Table data which is an improvement in extended scope and
closer tolerances over the 1934 Skeleton Table.

Acknowledgment
The Keenan and Keyes Steam Tables have served the power
industry well for many years. Only recently, with the increase
in throttle pressure, have any problems been encountered. These
are in an area where experimental data were not available and it is
understandable that some errors would exist. The authors are
to be commended for an excellent job.

References
1 Keenan, J. H., and Keyes, F. G., "Thermodynamic Properties
of Steam."
2 "A Project for Steam Properties Research," ASME Research
Committee on Properties of Steam, July 1955.
3 "The 1967 IFC Formulation for Industrial Use," IFC Secre-
tariat, Verrin Druscher Ingenieurs, Dusseldorf, Prinz-Georg-
Strasse, 77/79, Germany.
5 ASME IFC Mollier Diagram.

DISCUSSION

C. B. Scharp

ASME Performance Test Code No. 6 was revised and reissued
during the time when much of the work was being done by the
International Conference on the Properties of Steam and its In-
ternational Formulation Committee. The three authors of this
paper are members of ASME PTC Committee No. 6 and have
kept the Committee informed on the progress of the International
Conference. In 1964, when it became evident that the revised
PTC 6 publication would be ready prior to the new steam tables,
paragraph 3.33 of the Code was changed to allow use of "tables or
charts approved by ASME," but kept the emphasis on use of
Keenan and Keyes' "Thermodynamic Properties of Steam" (1936). During the succeeding time since publication of the
Code, the committee has been preparing two reports to cover
commercial and routine testing of steam turbines. Early in 1966,
it became obvious that the new working steam tables would be
more accurate in the region of modern turbine throttle conditions
and would give lower enthalpies than those given by Keenan
and Keyes. The effects given in this paper were discussed by the
Committee for some time and, because of the complexity of the
subject, the authors were urged to publish this information.
As part of its present charge PTC Committee No. 6 will re-
orient the reference in the Code to emphasize the new formu-
lations. Reports in the process of preparation will also emphasize
the new formulations and, in addition, draw attention to sig-
nificant differences in the range of 2000 to 4000 psia and 800 to
1200 deg F. Although the Keenan and Keyes tables are satisfac-
tory in the region of interest in nuclear steam cycles, emphasis
here will also be directed toward the new formulations. Since
the Code provides for the accurate testing of steam turbines for
the purpose of obtaining the absolute level of performance, it is
essential that the most accurate steam properties be used. This
paper presents the effects of the 1967 IFC Formulations on calcu-
lations of test results quite well. It is shown that the new for-
mulations will give improved heat rates and poorer test high pres-
sure turbine efficiencies for the typical turbine with 3500 psia and
1000 deg F throttle conditions. It should be pointed out, though,
that in comparing different sets of test results, one should use cau-
tion to assure that the same formulation of steam properties is
used in each instance.

Authors' Closure

The authors thank Mr. Scharp for his discussion and are in
complete agreement with his comments.