

## ENGINEERING

# Plans for Safer Living

Engineers prove that oxygen pumped into water aids purification; same wind-resistance principle applies to bridges and planes; more and better highways needed.

► PUMPING AIR into polluted rivers aids purification, the American Society of Civil Engineers meeting in Spokane was told by Prof. Richard G. Tyler of the University of Washington.

He cited the successful experiments of the past three summers at Park Falls, Wisc., where one and a half tons of oxygen a day was discharged into the waters of the Flambeau river. The result was shortening "to a considerable degree the length of stream utilized for the oxidation of the waste," he said, and it served to prevent nuisances caused by bacteria.

"Experience indicates," he said, "that the stream is a more efficient purification plant than presently used artificial methods of treatment." But, he added, the process is too slow for practical application unless air is added to the water to supplement the functioning of sewage treatment plants.

Prof. Tyler declared the natural methods of self-purification of streams, "which have been so important in conserving their waters for the use of mankind, may be reinforced efficiently and economically by stream re-aeration," and expressed the hope that "further large-scale applications of this process will be welcomed by state and federal authorities."

## Build for Wind Pressure

Airplanes and suspension bridges seem to the layman to have little in common, but engineers now state that the same principles used by aircraft makers in decreasing wind resistance can be applied to suspension bridge construction.

The principle, three experts told the meeting, is virtually identical whether applied to the plane or a bridge. The objective in bridge designing is to eliminate wind pressure, in the same manner as the plane makers have done away with wing flutter.

The three engineers reported on an investigation by them of the recent failure of the Tacoma Narrows suspension bridge which they made to secure information on how to make suspension structures safe throughout a normal lifetime. They are Prof. F. B. Farquharson of

the University of Washington, and C. E. Andrew and Dexter R. Smith, engineers of the Washington Toll Bridge Authority.

The Tacoma Narrows bridge failed because of constant oscillation in the winds prevailing in the section. It virtually "shook itself" to pieces, the engineers said. With the help of wind-tunnel studies, they have designed a bridge that they feel will be safe.

Their studies have convinced them, they declared, that investigations of winds as they exist may well become very important in the preliminary design studies of every suspension bridge, and will be a major control of the type of structure to be used.

## Millions Needed for Roads

From \$16,000,000,000 to \$20,000,000,000 will be required to modernize the present highway system to accommodate present traffic, Charles Upham of the American Road Builders' Association told the Society.

The highway appropriation for 1946 should approximate \$750,000,000, and reach \$2,000,000,000 by 1949, and then continue at that level, he believes. It would be financed by gasoline and other taxes paid by highway users.

"In the years before the war the highway users paid into the government agencies in highway user taxes approximately \$2,240,000,000 per year," he stated. "With the additional ten to fifteen million new cars coming on the highways and the pent up desire of everyone to get out on the road again, the gasoline taxes collected by the state and federal governments would amply finance the cost of all new highway construction if it were all used for that purpose."

A heavy road building program is needed also to keep general economical conditions at a high level. For every dollar spent in road construction by modern methods, three dollars worth of business results, he asserted. For every man employed on the road building job, 1.7 are employed in the industries that furnish materials and equipment.

The full public construction program, including roads, buildings and other projects, should be adjusted, Mr. Upham said, to keep the total construction always above 12% of the national income. "During the '20's, full employment and prosperous conditions existed when construction volume exceeded 12% of the national income. Unemployment occurred when the volume went below this figure."

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## INVENTION

## Ball and Socket Joint Compensates for Own Wear

► BALL AND socket joints, important to users of many kinds of machines, will no longer need frequent replacement if a new joint recently patented lives up to expectations. It is called an automatic wear-compensating joint, the wear being compensated for by a tapering pin that spreads the two halves of the ball.

This ball of the joint is in two semi-spherical parts with curved inner surfaces that form a tapering bore to hold the tapering pin. The smaller end of the pin, projecting through the socket, holds a nut behind which is a spring. The spring tends to draw the pin tighter into the bore, and does so if there is any wear on the outside of the ball or the inside of the socket. This expands the sections of the ball, causing them to fit closely into the socket. A special system of lubrication helps reduce wear.

The patent number for this joint is 2,401,814 and it was awarded to Paul B. Burhans of Fort Myers, Florida.

*Science News Letter, July 27, 1946*

## PHOTOGRAPHY

## High Contrast Film For Television Movies

► BETTER TELEVISION pictures will result from use of a new du Pont motion picture film which carries an emulsion to obtain more detail in both highlights and shadows of outdoor scenes.

To save processing time and demonstrate the flexibility of handling of news pictures over a television system, the new film is used in negative form. A positive picture will appear on television screens. Since the picture is reversed as it passes through each stage of signal amplification in the television system, it is only necessary to have an odd number of amplification stages to end up with a positive picture on the screen.

*Science News Letter, July 27, 1946*