the 1960s. Access was given to the employ-
ees' roll although employment details during the
war were virtually non-existent. We
think that the information gathering process
when taken together with the records of the
 Coroner and the histopathology review was
as detailed as any other similar study in
existence.
As the "non-exposed" group was classi-
cified as such by history it is obvious to most
readers that we are unable to state how they
acquired excessive amounts of amphibole
fibres within their lungs tissues. If these eight
cases with high amphibole concentrations are
deducted the rate of mesothelioma becomes 1-6
malignant cases a year which is similar to
the generally estimated background rate.
Greenberg seems to be unaware that an
aspect ratio amphibole fibres have been
found in the pleura. By contrast with ani-
mal studies, which rely on the administra-
tion of enormous doses and overload of the
respiratory defences, human studies have
been remarkably consistent in showing a
strong association between amphibole expo-
sure and mesothelioma whereas dust of
chrysotile it has been weak or non-existent.1
Even in chrysotile miners and millers, in
whom there have been few mesotheliomas,
the evidence indicates that they were related to
translocation rather than chrysotile expo-
sure.14 To the best of our knowledge the
forthcoming review of chrysotile by the
International Programme on Chemical Safety
will not present any new evidence although
it might give a different opinion. Other
reviews conclude that amphiboles have a
much greater potency than chrysotile for
producing mesothelioma.14

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1 Boutin C, Dumortier P, Rey F, Viallat J, De Visschere P. Black spots concentrate occupational exposure to
3 Dufresne A, Hargram M, Mass R. Benign fibres in lung tissues of mesothelioma cases among miners and millers of the township of

Biomarkers of exposure to low concentra-
tions of benzene: a field assessment

Editor—Ong et al1 present data on the rela-
tion between concentration of benzene in
ambient air and urinary muconic acid
concentration. With the formula they provided in
figure 3, the urinary concentration of muconic
acid is equivalent to exposure to 1 part per
million (ppm) is 144-4 or 128-6

ng/ml creatinine, depending on whether log
of the base 10 or natural log is used, respec-
tively. This number seems to be very low
compared with that given in many studies which
are usually in the range of >1000
ng/ml creatinine.1 It will be helpful if Ong et al could provide explanation for this
apparent discrepancy.

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1 Ong CN, Kok PW, Ong HY, Shi CY, Lee BL, Phoon WH, Tan KY. Biomarkers of expo-
sure to low concentrations of benzene: a field assessment. Occup Environ Med 1996;53:
328-33.
2 Lauwersy RR, Bucher J-P, Andien F. Muconic acid in urine: a reliable indicator of

Author's reply—The overall objective of our article2 was to evaluate the usefulness of five
combination of urinary low level exposure (0-5
ppm) exposure to benzene and as stip-
ulated in the conclusion all the biomarkers
were unable to provide sufficient specificity
for biomonitoring at the low concentration
range. All data indicate that ratios should
not be used for estimation of exposure to
low level environmental exposure to ben-
zene, particularly <0.25 ppm. Our earlier
data showed that low level of trans-muconic acid could be useful for environmental
exposure to benzene >0.5 ppm; with a calculated
exposure to 1 ppm benzene, about 0-9-1-7
mg/ml creatinine would be expected at the
end of eight hours of exposure.

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1 Ong CN, Kok PW, Ong HY, Shi CY, Lee BL, Phoon WH, Tan KY. Biomarkers of expo-
sure to low concentrations of benzene: a field assessment. Occup Environ Med 1996;53:
328-33.
2 Lee BL, New AL, Kok PW, Ong HY, Shi CY, Ong CN. Urinary trans,trans-muconic acid
determined by high performance liquid chromatography: appli-
3 Ong CN, Lee BL. Determination of benzene and its metabolites: application in biological
monitoring of environmental and occupa-
4 Ong CN, Kok PW, Lee BL, Shi CY, Ong HY, Chia KS, et al. Evaluation of biomarkers for

Offspring sex ratios and reproductive
hazards

Editor—Weijin Z, Olsen J. Offspring sex ratio as an indicator of reproductive hazards. Occup
2 France JT, Graham FM, Gosling L, Hair P, Knox BS. Characteristics of natural con-
cellular cycles occurring in a prospective study of sex preselection: fertility awareness symp-
toms, hormone levels, sperm and pregnancy

3 Gray RH. Natural family planning and sex
4 James WH. Factors affecting sex ratios in
human populations: implications for studies of
5 Weijin Z, Olsen J. The hypothesis of sex ratio as an indicator for reproductive hazards. Occup
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be made by cheque in sterling drawn on a UK bank, or by credit card (MasterCard, Visa, or American Express) stating card number, expiry date, and your full name. (The price and availability are occasionally subject to revision by the Publishers.)

Handbook of Stress, Medicine, and Health, 1st ed
Edited by CL COOPER

One of the aims of this handbook, declared by the editors in their preface, is to create a new medical specialty: Stress Medicine. Cooper qualified in psychology and business studies in California and now holds the chair of organizational psychology at Manchester University's Institute of Science and Technology. He is coeditor of the journal Stress Medicine, and is well known for his many publications in this field.

The book constitutes a gold mine of refereed material, to chart the development of the stress concept, from the early work of the physicians who noted that diverse physical challenges (such as noise, cold, heat, pain, toxins, blood loss, x ray films, etc) resulted in certain physiological disturbances in common. Hans Selye borrowed "stress" from engineering usage to denote these shared, non-specific distortions of normal functioning. This was an unfortunate choice, which has caused much confusion: to an engineer, it is the forces applied to a structure (a bridge for example) that stress the resulting structures, known as strain. Selye used the wrong word. As he himself later acknowledged, "strain" would have been the right term. Nevertheless stress has persisted, albeit as something of a chameleon with shifting definitions towards pressures of a more psychological kind and stress has become a vogue word.

Most of the 19 chapters which comprise the book are by psychologists, although some work by specialists in other fields is also included. Detailed chapters are devoted to a variety of adverse conditions which can exert stressful pressures: cancer, ischemic heart disease, HIV/AIDS, and other chronic illnesses. These, as well as personal stress, bring their burdens of anxiety and illness. These, as physicians know only too well, are imposed on a variety of adverse conditions which can worsen further the quality of life. There is detailed consideration of the need for social support and techniques for coping.

It is much more difficult to show the reverse process: the ability of stress to produce organic disease. What is clear is that emotional factors may play some part in the onset and course of many medical conditions. However, the most convincing evidence that stress may be a significant aetiological factor for a specific illness concerns the acute myocardial infarction and psychological variables. Some of the authors who contribute to this book casually include other conditions (such as essential hypertension) for which, on the basis of much less adequate evidence, emotional factors have been claimed to be important primary causes. This book does not always provide adequate critical assessments of the evidence which it presents; instead, the mission of the authors seems (with some encouraging exceptions) to be to accumulate everything which can be traced in the scientific literature in support of the claimed aetiological relation, to add to their case. It would be unfair to liken the approach to that of the critical advocates of psychosomatic medicine between 1930 and 1950, who produced an immense, tendentious literature supporting the case for the alleged emotional origins of essential hypertension, rheumatoid arthritis, thyrotropic, peptic ulcer, ulcerative colitis, neurodermatitis, and asthma. But it is unfortunate that some of the literature on stress reviewed in this expensive handbook has not been presented with more rigorous criticism.

The book offers few practical tips to occupational physicians who advise companies on personnel policies aimed at reducing the adverse effects of restructuring and "downsizing", without jeopardising economic objectives. Professional advisers are only too aware of the reality of stress in organisations which are undergoing such changes. Uncertainties about job security, workload, roles, and self esteem give rise to anxiety and depression, and today general practitioners increasingly certify that stress is the cause of the resulting ill health. Those to whom senior managers and personnel directors must answer are concerned above all with financial viability, but many are also responsive to practical, cost neutral proposals for preserving the morale of the workforce.

Although the handbook contains little direct practical guidance, some of the academic work which it reviews can nevertheless be interpreted in helpful terms for this purpose. An example will illustrate this. An employee's performance generally increases, up to a point, as pressure grows: but a critical point is reached beyond which increasing pressure leads to fast output and may damage performance irreversibly. Again, there is an engineering analogy: increasing tension in a metal sample produces reversible stretching until the elastic limit is exceeded, after which irreversible changes and breakage occur. In employees, the critical point differs from person to person. The changes underway in many companies have increased pressure, and many workers whose critical point is too easily reached. But there are alternatives: for example it is now clear that, if people are allowed some control over how they do their jobs, they are less at risk from increasing pressure which is imposed with little flexibility or empowerment.

G DIGOLE

The Pharmacological Basis of Therapeutics. 9th ed

Goodman and Gilman (G and G) has been described many years ago as the "Blue Bible of Pharmacology"—this edition is black but still the best textbook of pharmacology and therapeutics available. Occupational physicians wishing to understand toxicological and pharmacological principles and needing a reference source for information on drugs and chemicals, will find this edition an excellent addition to their libraries.

The editors acknowledge that this is the first edition not to be edited by a Goodman or a Gilman, but has aimed, preserving the best features of earlier editions while adding many excellent new features. These include several new chapters (including one on gene therapy), synopses at the opening of each chapter, and a prospectus setting out likely future advances at the end of each chapter. This last innovation is justifiable: not only is G and G now up to date, but it also provides the information which you may need next year.

In reviewing this book, I have looked closely at the famous family of chapters on the autonomic (ANS) and central nervous systems (CNS). This has been a chastening experience, especially with regard to the CNS. The group of chapters starts with an account of neurotransmitters and receptor (the fold-out diagram of the ANS remains) which is splendidly up to date but which still includes adequate accounts of the historical development of the field. This has always been a feature of G and G and it is good to see that it has not been lost. The diagrams explaining neurotransmission have been improved and now involve a modest use of colour. This is helpful and attractive. Details such as isoelectric subjects as structure of the "docking complex" for neurotransmitters (do you know neuromen and syntax?) are rapidly assimilated from the excellent diagrams. As one would hope, nicotinic and musculin receptors are discussed in detail. The referencing of this chapter is as up to date as one could hope in a book of this size: references from 1994 and one from 1898 are included.

The chapter on anticonvulsant actions (AChE) agents has been an old friend for 15 years. Palmer Taylor has taken over the authorship of this chapter from Koelle and has added an excellent series of diagrams illustrating the interaction between the AChE molecule and the anti-AChE molecule. A useful note on Alzheimer's disease and the possible value of AChE inhibitors has now been added. The bibliography of the chapter has been shortened and it is odd that Koelle's masterpiece (Handbuch der Experimientalen Pharmakologie, 1963) and Balintyare and Marr's more recent volume (in many ways the successor to Koelle's work) do not figure more prominently.

To other chapters: those in the treatment of asthma, hypertension, and diabetes, seem uniformly excellent as is that on the management of asthma. The latter stresses asthma as a predominantly inflammatory disorder and provides a concise review of the inflammatory mediators which may be involved in its pathogenesis. The prospectus is brief, perhaps disappointingly so. As well as being a textbook of pharmacology, G and G has always been a textbook of toxicology. This edition maintains that tradition with a chapter on heavy metals and one on nonmetallic environmental toxicants by Klaassen. The reviews, on a compound by compound basis, are short but the coverage is good and although the bibliography looks just a little dated (no Schwartz, Pope, or Dockery on particles), there are some references to works published in 1994. The book concludes with 79 tables of pharmacological data dealing with about 360 drugs. This is a unique source of information.

Goodman and Gilman is a large book and this review, although long, does not do it justice. That such a book can be priced at £65 is nothing short of amazing. No doctor, pharmacist or toxicologist, or even medical student could spend £65 or many hours better by buying this book. For those who have entered the computer age there is even a version available on CD-Rom.

R L MAYNARD