ENGINEERING

Jet Oiling for Metal Cutting

Method for quintupling metal machining production developed. Fine jet of oil under high pressure squirted upon cutting point to give lubrication.

➤ A NEW way of jet oiling metal cutting that can quintuple metal machining production to speed defense and industry has been invented by R. J. S. Pigott, director of engineering research of the Gulf Research and Development Co. in Pittsburgh.

Faster cutting of difficult metals, more economical cutting of softer metals and cutting of the new metal, titanium, at any reasonable speed are all forecast by the new machining process announced by the Gulf Oil Corporation.

Squirting a fine jet of a specially-developed cutting oil under 400 pounds per square inch pressure from below and directly upon the cutting point, the new method lubricates as it cuts. This allows the machinist to cut faster at the same time that the oil cools the metal and lengthens the life of the cutting tool.

The new process, marketed under the name Hi-Jet, will be developed by Thompson Products, Inc., of Cleveland, Ohio. They will devise ways of applying the new process to hard, tough steels and alloys, with a saving of time, power and scarce materials.

Wonder that direct lubrication of the cutting point in metal working had not been applied 50 years ago was expressed by Mr. Pigott. He is a mechanical engineer, a graduate of Columbia University and president this year of the American Society of Mechanical Engineers. Older processes used in cutting metals flood the piece of metal being cut with so-called cutting oil, according to Mr. Pigott, but the oil is deflected by the metal chip being pushed up by the tool as it cuts. The cut surface comes out dry, and the only effect of the oil is to carry away some of the heat developed by the friction of the tool.

In the Hi-Jet process, by installing a compression pump and from one to five jets under the cutting point on the machine, Mr. Pigott explains, lubrication reaches the exact point where this friction develops the heat. This allows faster cutting, longer wear for the machine tools, and the possibility of cutting metals too tough for present practice. Additional cooling is provided in the design of the new apparatus by a thin curtain of the same oil dropped from above the tool, so that all cuts are made within a small volume of space surrounded by cooling oil. Hi-Jet oil can also be used on the same machine for lubrication and for a hydraulic fluid for moving parts, which allows re-use of the oil and fewer kinds of oil to be stocked by the shop.

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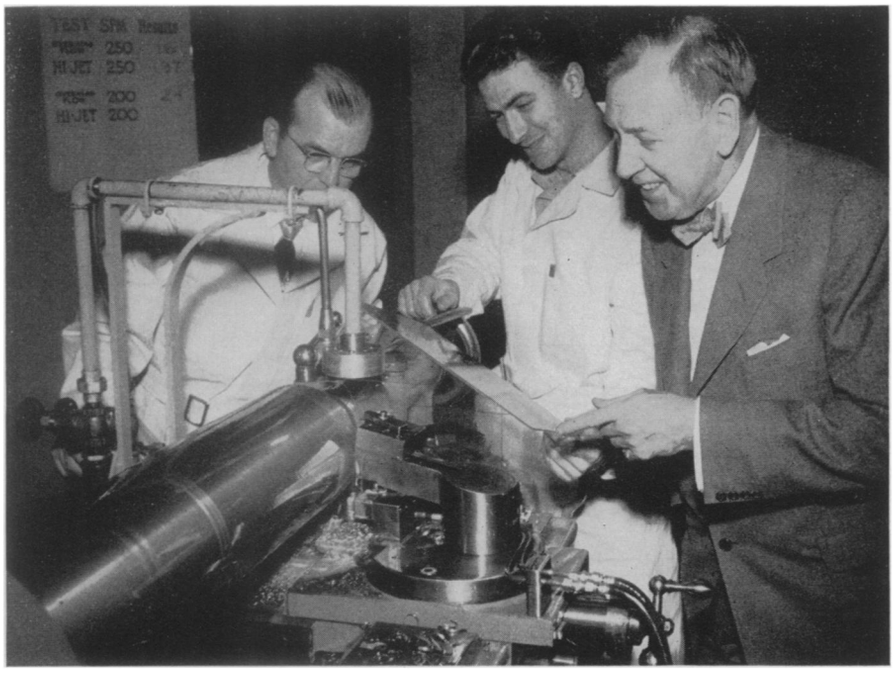

JET OILING—Paul Busang, engineer, George Wright, machinist, and R. J. S. Pigott, inventor of the new Hi-Jet method of faster machine cutting for hard metals (left to right), are shown here discussing this process which can quintuple metal machining production.

MEDICINE

Florida Rats Help Fight Disease in Britain

➤ A DOZEN swamp rice rats have been imported from Florida by a British veterinary scientist to help fight disease.

The scientist is Dr. J. S. Steward of the Imperial Chemical Industries Ltd., London. He believes that the rice rat should be ideal for testing the effectiveness of new drugs because they are considerably smaller than cotton rats and white rats now used for this purpose. He also recommends testing the rice rat for its susceptibility to infections which do not normally take well in other laboratory animals.

Dr. Steward has been able to keep and breed the imported rice rats in his laboratory in England on a diet of ordinary rat cubes supplemented with carrots.

He found the rice rat far from a docile animal by nature, as it will bite even before being handled. He thinks, however, that after several generations in captivity it may settle down to more gentle ways, as the cotton rat has done.

Dr. Steward's methods for successfully rearing rice rats as laboratory animals are reported to fellow scientists in the JOURNAL OF HYGIENE.

Science News Letter, January 26, 1952

GEOPHYSICS

Thunderstorms Intensify Earth's Electric Field

➤ THUNDERSTORMS as far as 100 miles away have been found to produce strong disturbances in the intensity measurements of the earth's electric field.

Two possible explanations are: 1. Such disturbances are caused by wind-blown electric space charges. 2. They are caused by a layer of increased conductivity about 12 miles above the earth's surface.

Dr. G. F. Schilling of the Institute of Geophysics at the University of California at Los Angeles, finds, through research in both his native Austria and in the United States, that thunderstorms act as generators which reverse the normal pattern of electrical currents flowing in the atmosphere. They are thus a principal factor in maintaining the earth's electric charge.

Dr. Schilling's experiments verify the importance of distant thunderstorm activity on the electric field of the earth.

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MEDICINE

Polio Prevention Closer

Finding that there are only three different kinds of polio virus brings medical scientists closer to prevention of infantile paralysis.

➤ BECAUSE SCIENTISTS at four different universities have discovered that there are only three different kinds of polio virus, medical science is closer than ever before toward the prevention of infantile paralysis.

The next step in the fight to prevent polio is incorporation of the three viruses into a vaccine which can be used safely and effectively in man.

Investigations at the University of Southern California, University of Utah, University of Kansas and the University of Pittsburgh were conducted with the support of the National Foundation for Infantile Paralysis and coordinated by Dr. Hart E. Van Riper, medical director of the Foundation.

Dr. Van Riper and Dr. Jonas E. Salk, of the University of Pittsburgh, department of bacteriology, speaking as guests of Watson Davis on Adventures in Science Program over the Columbia Broadcasting System radio network, told how viruses isolated from more than 100 sources show that there exist only three different viruses of polio.

Polio virus was first discovered in 1909; not a great deal of work was done with this virus over the next 20 years and it was not until 1930 that research workers became suspicious that more than one polio virus existed. This was suspected through laboratory experiments in which it was found possible to infect an animal with virus #2 even though the animal had been protected against virus #1. In 1948 a third virus turned up which was different from #1 and #2. The existence of more than one virus explains why polio may strike more than once. The ultimate goal is to devise an effective vaccine for the prevention of polio, and to incorporate in such a vaccine all of the viruses that can cause the disease for which it is desired to produce immunity.

The customary way in which vaccines act is through the development in the body of the injected person of substances that neutralize the virus. In this way the establishment of infection is prevented if after vaccination the individual comes into contact with the particular viruses that are included in the vaccine. If poliomyelitis is caused by one, two, three or more viruses, it would be necessary to include all of them in the vaccine in order to protect against all of the polio-producing viruses.

The magnitude of the operation necessary to find how many different types of poliomyelitis virus exist is great. After studying viruses isolated from more than 100 sources, the evidence points very strongly to the existence of but three different viruses. The next step is the incorporation of these three viruses into a vaccine that can be used safely and effectively in man. All this means that scientists are closer than ever before to the final goal.

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TECHNOLOGY

Interconnecting Pipelines

➤ A SEMI-NATIONAL "hook-up" of pipelines bringing natural gas from fields in the southwest to northern and eastern areas was suggested in Philadelphia by Frederic O. Hess, a director of the Gas Appliance Manufacturers Association.

Interconnecting pipelines between the now separated main lines would be a public aid, particularly when seasonal or other emergency conditions place extra stress on the system, he indicated.

"We know how effectively such interconnecting and looping systems protect the electric industry against power failure, peak demands, unbalanced load factors and excessive distribution costs," he stated. Similar benefits would result if the many natural gas pipelines supplying gas to the area from the Mississippi to the Atlantic coast were interconnected. He indicated particularly the benefits that would follow an interconnection from Kansas City eastward to New England. This would make Texas panhandle gas available in times of need to the eastern area.

Another step advocated by Mr. Hess to assure the eastern states of a plentiful supply of natural gas during the winter months is a search for additional natural gas in the Appalachian region. It was gas from this eastern area that was first used in America for heating and lighting.

A research and development program sponsored by the gas industry is also recommended by Mr. Hess. The program would be concerned with the integration of the distribution facilities and expansion of service to the public. The U. S. has some 260,000 miles of natural gas pipelines.

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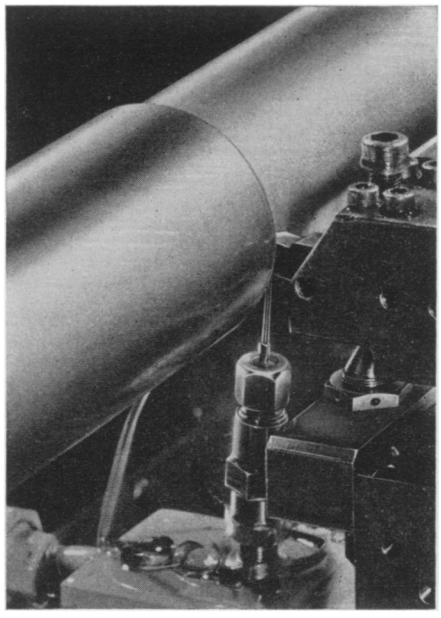

EFFICIENT METAL-CUTTING— The Hi-Jet method of metal cutting directs an oil stream at the contact edge of the cutting tool, thus increasing the efficiency of metal-cutting.

GENERAL SCIENCE

Seven Seek Each Science Foundation Fellowship

➤ MORE THAN 2,700 students from every state and territory in the Union have applied for the approximately 400 fellowships worth $1,350,000 to be granted by the National Science Foundation.

This ratio of one fellowship to seven applicants compares, in the experience of administrators of fellowships, with a usual rate of one to three. A preliminary examination of the applications shows that practically none of the fellowships will go to anyone who has not achieved straight A grades throughout his college career.

The granting of the fellowships is being administered by the National Research Council, which has handled many governmental and private fellowship funds.

The majority of applicants, according to Dr. Claude J. Lapp, head of the fellowship office for the NRC, wish to study in the fields of biology, chemistry and physics. Ranking just behind these are engineering and geology. Other applications cover the entire range of natural sciences.

Dr. Lapp stated that from a look at the applications it appears as though the American taxpayers are going to spend their money on a group of "Class A humdingers." The money, he believed, would be returned to the country, as a result of the increased training of these students, manyfold.

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