

## PHYSICS

# Possibility of More Energy From Uranium-235 Is Seen

## Fission of Nucleus Three Ways Instead of Two With 10% More Energy Called Theoretically Possible

**P**OSSIBILITY that the energy yield from U-235, form of uranium that may some day be useful as a source of atomic power, may be greater than hitherto supposed, was suggested by Dr. R. D. Present, of Purdue University.

Speaking before the American Physical Society, which was meeting in affiliation with the physics section of the American Association for the Advancement of Science in Philadelphia, he stated that it is theoretically possible for the nucleus of the uranium atom to divide into three parts as well as two. Such a reaction would yield about 10% more energy, according to his calculations, than binary fission.

It is the binary fission that has held the spotlight in most of the recent discussions of atomic power. It was forecast in 1939, and verified experimentally early in 1940 when minute samples of U-235 were isolated. Such fission, it has been found, can be instigated either by bombardment with slow neutrons (which are atomic fragments without electrical charge) or by gamma rays.

When fission occurs, energy is released, and more neutrons are emitted. Thus, it is believed, a chain reaction could be started, since these neutrons would cause fission of additional atom nuclei. The energy given off might be utilized as a source of power, so that U-235 would be millions of times more effective than coal. So far as known, however, no one has yet isolated a large enough piece of U-235 to test this thoroughly.

Ternary fission, or division into three parts, can also occur, with still larger energy fields, finds Dr. Present. Though the energy to activate the process is the same as for binary fission, he believes that with low energy neutrons, it is less likely to occur.

So far no experimental verification of the triple division has been found.

*Science News Letter, January 4, 1941*

## Temperature Inside Sun

**T**HE temperature in the heart of the sun is 25,700,000 degrees Centigrade (slightly less than 50,000,000 degrees in

the Fahrenheit scale) according to new calculations presented to the meeting by a four-man research team. It comprises Dr. H. A. Bethe, of Cornell University; G. Blanch and A. N. Lowan of New York City; and R. E. Marshak, of the University of Rochester.

The density in the solar core is calculated to be about four pounds to the cubic inch, which is ten times the value for lead. Both the density and the temperature value, they pointed out, are considerably higher than those usually taken for the sun.

Dr. Bethe is known as one of the originators of the theory that the sun, and other similar stars, keep going by the energy given off in a process of transmutation of hydrogen to helium with the aid of carbon.

On the basis of their present assumptions, it is estimated that this process would yield about a hundred times too much energy. However, they call attention to the fact that they have not taken into consideration the variation of the molecular weight which is caused by the progressive ionization, or breaking up

of the atoms. This correction, it was said, may cause a lowering of the internal temperature. The presence of more helium, in addition to the 35% of hydrogen which they estimate in the sun, would also remove the discrepancy, they stated.

*Science News Letter, January 4, 1941*

## 110,000 Times Per Second

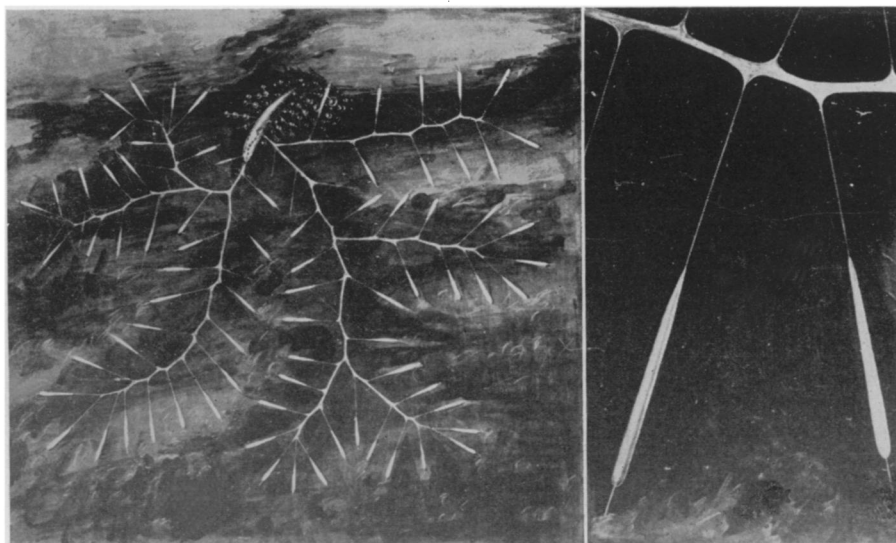
**T**HE PROPELLER of a pursuit airplane, spinning at 2,500 revolutions per minute, is practically standing still compared with a tiny steel ball used in experiments described (*Turn to Page 11*)

## ENTOMOLOGY

## Fly Reverses Role; Catches Spider in Web

**A** BLOODTHIRSTY fly, that lives like a spider, catching prey in a web that it spins, is the extraordinary insect described before the meeting of the American Association for the Advancement of Science in Philadelphia by Dr. B. B. Fulton, research entomologist of North Carolina State College. It is even able to snare and devour small spiders, as Dr. Fulton demonstrated by experiment; whether or not it regularly reverses the traditional spider-and-fly role in this way he was not prepared to say. And it does all this while it is still only an infant, a larva, looking very much like a small worm.

And just to make the strange insect more nearly incredible, it is luminous



### "WON'T YOU WALK INTO MY PARLOR?"

*This curious-looking web wasn't spun by a spider, but by a fly! The fly does this while it is still a baby—a larva. The spindle-shaped branches are sticky, and they catch prey for the larva, head-end of which can be seen at top-center.*

like a firefly or glow-worm; only it goes the firefly one better and carries lights both fore and aft. Its front segment and its five rear segments shine with a weird blue light. Whether this lures other insects into its web, again Dr. Fulton was unprepared to say, although its behavior "suggests such a possibility." The creature's luminosity makes night the best time to hunt it, for its web is quite small—only about two inches across—and is spun in inconspicuous places near springs and among rhododendron roots. It turns its lamps on at sunset and off again at dawn. When Dr. Fulton kept some of them continuously in the dark, in a tin can, they maintained approximately the same lighting schedule for at least six days.

The web is a curious affair, suggesting the flattened-out root system of a small plant, with a few main trunks, each having several lateral branches. The main trunks are ribbon-like runways for the larva and are not sticky; the adhesive that catches the prey is spun on the side branches.

The larva's spider-like behavior was vividly described by Dr. Fulton:

"When an insect is caught in one of the special thick adhesive strands in the outer portion of the web, the fly larva darts out along one of the suspended ribbon-like main strands until it comes to the side branch holding the prey. It follows this out until it comes to the victim. If the prey is small, the larva grasps it with its mouth and pulls it back at once into its den. In dealing with more powerful prey the fly larva quickly attaches more strands of web to prevent its escape and then crawls across its legs to coat them with slime so that they stick together.

"Small spiders dropped into the web were also subdued and devoured. Spiders probably do not constitute an important part of the diet but the observation is of interest because of the reversal of the proverbial roles of the spider and the fly. Certain kinds of flies are known to live in their larval state as internal parasites of spiders but in this case we have a juvenile fly capable of capturing a spider and it can do so by the same system habitually used by the spider in capturing the adult fly."

When this amazing piratical infant grows up and becomes a fully-developed winged adult, it becomes a mild vegetarian, feeding harmlessly on mushrooms. The species, recently discovered, has been named *Platyura fultoni* in honor of Dr. Fulton by Dr. Elizabeth Fisher, a fellow-entomologist.

*Science News Letter, January 4, 1941*

GENERAL SCIENCE

# Air-Raid Shelter in America Proposed to Guard Best Data

## Formation of a Preservation of Science Council To Protect Cream of World's Research Is Urged

**T**HE BUILDING somewhere in America of a great research vault and air-raid shelter in which the cream of the world's scientific research data and equipment would be placed to protect it against destructive bombs of the future was advocated by Dr. K. A. C. Elliott, biochemist of the Philadelphia Hospital.

The formation of a Preservation of Science Council was also urged by Dr. Elliott in a Christmas statement issued by the American Association of Scientific Workers on the eve of the Philadelphia science meetings.

The United States will continue to be the stronghold of the world's scientific and cultural traditions, Dr. Elliott declared.

"The people of Great Britain have grim problems of their own," he asserted. "The main responsibility for the preservation of science now rests on us in America and that responsibility has become so great that I believe it can only be efficiently and comprehensively handled by a special influential representative body."

*Science News Letter, January 4, 1941*

### "Blueprint in Sky"

**W**ITH WHAT he called a "blueprint in the sky," Prof. Anton J. Carlson of the University of Chicago outlined his scientist's ideal of a democratic society.

"To my way of thinking," he said, "a truly democratic society is that social, economic, and political order which favors or permits the maximum freedom and opportunity for the efforts and achievements of the individual, consistent with the common welfare, and gives the individual full or equal share and responsibility in establishing, balancing and sustaining that freedom and opportunity. Again, to my way of thinking, this does not mean equal responsibility from each citizen, for we are not born with equal capacities, mental, moral or physical. If there was now, or ever could be devised, a way to assess individual

social responsibility strictly according to individual capacity, I think we would be on the road to a closer approximation to social and economic justice for all than is the case in any extant democratic society or democratic way of life of which I have ken."

Nowhere, Prof. Carlson hastened to add, is there an actual, factual realization of this blueprint. No democracy is all white—they are all gray. No totalitarian state is all black—they are all a darker shade of gray. However, the leaven of democracy is at work everywhere. Even in Japan, where the Emperor is not merely the supreme ruler but God himself, democracy is astir among the masses.

Failure to realize democracy, despite the many trials that have been made, Prof. Carlson laid to "the eternal cussedness, the dishonesty, the greed, the vanity, and the laziness of man. But although this goal seems as far away as the proverbial rainbow, I would rather chase this rainbow than stay contented in the jungle."

*Science News Letter, January 4, 1941*

### Must Serve Individual

**T**O HAVE democracy in its highest form, our mode of life must be rearranged so that the individual under the trusteeship of his chosen executives will be adequately fed, clothed and housed, provided with such services as education, medical attention and recreation, and have the experiences of working with others to enrich personality.

This was the contention of Walter Rautenstrauch, professor of industrial engineering, Columbia University, speaking in Philadelphia before the American Association of Scientific Workers and the American Association for the Advancement of Science.

Maladjustments in our social and economic system result, according to Prof. Rautenstrauch, from three factors destructive of civilization's vital forces:

1. Ownership of the natural resources