The latter chapter builds on very up-to-date data information in the previous chapter (13) entitled "Air Pollution Aspects of Incineration Processes." In it, the emissions of various constituents (metals, dioxin and acid gasses) are discussed.

The only criticism of any note is this is a book designed for use (among other uses) as a text. Consequently, I believe it should have problems and exercises to be assigned. Also, for a university-adopted text, it is very expensive.

G.F. Bennett

PII S0304-3894(96)01847-X

Handbook of Water and Wastewater Treatment Technology, by P.N. Cheremisinoff, Marcel Dekker, New York, NY, 1994, $195.00, 840 pp. ISBN: 0-8247-9277-7

In the preface of this book, the author says, "This handbook is a collection of exact and useful information relating to the treatment of water and wastewater for municipal, sanitary, and industrial uses". And with over 840 pages, the author has presented a lot of material. Unfortunately, not much of it is new nor detailed in theory sufficiently to be of real use to either the designer or practitioner.

A case in point is found in Chapter 3 which gives the Stokes equation which can be used to compute oil bubble rise velocity. The author then moves into API separation when he could have used the prior equation to show design principles (as done in other treatments I have seen). Also, he shows corrugated (coalescing) plate interceptors, but not parallel plate interceptors here (he does correct this omission later under solids removal).

On the other hand, I found uniquely refreshing his comprehensive treatment of cyclone separation of solids from liquids. He covered the topic well from theory through application.

The author and I must have used many of the same papers in our files as I recognized many of the drawings he utilized. However, like my files, the drawings, though relevant, are very old. I was amazed to find no literature references at all in the whole text. Clearly the author drew much of his information from published sources that ought to have been cited. And, in addition to aiding the reader in verifying the data, references provide supplementary sources of information. Rarely does (or should) one omit references. Indeed, I am extremely hesitant to accept a scientific paper for publication in a journal without proper reference citation and a good literature review.

G.F. Bennett

PII S0304-3894(96)01848-1

Naturally Occurring Radioactive Materials—Principles and Practices, by Philip T. Underhill, Society for Environmental Management and Technology (SEMT) and St. Lucie Press, 100 East Linton Blvd, Delray Beach, FL 33483, 145 pp. $49.95 plus $7.95 handling and shipping. ISBN: 1-57444-009-8.

Many think of radiation from man-made sources, but, in fact, radioactivity and its effects have been on Earth for eons. This volume covers the sources, as well as half-lives and effects of the sources. The abbreviation NORM covers both naturally occurring and man-made or regulated sources. One material which has received wide attention is radon, which is emitted from naturally-occurring ^{238}U and ^{232}Th, and passing through a number as isotopes until a non-radioactive isotope evolves. Rock formations, such as shale, contain these elements and their daughter products, which are insoluble in water, whether fresh, salt, oil, gas or concentrate.

The decay chain of ^{238}U contains 14 isotopes before decaying to Pb (or lead 206), a staple element, while ^{232}Th produces 11 isotopes before reaching ^{208}Pb (or lead, a stable element).

As part of understanding NORMs, a fundemental presention is made to introduce the atom, its atomic compositon and includes atomic properties of sub-atomic particles. The atom has both physical properties, chemical properties and reactive properties. The periodic table or chart of the elements include 103 of the most-known elements. Elements 104 through 110, recently announced, will appear in the near future.

Chapter 3, "Origin and classification of radiation", defines terms, measured in 1 keV or kilo-electron-volt and 1 MeV (mega- electron-volt). The spectrum of electromagnetic radiation, from cosmic to radio waves, is tabulated and defined.

Radiation is measured in terms of:

Roentgen (R)	measurement of radiation to ionize air;
rad	(radicals absorbed dose) is a unit of energy deposition;
gray (Gy)	a unit of adsorbed dose;
rem	roentgen equivalent man;
sievert (Sv)	a unit of human dose equivalent;
curie	(or amount of any radioactive material that will decay at the rate of 3.7×10 disintegrations per second)
becquerel (Bq)	one disintegration per second
$T^{1/2}$	a measure of the half-live of the original nuclide

The biological and health effects of radiation are presented in Chapter 4, describing how ionization by various radiations and levels can cause biological damage. Acute vs chronic doses are explained together with the possible biological effects. Chapter 5 discusses radiation in the world around us, including both natural sources and artificial sources. It may be noted that since the first of 1996, both France and China have tested atomic devices. This reviewer can attest that in the 1950s, radioactivity from tests in Nevada were sampled in the Albany, New York area, with some measurements being 20 times the normal background. Consumer products contribute to the dose the public receives; luminous dial wrist-watches, tobacco, combustion of fossil fuels, natural gas, medical and dental X-rays, in addition to nuclear power plants (both workers and personnel living near the plants).

Chapter 6, "Measurement of radiation", is important, since many detectors are available on fire trucks and other public places. Chapter 7 suggests how to survey and sample radioactivity, and the precautions necessary to make a worthwhile survey. Chapter 9, "Regulation of NORM", and Chapter 10, "Glossary of terms", are valuable

references. This volume is highly recommended as a reference to the subject, which still needs much more attention and control.

H.H. Fawcett

PII S0304-3894(96)01849-3

Bretherick's Handbook of Reactive Chemical Hazards, 5th Edition. P G Urhen (Ed.). Butterworth–Heinemann, Oxford, 1995. Vol. 1: xxvi + 2004p. Vol. 2: xx + 407p. UK £150. ISBN: 0-7506-1557-5.

> "It happens, like as not,
> There's an explosion and good-bye the pot!
> I've no idea why the thing went wrong;
> Recriminations though were hot and strong.
> 'Well', said my lord, 'there's nothing more to do.
> I'll note these dangers for another brew;
> Don't be alarmed, help to sweep the floor
> Just as we always do, and try once more'."
> (extract from "The Canon Yeoman's Tale" from "The Canterbury Tales" by Geoffrey Chaucer, 1386. Translated by Neville Coghill).

Six hundred years later the Canon Yeoman could have consulted Bretherick (as the handbook is colloquially referred to by chemists, it being by now such a well known and recognised work) for information. Or if the Canon Yeoman's experience was unique he could have contributed to the accumulated knowledge in Bretherick by sending his carefully noted dangers as an "additional contribution" in response to the editor's and publishers active encouragement of users of the book to participate in increasing the (already monumental) scope of its coverage of chemical reaction hazards as a service to their fellow workers in chemistry. Much of the material in the handbook has been collected in this way over the years.

As Trevor Kletz says in his foreword "Those of us who have been working in the safety field for many years have seen the same accidents repeat themselves with distressing regularity. We welcome, therefore, every attempt to bring together scattered information on any aspect of safety and make it readily available".

As a preparative chemist Leslie Bretherick was aware during his early career of a general lack of information relevant to the reactive hazards associated with the use of chemicals, but it was as the result of a well publicised incident in the mid-1960s, which was a repeat of one which had occurred 16 years earlier, that he recognised that the then currently existing arrangements for communicating "well known" reactive chemical hazards to practising chemists and students were largely inadequate and he recognised that his handbook needed to be compiled. Leslie Bretherick produced a masterly summary of available information on reactive chemicals and their reactions working almost unaided and largely in his spare time at least for the first edition. And the rest as they say is history. Sadly Leslie Bretherick has had to withdraw from compilation now