AERONAUTICS

Newest NASA Program Features Jet Slow-Down

➤ SEEMINGLY out of line with the current push for supersonic speed is the National Aeronautics and Space Administration's newest program, slowing down the huge Boeing 707 jet transports.

Using the Boeing Company's 707 prototype, which once set a transcontinental record with an average speed of 612 miles an hour, NASA hopes to find ways to lower landing and takeoff distances required for the huge planes.

In preliminary tests the airplane has been flown at speeds well below 100 miles an hour during landing approach. Normal speeds for the 707 are 150 miles an hour on approach and 135 miles an hour at touchdown.

The prototype was modified by Boeing with large wing flaps, a boundary layer control system, a thrust modulating system and instruments to measure its flight capabilities.

• Science News Letter, 85:296 May 9, 1964

TECHNOLOGY

'Invention by Computer' Seen as Possibility

➤ "INVENTION BY COMPUTER" could be a reality within a few years, a Columbia University scientist predicts.

Any invention can be seen as a mechanical circuit, just like an electrical circuit, said Dr. Ferdinand Freudenstein, professor of mechanical engineering, Columbia school of engineering and applied science, New York. Next it can be changed to a geometric pattern and then to a set of numbers, which can be fed into a computer.

The computer picks the best combination of parts and kinds of motion, producing the most effective machine. This would eliminate the need for many models and test drawings. In addition, it might be possible to patent merely the computer code describing a device, as well as any alternate codes suggested by the computer.

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PHYSICS

Semiconductors Found Superconducting Too

➤ SEMICONDUCTORS have now been found to be superconductors.

A superconductor loses all its apparent resistance to the flow of electrical current when it is cooled to temperatures near absolute zero, or 459.72 degrees below zero Fahrenheit.

Many scientists had believed that semiconductors could not be superconductors. Now, however, germanium telluride and strontium titanate have been shown in the laboratory to be capable of carrying an electric current without resistance.

The theory underlying the experiments was developed by Dr. Marvin L. Cohen, now at Bell Telephone Laboratories, Murray Hill, N. J., while he was a graduate student at the University of Chicago.

Dr. Cohen's theory has since been confirmed by Robert A. Hein, John W. Gibson of the Naval Research Laboratory, Washington, D. C., and Robert Mazelsky, Robert C. Miller and John K. Hulm of the Westinghouse Research Laboratories, Pittsburgh, Pa., and James F. Schooley and William R. Hosler of the National Bureau of Standards, Washington, D. C.

Semiconductors have created a revolution in electronics. They make possible much smaller, more compact pieces of equipment, such as hearing aids, radios, TV sets and laboratory apparatus, than were previously possible because the tiny electrical components made from them can perform many of the functions of much larger vacuum tubes.

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BIOCHEMISTRY

Thalidomide Deformities Could Be Due to Fathers

➤ MEN, AS WELL AS women, who take the tranquilizing drug thalidomide could risk deformities in their offspring, a British scientist believes.

Dr. Cecilia Lutwak-Mann reported her experiments at Cambridge University, England, with male rabbits in the British Medical Journal, April 25, 1964, cautioning that the results need not "necessarily" be applied to humans.

But 27 out of 40 rabbit matings showed harmful effects of thalidomide given to the males.

Six male rabbits of proved fertility were treated with thalidomide and later mated with 40 untreated does of high fertility, at intervals of two to ten weeks from the end of the drug administration.

In three cases no pregnancy occurred. Gross malformations, including an open spine and no tail, were found in two litters fathered by the same male. Eight litters showed total loss of the young, and eight other litters showed marked death rate by the end of two weeks following birth.

Further studies are being made on the mechanism of the effect of thalidomide taken by the males.

The question arises, how many more malformed babies born in Germany and other countries, including a few babies in the United States, could be traced to fathers who took the drug?

Dr. Frances O. Kelsey, chief, investigational drug branch, U.S. Food and Drug Administration, who kept the child-deforming drug from being licensed in this country, told SCIENCE SERVICE that only "sporadic" references had been made to the possibility of offspring being affected by males' use of thalidomide. No U.S. study has been made.

"Further danger of men continuing to take thalidomide is pretty well past," Dr. Kelsey said. "Druggists have voluntarily taken the drug off the market in countries where it was used, but more studies have great value and interest."

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IN SCIEN

PSYCHOLOGY

Alligators Less Curious In Maze Than Rats

➤ ALLIGATORS are more consistent than rats in leaving by a certain rear door exit. They probably are just less curious.

Using alligators for the first time in laboratory maze experiments, Robert S. Davidson Jr., doctoral student at Florida State University, Tallahassee, found that the swamp creatures consistently left the eight-foot long, four-foot wide runway maze by the same exit—either by the right-hand exit or by the left-hand exit.

The animals could freely choose turning right or left at the end of the runway in order to plunge into refreshing cool water and receive some fish as reward.

Rats in a similar shape maze usually alternate from side to side in choosing an exit, Mr. Davidson added. Presumably rats act this way because they have a curious and exploratory nature.

Setting the alligators on the runway course about every other day, Mr. Davidson found he could make them move faster by using heat from a heat lamp as stimulus.

The heat lamp would bring the already high room temperature of 90 to 94 degrees Fahrenheit up to 105 degrees, he said. So they would willingly move along to the cool bath at the end.

By watching their reflection in an overhead mirror, and by peeping through holes in a door, Mr. Davidson was able to accumulate information which he hopes to analyze in the next few months.

Snakes, turtles and a few Central American iguanas are also being tested in the maze experiments, under the direction of Dr. Barron B. Scarborough at the University.

Other creatures which have been used elsewhere in maze tests include earthworms, cockroaches, fish, frogs, crabs, and of course, rats.

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TECHNOLOGY

New Sponge Rubber For Cars Crackproof

➤ NEW WEATHER SEALS promise to keep cars tight as drums, despite rain, snow or temperatures from 250 degrees Fahrenheit down to 60 degrees below zero.

A newly developed sponge rubber is resistant to weather as well as to ozone. Ozone is the chief cause of hardening and cracking in sponge rubber automotive parts, said Dr. Lawrence Spenadel of Enjay Laboratories, Linden, N. J., at the American Chemical Society's division of rubber chemistry, Detroit.

Sponge rubber in cars is used in many ways, including trunk and door seals, heater gaskets and roof rail strips.

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CE FIELDS

ZOOLOGY

Heart in Sea Urchin Finally Identified

➤ ALTHOUGH the sea urchin has been studied for more than 150 years, no scientist has ever positively identified its heart.

Now a University of California, Los Angeles, zoologist, Dr. Richard Booloostian has found a tiny pulsating organ in the purple sea urchin that appears to pump colorless "blood" throughout a farflung system of "blood vessels."

The two-chambered organ has rhythms that can be recorded like an electrocardiogram. Although the heart is only a fraction of an inch in size, it pumps a surprising volume of fluid, Dr. Booloostian says.

Apparently the organ has the function of moving a solution of nutrients from the "abdominal cavity" into and throughout the vascular system of the spiny creature.

Algae are the sea urchin's main food. They are converted into an amino-acid-rich fluid by a rather elaborate alimentary canal. It is this fluid that is deposited in the "abdominal cavity" and transported by the sea urchin's cardiovascular system.

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ASTRONOMY

Strange Celestial Objects Newly Named: Quasars

➤ THE STRANGE OBJECTS in the sky that are believed to result from most violent explosions in the universe unleashing more power than a thousand, trillion, trillion H-bombs per second, now have a new name, quasars.

A "conveyor belt" for transferring the tremendously high energies of these odd-ball stars from the furnace at their centers to the light and radio waves detected on earth was suggested to the American Physical Society meeting in Washington, D. C.

Drs. Louis Gold and John W. Moffat of Martin Company's Research Institute for Advanced Studies, Baltimore, Md., believe that each of the 12 such objects now known is a vast collection of hot, electrically charged gas. They are the brightest light sources known.

The objects until now have been called "quasi-stellar," from which the new "quasar" is contracted. They are so called because they seem to be matter unable to decide whether to be a star or a galaxy, which is a giant collection of billions upon billions of stars.

The vibration of hot, charged particles in the gas, or plasma, gives rise to the radio waves, according to the mathematical model drawn by Drs. Gold and Moffat. It takes about a year for the heat from the central core of quasars, which have a mass of at least 100 million suns, to be transferred to the surface as radio waves and light.

A key in this transfer is the "Debye free energy." This energy is normally so small that it has been considered only in reactions on the atomic level.

However, Drs. Gold and Moffat have found it can be important in explaining the energetic radiation of quasars. Their theory does not rule out the previous suggestion that such objects are undergoing gravitational collapse.

The ultimate stages of collapse will never occur but are delayed indefinitely, Dr. Peter Bergmann of Yeshiva University, New York, has calculated, using Einstein's general theory of relativity.

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GENERAL SCIENCE

Spider Web Cigarette Filter Shown at NSF-I

➤ A NEW CIGARETTE FILTER made of spider webs was exhibited at the 15th National Science Fair-International, May 5-9.

The exhibit comes from Caguas, Puerto Rico, where Eduardo F. Carlo Jr. worked on a science project to develop an effective filter for cigarette smoke.

Eduardo noted the consistency of the spider web, and tested the feasibility of spider web filters for the cigarette-smoking public. He finds that the spider web filter is almost 100% effective in filtering tars and nicotine from cigarettes.

He thinks spiders could be cultivated on a large scale, or possibly industry could come up with an artificial, mass-produced effective substitute.

Eduardo, 17, a senior at Caguas' Notre Dame High School, broke his pattern by working on the spider web project. He plans a career as an electronics engineer, his hobby is electronics and he wants equipment to aid in his work with electronics.

He is at the National Science Fair-International representing the Eastern Puerto Rico Science Fair, held in Humacao. The Eastern Puerto Rico fair is sponsored by Humacao Regional College and the University of Puerto Rico. The National Science Fair-International is conducted by SCIENCE SERVICE, Washington, D. C., through its National Science Youth Program.

Baltimore was the scene of this year's event with 420 finalists from 222 affiliated science fairs in Canada, Japan, Sweden, and the United States.

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COMMUNICATIONS

Radar Signals Analyzed In Slow Motion

➤ A METHOD of analyzing radar and communications signals by observing them in slow motion has been developed.

In the new technique of the Precision Instrument Company, Palo Alto, Calif., signals as brief as 167 ten-thousandths of a second may be observed without distortion over a period of from five to ten minutes by recording them on video-tape.

The system eliminates the need for loop recorders and other devices that artificially sustain the signal.

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GEOPHYSICS

Magnetic Field Mapped In Exploding Galaxy

➤ THE LARGE-SCALE magnetic field of a galaxy has been observed for the first time. The galaxy is M-82, believed to be undergoing one of the most gigantic explosions in the universe.

The explosion itself was first seen in 1963.

The magnetic field was observed by Drs. Allan R. Sandage and William C. Miller of Mt. Wilson and Palomar Observatories, using the world's largest telescope, the giant 200-inch atop Mt. Palomar. They are now planning to map the field in detail.

Photographs of M-82 taken in blue light show large-scale, very faint filaments surrounding the galaxy. These filaments emit continuous radiation that is highly polarized, and this polarization indicates the magnetic field. The galaxy's field is about 63,000 times stronger than the earth's magnetic field.

A similar huge explosion may account for the cosmic rays observed in the solar system, the scientists reported in Science, 144:405, 1964.

• Science News Letter, 85:297 May 9, 1964

MEDICINE

'Kissing Disease' Term Blamed on Folklore

➤ THE TERM "kissing disease" applied to infectious mononucleosis stems from pure folklore, the director of Princeton University's Health Services maintains.

Dr. Willard Dalrymple, who was formerly chairman of the American College Health Association's Committee on Mononucleosis, told SCIENCE SERVICE that scientists still have not even identified the organism, presumably a virus, that causes "mono."

"Until the organism is found, we cannot prove how the disease is transmitted," he said.

At least two different college studies have indicated that kissing played a part in spreading the disease. But most doctors believe kissing is only one possible way "mono" could be spread.

Infectious mononucleosis is ordinarily a benign disease characterized by intermittent fever and sore throat, but because there are sometimes serious complications of the spleen, many physicians insist on prolonged bed rest.

Dr. Dalrymple has made a study of 131 patients at Harvard and Radcliffe. It shows more rapid improvement in those allowed activity as desired during the illness.

One young man reported one morning when Dr. Dalrymple made his rounds that he had just done 50 deep knee bends and felt fine.

Only in severe complications, Dr. Dalrymple says, does a patient require strict bed rest or prolonged limitation of activity.

The second of two detailed studies is reported in Postgraduate Medicine, 35:345, 1964. The first article was published in March.

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