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Abridged Steam Tables

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1-1. Introduction. The history of the steam turbine can be traced to ancient times when Hero of Alexandria described what might be regarded as a crude form of the steam turbine. However, a practical form of the steam turbine did not appear until the end of the nineteenth century when De Laval designed a high-speed turbine as a power mover for a steam engine, a function for which the steam engine was totally unsuited. This era witnessed the evolution of turbine designs by Sir Charles A. Parsons and G. G. Curtis which laid the cornerstone for the development of the modern steam turbine.

Following the close of the century, the development and application of the steam turbine proceeded rapidly until today it is the most important of the large prime movers. In large capacity it has no peer. Only in the smaller size (100 to 500 hp) does the steam turbine begin to find competition in the diesel engine and to some extent in the gas turbine.

Modern steam turbines range in capacity from a few kilowatts to 500,000 kw and in speed from 1000 rpm to well over 15,000 rpm. Total steam pressure varies from atmospheric to 5000 psig with temperatures in excess of 1200 F and exhaust pressure as low as 1.5 in. Hg abs. The versatility of the steam turbine in meeting an extensive range of operating conditions is unparalleled by any other form of prime mover.

Among the advantages of the modern steam turbine are simplicity, reliability, and low maintenance costs. Space requirements for the steam turbine are much less than for the diesel or steam engine. The absence of reciprocating motion results in decreased vibration and permits lighter foundations. Lubrication in the steam turbine is simpler than in a reciprocating engine. Furthermore, the ability to deliver oil-free condensate or exhaust steam is a valuable consideration in the process



Fig. 1-1. Hero's turbine.