

ENGINEERING

Pressure Tanks Made Safer By Disks Which Burst

EXPLOSIONS of tanks used in industry to store dangerous gas mixtures can often be prevented by inserting in their walls disks of a material which gives way more easily than the tank itself, Merl D. Creech, of Oklahoma City, told the American Society of Mechanical Engineers meeting in New York.

While such tanks are usually provided with safety valves, they do not operate rapidly enough to prevent a possibly disastrous explosion, he said.

Mr. Creech described experiments he has conducted with a special tank in which he actually exploded mixtures of air with the combustible gas propane. Meters were attached to the side of the tank to determine the pressures before and after the explosions. The tank was sufficiently strong so that it did not burst even when made without the safety disk.

Under these conditions, pressure increased as much as seven or eight times when the explosion occurred. With a rupture disk four inches in diameter, the increase was only about 4.25 times and it was still less with larger disks, being about 2.5 times with a 12-inch disk.

Though emphasizing that his results are still preliminary, he expressed the opinion "that by using a higher factor of safety in designing the vessel together with a rupture disk of suitable size, every vessel containing an explosive combustible mixture can be protected. For many of the less violently explosive mixtures, a rupture disk alone will give absolute protection from a destructive explosion."

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GEOGRAPHY

Kra May Set Japan On Road to Mandalay

THE Isthmus of Kra, danger neck of land in southern Thailand (Siam), is now a likely goal for Japan's conquest maneuvers in southeastern Asia, and its control would even set Japan on a road to Mandalay.

That Kra is a name to pin in your hat, because it may soon become a hot spot of the Far East is forecast by Dr. Joseph E. Spencer, University of California geographer, who has returned from seven years in the Orient. A logical climax of Japan's thrust into Indo-China, if successful, he points out, would be to

move west from the south tip of Indo-China to the long, dangling Malay Peninsula.

By striking at the narrow Isthmus of Kra, where the peninsula is less than 70 miles wide, Japan could cut off Great Britain's Gibraltar of the East, Singapore at the southern end of the peninsula. Not only would Great Britain have one more enemy angle to watch, but her position diplomatically would be weakened in Thailand's estimation.

For some years, Japan has had an eye on the isthmus, and has sought permission to cut a canal through it, but Thailand has never welcomed the Japanese in.

If Japan could establish herself there now, she would be close to Burma, which some observers believe is included in Japan's conquest and expansion program. But an advance toward India would bring Japan up against not only irate Britain but disapproving Soviet powers, who would like India themselves, if it is to change hands.

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CHEMISTRY—AGRICULTURE

Urea in Cattle Ration May Mean Future Savings

UREA, a simple nitrogen compound hitherto used principally in fertilizers and plastics, can be mixed with cattle feed as a substitute for more expensive sources of nitrogen, nutrition researches at the University of Wisconsin indicate.

Comparative feeding experiments, conducted by I. W. Rupel, G. Bohstedt, M. I. Wegner and E. B. Hart, showed that groups of cows receiving urea as their principal source of nitrogen produced as much milk as similar groups which got their nitrogen in the form of the considerably costlier linseed oil meal.

The experiments lend support to the theory that bacteria in the digestive tract of cattle assist in their nutritional processes. When natural stomach juices from the animals were mixed with urea and cattle feed, under proper chemical and physical controls, as much as 95% of the urea disappeared, to reappear in the structure of bacterial cells. Furthermore, when some of the contents were withdrawn from the stomach of a living heifer, after feeding, it was found that all the urea had been converted into ammonia within an hour, and in four or five hours the ammonia had disappeared, presumably going into the bodies of bacteria as protein.

Further experiments on the feeding value of urea are now in progress.

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IN SCIEN

ENGINEERING

New Type Steam Engine Gives High Efficiency

A NEW type of steam engine which yields one horsepower for each five pounds of weight, comparing favorably with gasoline engines used for automotive service, was described to the meeting of the American Society of Mechanical Engineers in New York.

Technical details of the engine were given by S. L. G. Knox, of Englewood, N. J., who designed it, and Prof. J. I. Yellott, of the Illinois Institute of Technology, who has conducted tests upon it.

The engine, which weighs 450 pounds, and gives a maximum of 90 horsepower, is a reversible one, in which changing the direction of the flow of steam reverses the direction of rotation. Its outstanding feature, the engineers said, "is the valve gear, by which a number of useful functions are performed without introducing more moving parts than the minimum number required for a simple non-reversing engine with the same number of cylinders."

The boiler employs a new principle to obtain forced circulation. An impeller in a lower drum forces water through a number of vertical tubes on the other side of which are the heated gases from the flames of the oil burners which provide the heat.

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ICHTHYOLOGY

Ocean Currents Important In Distribution of Fish

FISH in the sea, no less than fish in rivers, are governed in their movements to a considerable extent by water currents, states Dr. Harald U. Sverdrup, director of the Scripps Institution of Oceanography.

Upwelling currents, that bring water rich in marine food from the depths to the surface, are an especially important factor in determining the places where fish congregate to feed. There are strong upwelling currents along most of the California coast, which account to a considerable extent for the wealth of West Coast sardine and other fisheries.

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CE FIELDS

GENERAL SCIENCE

Anti-Nazi Intellectuals May Come to New World

HOPE has arisen anew that many intellectuals and others in real danger of liquidation by the Nazis may be released from French prison camps in order that they may come to the New World.

To the American Committee to Save Refugees, headed by Prof. Walter Rautenstrauch of Columbia University, New York, there has come news that official Vichy government decree assures the release of all interned refugees from Germany, Austria, Danzig and Sudeten Czechoslovakia who can prove that other countries are willing to offer them hospitality.

Mexico and several other Latin American countries have announced that they will open their doors to refugees, especially those of scientific, medical and other professional and trade attainments.

Along with the Germans interned, there are thousands of Spanish Loyalists who have fled from Franco's Spain. Parts of Latin America are open to them also and another New York committee is raising funds to provide a boat to bring them westward.

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PSYCHOLOGY

Swing Is Art And Is Becoming Great Art

SWING is art, and it is recently becoming great art.

"The difference between Beethoven's Fifth Symphony and Benny Goodman's 'Opus 1/2,'" concludes Dr. J. F. Brown, psychology professor at the University of Kansas, "is one of degree, and not one of kind."

Art, he explains in a new textbook, *The Psychodynamics of Abnormal Behavior* (Reviewed SNL, this issue), is the expression in more or less disguise of conflicts or problems that are a part of life.

Songs are popular when the problems which are their content are easily recognized—when the disguise is thin. Usually the lyrics of swing music speak of

unrequited love, a problem of deep concern to boys and girls of college and high school age. And they speak pretty frankly.

As art disguises its content, uses technically difficult and distorted expression forms, and requires more competence of the performers, it becomes "great" art.

If you want to satisfy yourself that popular music is becoming "greater" art, just listen to records made in the early twenties and compare these with the latest recordings of the same songs.

From the old records you will hear a thinly orchestrated and purely melodic recording of the verse followed by as many identical repetitions of the chorus as space would allow. The monotony is tiring to the ear.

Some of Benny Goodman's and Bob Crosby's and Count Basie's widely swung choruses represent variations as complex, Dr. Brown insists, as some of Brahms's. You can even listen to modern swing in a concert or "jam session."

As swing gets farther away from the simple love-making of the dance, fewer individuals will be able to follow it, it will become esoteric and no longer popular, he predicts.

Swing, according to Dr. Brown's analysis, is not only art, it is good psychology—or psychoanalysis. Freud himself would have approved a title like "You Remind Me of My Mother" or the use in love songs of "Mama" and "Daddy."

The song writer, like the psychoanalyst, recognizes the significance of dreams—"You Can't Stop Me from Dreaming," "I'll See You in My Dreams," or "I Wake Up Smiling."

"Fall in love, fall in love, says my heart . . . but each time that I'm almost in your arms, this old school teacher brain of mine starts ringing false alarms." These words from a recent popular song might be translated into technical language and find their place in a psychology textbook.

Hate, Dr. Brown says, is seldom expressed in popular songs except in war time. For hostility, go to the comic strip or the animated cartoon.

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METALLURGY

Make Non-Magnetic Steel With High Resistance

STEEL that is non-magnetic and which has high electrical resistance, adapting it for certain technical uses, has recently been developed. (*Jessop Steel Co.*)

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PHYSICS

Cosmic Ray Measurements From Little America

FIRST observations to determine the effect latitude has on a recently discovered characteristic of cosmic rays that bombard the earth from outer space are now being made on the trip of the *U.S.M.S. North Star* to Little America to bring back the last of the United States Antarctic Expedition. She sailed from Seattle on Dec. 10. Another supply ship, the *Bear*, sailed in October, and is now in the South Seas.

According to Dr. Serge A. Korff, of the Bartol Research Foundation of the Franklin Institute, Dana Bailey, of the Harvard College Observatory, is making the observations. These will be of the neutrons, electrically neutral particles, that are produced by the cosmic rays. Discovered in 1932, as produced in the laboratory, their connection with cosmic rays has only lately been noticed.

Dr. Korff has designed a new form of counter to measure them, as distinct from the measurements of the other types of cosmic radiation. This consists of a tube containing a gas, boron trifluoride. The neutrons break up the nuclei of the boron atoms, and alpha particles, atomic bullets of another kind, are formed. These are detected in the counter.

Mr. Bailey, who was at Oxford University as a Rhodes Scholar until last spring, sailed from Seattle on December 1 and will be back about the end of April, 1941. He will also bring back two cosmic ray meters of the type devised by Dr. R. A. Millikan, which have been in use at Little America since January 1940. These he will continue to operate on the return voyage.

Dr. Korff expressed the opinion that the year's work at Little America will yield important data on cosmic rays. The meters were installed by Dr. Eric Clarke, now of the Massachusetts Institute of Technology, and have been operated by Dr. F. Alton Wade, senior scientist of the Antarctic Expedition. He took the meters on one flight over Antarctica, which reached an altitude of 22,000 feet.

From the results obtained, especially during the Antarctic night, it may be possible to learn whether cosmic ray fluctuations near the South Pole can be correlated with those here; and whether they have any relation to the earth's magnetic field and magnetic storms.

On Commander Byrd's last expedition, cosmic ray meters were used, but these were of a less sensitive type.

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