openings for radial, nonradial, and multiple nozzle arrangements are covered, as is designing their thermal sleeves which are vital to vessel thermal-shock protection. Stresses in bolts and the design of bolted and nonbolted closures receive extensive treatment as do the use of crack arrest features to negate brittle fracture potential. Vessel support skirts, saddles, and attachments impose both structural and thermal loadings that must be reconciled with the vessel pressure stresses. Gaskets are essential to removable closures and their type, design, and control parameters are presented. Thin claddings are widely used to prevent corrosion of the base metal or contamination of the media, and their life is appraised.

Chapter 7 introduces fabrication-construction methods and their economic potential. This includes novel innovations to satisfy a unique requirement, such as filament-wound, multilayer, wire-wrapped, link-belt, coiled, prestressed steel and concrete, and other vessels. Material selection is by basic cost per unit of stress and optimum safety factors utilizing advanced composites, high strength materials, or those with enhanced properties such as that obtained from directional solidification for use in a creep rupture environment. Fabrication methods like modular construction, cryogenic and high energy forming, adhesive joints, metallurgical bonding and healing of internal defects by hot isostatic pressing, etc. – all to achieve the economic goal of low cost and long service life – are presented.

Chapter 8 introduces the stability theory of plain and stiffened vessels, and its application to the design of thin, intermediate and thick walled ones. The overall stabilizing effect of structural stiffeners, as well as their effect in regions of high local compressive stress, is covered from initial design, failure analysis, and repair viewpoints. This forms the basis for the development of regulatory codes and compliance standards. The fabrication tolerances and construction details of noncircularity, local thinning, unreinforced openings, and stress concentrators are not self-limiting or self-compensating in a buckling phenomenon, and these critical effects are evaluated."

J. H. Harvey
(*from* Preface)

Pressure Vessel Design Handbook, Second Edition, 1985, by Henry H. Bednar, Van Nostrand Reinhold Company, New York, $46.50.

"This handbook has been prepared as a practical aid for engineers who are engaged in the design of pressure vessels. Design of pressure vessels has to be done in accord with specific codes which give the formulas and rules for satisfactory and safe construction of the main vessel components. However, the codes leave it up to the designer to choose what methods he will use to solve many design problems; in this way, he is not prevented from using the latest accepted engineering analytical procedures.

Efficiency in design work is based on many factors, including scientific training, sound engineering judgment, familiarity with empirical data, knowledge of design codes and standards, experience gained over the years, and available technical information. Much of the technical information currently used in the design of pressure vessels is scattered among many publications and is not available in the standard textbooks on the strength of materials.

In revising the first edition the intent has been to improve the handbook as a reference book by enlarging its scope. The stress analysis of pressure vessels has been greatly enhanced in accuracy by numerical methods. These methods represent a great addition to the analytical techniques available to a stress analyst. Therefore, chapter 12 describing the most important numerical methods with illustrative examples has been added. Throughout the text new material and new illustrative examples have also been added. The writer believes that any technical book in which the theory is not clarified by illustrative examples, can be of little use to a practicing designer engineer. Also some typographical errors have been corrected.

It is assumed that the reader has a working knowledge of the ASME Boiler and Pressure Vessel Code, Section VIII, Pressure Vessels, Division 1."

H. H. Bednar
(*from* Preface)

The Engineer Is Human, 1985, by Henry Petroski, St. Martin's Press, New York, $16.95.

"Though ours is an age of high technology, the essence of what engineering is and what engineers do is not common knowledge. Even the most elementary of principles upon which great bridges, jumbo jets, or super computers are built are alien concepts to many. This is so in part because engineering as a human endeavor is not yet integrated into our culture and intellectual tradition. And while educators are currently wrestling with the problem of introducing technology into conventional academic curricula, thus better preparing today's students for life in a world increasingly technological, there is as yet no consensus as to how technological literacy can best be achieved.

I believe, and I argue in this essay, that the ideas of engineering are in fact in our bones and part of our human nature and experience. Furthermore, I believe that an understanding and an appreciation of engineers and engineering can be gotten without an engineering or technical education. Thus I hope that the technologically uninitiated will come to read what I have written as an introduction to technology. Indeed, this book is my answer to the questions "What is engineering?" and "What do engineers do?"

The idea of design – of making something that has not existed before – is central to engineering, and I take design and engineering to be virtually synonymous for the purposes of my development. Examples from structural designs commonly associated with mechanical and civil engineers are most prominent in this book because it is from those fields that I draw my own experiences, but the underlying principles are no less applicable to other branches of engineering.

I believe that the concept of failure – mechanical and structural failure in the context of this discussion – is central to understanding engineering, for engineering design has as its first and foremost objective the obviation of failure. Thus the colossal disasters that do occur are ultimately failures of design, but the lessons learned from those disasters can do more to advance engineering knowledge than all the successful machines and structures in the world. Indeed, failures appear to be inevitable in the wake of prolonged success, which encourages lower margins of safety. Failures in turn lead to greater safety margins and, hence, new periods of success. To understand what engineering is and what engineers do is to understand how failures can happen and how they can contribute more than successes to advance technology."

H. Petroski
(*from* Preface)

Process Plant Layout, 1985, ed. by J. C. Mecklenburgh, Halsted Press/John Wiley and Sons, Inc., New York.

"Layout is concerned with the spatial arrangement of process plant and its interconnections, such as piping. Good