explained, provides an enlarged photographic image of small objects, useful in medical and physical research. Its advantages are that all areas of the specimen under investigation are always in focus and that living specimens can be examined without harm.

The simplified device uses, for the first time, the principle of field emission of electrons, or negative particles, in an electron optical system, the American Physical Society meeting in Washington was told.

Source of the electrons is less than a fifty-thousandth of an inch in radius. The electrons are focused to a very minute spot on a gold target, where they produce X-rays. The specimen is placed between the X-ray source and photographic film so that it will cast an enlarged shadow.

The expected resolving power of the field emission X-ray microscope is about a million lines per inch.

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**REFUELING**—This is the giant fuel boom of a flying tanker about to "fill 'er up" for a jet bomber. Inside the line leading to the boom is an instrument developed by General Electric scientists. It can gauge enough fuel in one minute to send an automobile around the world.

## MATHEMATICS

## Build Intelligent "Brain"

► MAN can build an electronic "brain" more intelligent than himself.

The know-how for making a computing machine solve problems beyond man's present mental capacity is available now. Intellectual power can be amplified as physical power is, the British scientist Dr. W. Ross Ashby contends.

Although the electronic computer might not be able to play chess, its ability to amplify intelligence could solve some of the world's social and economic problems.

"Success in solving these problems is a matter of some urgency," Dr. Ashby states. "We have built a civilization beyond our understanding and we are finding that it is getting out of hand."

Looking for exceptional persons with high I.Q.'s is no solution, since those rating over 150 are quite rare. Man's intellectual powers are thus as bounded as those of his muscles.

By building machines, however, man has learned to amplify this muscle power 10,000 times. If the present-day brain worker had as powerful an intelligence amplifier, he would be able to bring to his problems an I.Q. of a million.

To develop intellectual power in this way, man must build devices that, given a little information, will supply a lot.

Generating new ideas is no difficulty, Dr. Ashby says, since a kaleidoscope gives a

"profusion" of them. Discriminating or selecting among them is what makes genius remarkable.

Getting an answer to a problem is essentially a matter of selection, Dr. Ashby says, and selection can be amplified. By dividing the selection process into two stages, a computing machine with a selection amplifier can be made more discriminating than the man who built it.

Dr. Ashby does not estimate exactly how long such a machine would take to provide answers. The upper limit, he calculates, is "forbiddingly high," but the lower limit is "reassuringly low."

His suggestions for building an intelligence-amplifier are made in "Automata Studies," edited by Drs. Claude E. Shannon and John McCarthy and published by the Princeton University Press. (See page 284.)

In the same volume, Atomic Energy Commissioner Dr. John von Neumann of the Institute for Advanced Study, Princeton, N. J., shows how it is possible to construct large and complex automatic computers that will operate reliably even though the component parts are unreliable.

Also described in the book are universal computers, which present machines would be if given, for example, a means of asking for more punched cards and for return of cards it has already punched.

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