"The Basic Concept Behind Philip Sporn Station," by Philip Sporn; "Sporn Heat Cycle Meets High Goal," by Theodore Baumeister; "(Philip Sporn Plant) Steam Generation Employs Reheat, Pressurization, Gas Recirculation," by S. N. Fiala; "Turbine, Condenser and Piping Fit Objectives," by S. N. Fiala; "Control of Units Centralized in Pairs for Effective Operation," by T. T. Frankenberg; "Simplicity Is the Keynote of Plant Electrical Features," by F. A. Lane; "Plant Construction and Architecture Keyed to Economy" by H. A. Kammer, *Electrical World*, vol. 133, June 5, 1950.

3 Companion paper, "The Development and Implementation of a Generation Program on the American Gas and Electric Company System, Part 2—Fuel Supply," by Philip Sporn and H. A. Kammer. Published in this issue, pp. 609–612.

4 "Philo Station Sets Record, General Conditions and Mechanical Features—I," by M. L. Sindeband and Philip Sporn, *Electrical World*, August 22, 1925.

"Philo Station Sets Record, Electrical Features and Control—II," by M. L. Sindeband and Philip Sporn, *Electrical World*, August 29, 1925.

Discussion

EDWIN H. KRIEG.[4] The author's stimulating and provocative exposition of system growth to about 15,000,000 kw, predicted for 1970, almost overshadows the unusual and interesting evolution of the fuel supply that contributes much in making such a large expansion possible. It is striking that when a new site is acquired, so much interest is given to the fuel which will be burned, not only now but 10, 20, and even 30 years from now. To the millions of tons of coal reserves that already existed at the Windsor, Philo, Tidd, and Sporn plants, have been added some 50,000,000 tons at Kanawha and 100,000,000 tons at Muskingum. One cannot help but feel that this approach and attention to long-range fuel procurement has much to do with the attainment of a coal cost of 16.5 cents per million Btu.

Although really large coal reserves are available near each of the six plants mentioned, perhaps enough for 30 or 40 years, still, of a 9,000,000-ton annual burn in 1954, 6,000,000 tons will be furnished by commercial operators. Thus the coal reserve is relatively untouched, assuring a future coal supply contiguous to the major plants. Fuel contracts expire; gas, oil, and even coal veins become exhausted; and if fuel may have to be brought considerable distances, transporting some 9,000,000 tons of coal per year could be costly. True it is that this country has ample coal resources, but unfortunately, the cost of transporting it costs the utilities more than the coal itself.

Conveying 80 per cent of the total coal to be used on the American Gas and Electric system over existing Ohio, Muskingum, and Kanawha River waterways upon which millions of dollars have been spent by the Federal Government to maintain all-year channel depth, and which have hitherto seen relatively little service for the investment involved, indicates a keen appreciation of long-range economics.

In Part 3 of this series, mention is made of studies of cycles using pressures up to 5000 psi and temperatures up to 1200 F. It would be of much interest if the authors would tabulate these as was done by Prof. T. Baumeister in an earlier paper.[5]

Messrs. Sporn, Kammer, and Fiala merit our real appreciation for their invigorating discussion of their generation program.

W. H. ROWAND.[6] The author mentions the desirability of installing units larger than 200,000 kw capability in the future. Studies of the problems involved in building a single reheat boiler for larger capacities indicate that a unit considerably bigger than 200,000 kw should be practical from a boiler-design standpoint.

G. B. WARREN.[7] The authors are to be complimented upon the preparation of what should be very valuable papers for the guidance of others planning large power-system developments, and also for this further evidence of important leadership in the development of outstanding power-plant facilities to serve the power needs of this country.

Mr. Sporn and his associates presented a similar program at a meeting of the Society four years ago and described a group of plants expecting at that time unprecedented efficiencies. These plants are now in successful operation. They, in turn, were the result of efforts on Mr. Sporn's part to reach new heights in such performance. The plants which are the subject of the curren papers should make another step in this continuing progress.

The authors of these papers belong to that small group of utility executives who, one after the other, with the assistance of the equipment manufacturers, have pioneered first one, and then another, and then another, and so on, of the outstanding and forward-looking engineering developments which, in their aggregate, have made up the great progress which the utility industry has made in this country. Out of this progress have come the step-by-step improvements in power-plant economies and capacities which have made our present utility development outstanding in all the world.

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[5] "Sporn Heat Cycle Meets High Goal," by T. Baumeister, *Electrical World*, June 5, 1950, table 1, p. 89.

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