

prevailing standards, and not very severe standards at that, for persons holding their posts.

The salary crisis, however, is easing.

III

But now comes the new crisis in school buildings and equipment.

We would have been hard put to get our schools back into shape after years of wartime neglect—even without a booming birthrate complicating the problem. Right now, 85% of all public school buildings need major remodeling to remove health and safety hazards.

And we aren't building enough new schools to keep up with current needs, to say nothing of catching up on those we were not able to build during the war years. School construction expenditures for 1948 are estimated at \$375 million—which is less than what was spent in 1939. With building costs twice as high as they were in 1939, that means we aren't even holding our own—we are falling further behind.

And now comes the rush of war babies.

IV

We must spend at least \$11 billion on new schools and equipment in the next decade.

Public and elementary schools must have \$6.6 billion. Equally important, another \$4.4 billion must be invested in buildings and equipment in our private schools, colleges and universities if they are to meet the demands which will be made upon them. The private school and the privately endowed university are doing their full share and doing it well. The need for them is increasing.

These figures cover only rockbottom needs for educational plant and equipment. But statistics are a very restricted recorder of this crisis.

You can see it better, I'm sure, in schools not very far from your home. There are schools with leaking roofs and outdoor toilets in our greatest cities. There are schools where students still use histories and geographies copyrighted before 1920—books with no

mention of World War I, the depression of the 1930's, the Russian Revolution or the rise of the dictators. There are countless schools where modern methods of visual education are completely unknown.

All of these conditions promise to get worse—promptly—as that scheduled 5 million increase in the school population gets rolling.

V

The Metropolitan Life Insurance Company does not indulge in lurid prose. It says, after painstaking study of the educational crisis that:

"Unless definite measures are taken immediately . . . large numbers of American boys and girls will be deprived of an adequate education."

Currently we are deeply concerned about our military defenses. We are taking, and I think rightly, emergency measures to strengthen them. But we must regard our schools as a part of our national defense as vital as are our armed forces. This is particularly true in these times of fifth columns and ideological warfare.

If we are wise, we will raise our sights. We will give the continuing crisis in education the same urgent attention being given the more obvious but no more real crisis in national defense.

Go to the school house in your neighborhood and discover what needs to be done to provide for the rising tide of young Americans. Ask your school board and your school administrators and teachers how you can help them.

That is good citizenship.

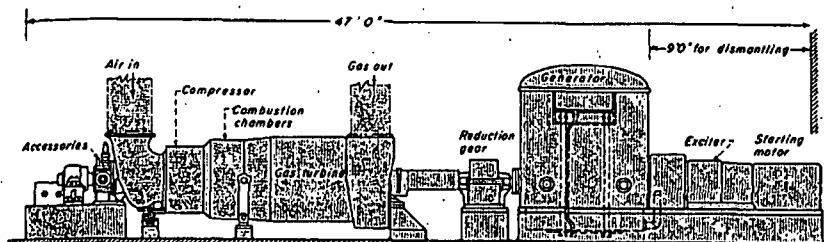
That is patriotism.

That is our duty to the oncoming generation.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 68TH OF THE SERIES



1 COMPLETE SIMPLE-CYCLE GAS TURBINE to produce 3500 kw at 80-F inlet-air temperature. Unit duplicates design on plant for locomotive drive, burns fuel oil, in six combustion chambers mounted between axial compressor and turbine

Installing Waste-Heat Boiler Increases Gas-Turbine Flexibility

Facts and figures on increasing the usefulness of gas turbines by utilization of the heat in the exhaust. Abstract of a paper by George R Fusner of General Electric Co, presented before the June 1948 meeting of the ASME, held at Milwaukee, Wisconsin

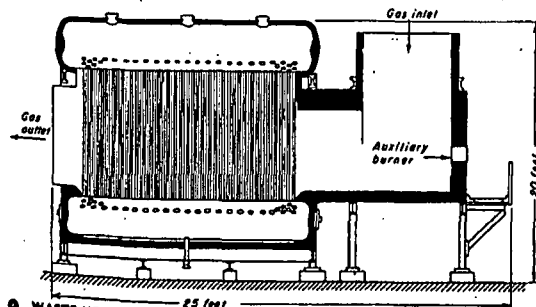
▶ WHILE A SINGLE-SHAFT GAS TURBINE with no heat recovery will find many applications, high fuel costs bar its utilization in some instances. One way of improving the plant heat rate passes the high-temperature exhaust gas through a waste-heat boiler that produces steam for process and space heating or for electrical-power generation. Use of just a simple waste-heat boiler has the drawbacks of steam generation depending on power output and decreased steam production with low inlet-air temperature at the compressor. These handicaps can be overcome in

two ways, the methods being demonstrated by performances calculated for the plant shown in Fig. 1. This unit is an adaptation of the 3500-hp locomotive unit described in Powan, May 1948, pp 95, 98.

With a 75% effective boiler it is possible to generate 31,200 lb per hr of 50-psig saturated steam and 25,600 lb per hr of 200-psig saturated steam when the unit runs at its design point of 3500 kw and 80-F inlet air. Cooling the gas to steam-saturated temperature makes 43 million Btu per hr available at 50 psig and 38 million Btu per hr at 200 psig.

Waste-Heat Boiler. Fig. 2 shows one suitable type of waste-heat boiler. This unit has 8500 sq ft of heating surface, arranged 20 tubes wide and 70 deep. The 2-in. tubes are rolled into a 48-in. upper and 32-in. lower drum. Over-all dimensions are about as follows: height 20 ft, width 8 ft, length 25 ft. Boiler purchase price will be about \$75,000.

Turbine Performance. Exhaust temperature of the simple-cycle gas turbine decreases with falling inlet-air temperature to the unit. Fig. 3 shows that at 3500-kw output the exhaust temperature with 80-F air temperature is 820 F, and at 0-F air the exhaust drops to 610 F. These lowering temperatures decrease the steam generation in a waste-heat boiler. Fig. 4 and 5 show the effects on a 200-psig and 50-psig boiler, respectively. These performances are based on feedwater temperatures of



2 WASTE-HEAT BOILER for gas-turbine plant has 8500-sq-ft heating surface with tubes arranged 20 wide and 70 deep. Required ground area is 8x25 ft.

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