

Recycling of non- ferrous metals

Michael E Henstock (1996), *The Recycling of Non-Ferrous Metals*, International Council on Metals and the Environment, Ottawa (fax +1 – 613–2352865), 340 pages, US\$ 27.

reviewed by Marian Radetzki

Having just assigned one of my doctoral students in economics to write a dissertation on the factors that determine the role of scrap in metal production, the book comes as a true blessing. Metals recycling is a fascinating and very important industry. Yet, the statistics on the subject, and the literature describing the industry, are scarce, highly scattered, and hard to come by. The book provides a broad and comprehensive review, even if superficial in parts, of the subject. It will fit splendidly as an introduction to my student, and save us both a lot of time.

Recycling of metals is as old as history. The prophet Isaiah was describing a well-established practice when he wrote "...and they shall beat their swords into ploughshares, and their spears into pruning hooks". The current significance of recycling can be gauged by the contribution it makes to the world supply of major

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metals. In the 1990s, scrap provided for more than 50 per cent of world lead consumption, around 40 per cent of copper and nickel usage, and about 30 per cent of the consumption of aluminum and zinc. In the European Union alone, it employs a workforce of some 100 000 persons. Against this background, it is surprising that a comprehensive survey of metals recycling has not been published long ago.

The book is basic in the sense that it first provides a detailed discussion of the properties and uses of metals, as a background to the data and analyses of the recycling of each. There are four introductory chapters on metals and recycling in general, followed by specialized chapters that present the detail for each of a score of different metals. An important chapter towards the end of the discourse contains an intriguing discussion of the environmental aspects of metals recycling.

Henstock has devoted considerable effort to compiling his statistics. The results indicate lacunae and point to existing discrepancies and inconsistencies. How come, for instance, that alternative reputable US sources assess total secondary magnesium to account for 38 per cent and 62 per cent, respectively, of total US consumption of that metal? US and UK data dominate in the presentations, perhaps because these two countries are better mapped statistically in this field, more likely, however, because the author, a UK national, accesses Anglosaxon publications with greater ease.

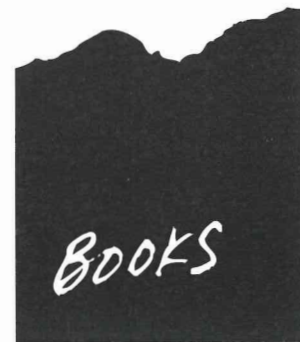
The second edition of the book, which I hope will be published in due time, will benefit from more careful editing. I was annoyed, when reading the present one, of the repetition of the same discussion in different parts of the book. An example is the longevity of final metal containing products, a significant determinant of the share of scrap in total consumption of the metal. Longevity figures for copper are presented on pages 30, 36, 54 and 121. Since they are derived from alternative

sources, the figures differ among themselves. This is not only annoying but positively confusing.

A crucial distinction in the supply of scrap is between new – the cutoffs, trimmings and rejects that occur in the process of metal production and fabrication – and old – the return of metal containing products which have reached the end of their useful life. Only old scrap involves a truly additional supply of metalliferous materials. New scrap is merely the result of a more roundabout production process. While Henstock makes this distinction, his following analyses and statistical presentations do not always clarify whether only one or both categories are included. The author has my sympathy, the literature on metals recycling on which he draws is often careless in this respect. Nevertheless, the next edition warrants a greater effort on Henstock's part to bring more clarity about the significance of the respective secondary sources and about their major determinants.

A further improvement for the second edition, to help me and my doctoral student, as well as all other readers, is a considerable expansion of the suggested reading list and of the index. The first is extremely meager. The second is incomplete. Most of the authors quoted have not been listed.

On two grounds, I suspect that it was the themes pursued in the crucially important environmental chapter that prompted the decision to publish this text. First, as noted, the publisher of the book is the International Council on Metals and the Environment, a minerals industry association established to foster better environmental practices by its members, to improve the environmental image of the industry, and to counter the wilder accusations made by the greens about the damage that mining and mineral processing cause to the environment. And second, the green approaches to metals recycling have been confusing, I would say on the verge of schizophrenic. If



transformed into policy, they would involve considerable cost to the industry, with doubtful environmental benefit.

Henstock notes that recycling has no virtue in itself, when regarded from the firm's point of view. It is pursued only as far as it is profitable. At the same time, he notes that recycling is environmentally benign in many respects. For instance the supply of metals obtained from secondary materials typically requires much less energy, more limited needs for landfill space, and smaller risk for environmentally damaging dissipation that may occur if old scrap is merely dumped. Such environmental benefits are often external to the mineral firm, so that less secondary production takes place than is socially desirable. Furthermore, by reducing the need of primary ores, the reuse of scrap contributes to sustainable development.

On the above grounds, recycling has attained an immense popularity with many environmental groups. Being seemingly unaware of the great importance of scrap as a raw material in metal production through history, these groups prod governments to implement policies that would increase secondary metal production. Such policies may be fine to the extent that they internalize the positive environmental effects of recycling. But the green efforts are far more ambitious in many cases. They suggest policies to maximize recycling, without regard to cost, whether internal or external to the firm. Such pleas must be worrying to the mineral industry and to its Council on Environment.

A recent move initiated by the environmental groups, and subsequently transformed into a recommended policy, has turned the greens' allure to recycling on its head, and aroused considerable apprehension in the industry. Member nations of the UN Environmental Program have set up rules on the transboundary movement of hazardous wastes. The effort is referred to as the Basel Convention. The purpose is to protect poor countries against being used as a cheap depos-

itory for industrial wastes of richer countries. In March 1994, a consensus declaration envisages "a phased-in ban for materials destined for recycling, with complete cessation by December 1997 of their transfer from developed to developing nations".

The declaration involves a remarkable trade-restricting measure for a very wide group of raw materials of great industrial importance to many developing countries. It misses the original purpose of the Basel Convention by a wide mark. If implemented, the proposed measure would clearly constrain metals recycling on a global scale, to the detriment of both industries, nations and the environment. It represents yet another instance of environmental enthusiasts carrying the day with proposals whose consequences, environmental and other, have not been thought through. No doubt, the parties to the consensus will modify their positions once they realize what they have agreed to. In the meantime, the declaration has caused a scare among all involved with metals recycling.

The desire to argue a reasonable case for secondary metal production in the face of environmental initiatives like those just quoted, must have formed a basic rationale for the International Council of Metals and the Environment to publish the present book. I am certain it will serve its purpose in this respect. The satisfaction of my own and my doctoral student's needs provides an additional bonus. ■

Gesellschaft Deutscher Metallhütten- und Bergleute, *Kleinbergbau und seine Bedeutung*, GDMB Heft 76, 1995. Paul-Ernst-Strasse 10, D-38678 Causthal Zellerfeld, Germany, Fax: +49(53) 23 937 237. ISSN 0720-1877; ISBN 3-9801786-7-6, 193 pp.

This volume on small-scale mining is composed of papers presented at conferences at Mittersill (October 1993) and Berlin (November 1994) in Germany. Definitions of small-scale mining, locations and objects being mined, market and socio-economic aspects are discussed as well as its advantages and limits. Within the scope of co-operation on development projects the support of small scale mining can result in local improvement of the socio-economic and technological infrastructure which implies improved lasting effects of support measures on a wider scale such as legal advice, advanced training and market strategies. In accordance to most national co-operation organisations the environmental protection aspects are getting more attention. Of particular interest are the articles by Michael Priester (Costs and usefulness of small scale mining) and Richard Nötstaller (Economic evaluation of small-scale mining projects in Developing Countries).

Metal Bulletin, *Price and Data 1996*, 10th Edition, Metal Bulletin Books Ltd, Park House, Park Terrace, Worcester Park, Surrey KT4 7HY, England. Fax: +44 (181) 337 89 43. ISBN 0 947671 96 X, ISSN 0269-1698, 420 pp.

As the title indicates the book includes prices and statistics of non-ferrous metals, iron and steel, scraps and alloys. Some error must have occurred in reproducing the diagram on gold prices (p. 110), otherwise the every day morning prices at the LME are reported in lists. In the Memoranda valuable information on international and national associations, conversion rates, inflation indices, physical constants of

metals etc. are given. An electronic version is also available on 3 1/2" disk as a Windows Help file.

Minerals Council of Australia, *Minerals Industry Survey 1995*, compiled from data collected by Coopers & Lybrand Chartered Accountants and published by the Minerals Council of Australia, Mining Industry House, 216 Northbourne Avenue, Canberra ACT 2601, Australia. Fax: +61 (6) 279 36 99, 30 pp.

The aim of this annual survey is to provide timely and accurate data primarily on the Australian minerals industry. Some additional information on overseas exploration activity and assets by geographic location is given. The information is based on a major portion of the mineral industry with omissions of some of the smaller mining and exploration companies and a proportion of some joint venture operations. The total exploration expenditure reached 613.3 M AUD during the fiscal year 1 994/95 of which 56,8 per cent was spent in Australia. The overseas mineral exploration expenditure was mainly spent on gold (36 per cent), diamonds (26.4 per cent) and base metals (20.3 per cent).

Minerals Bureau of South Africa, *Producers of industrial mineral commodities in South Africa 1995*, Mineral and Energy Affairs, Mineralia Building, Private Bag X4, Braamfontein 2017, South Africa, Fax: +27(11) 403 2061. ISBN 0-7970-3280-0, 86 pp.

Groups, companies, mines, plants and marketing agencies are listed for all industrial mineral commodities in South Africa including "wonder stone". A list of useful addresses of departments and other mineral-related organisations is included.

Mark Payne, *The Global Mining Industry - a selective guide to the world's leading companies*, FT Newsletters & Management Reports 1996, Pearson Professional Ltd, Maple House, 149 Tottenham Court

Road, London W1 P 9LL, England. Fax: +44 (171) 8896 2333, ISBN 1 85334 391 9, 138 pp.

Altogether 51 world leading mining companies are presented in various aspects including strategy and development, sales and production of minerals and recent financial performance. Pricing and investment considerations, opportunities, and environmental issues are treated in a short introduction.

Society for Mining and Metallurgy and Exploration Inc., *Resource Guide 1996*, SME Publication Sales Res, PO Box 625002, Littleton CO 80162-5002 USA. Fax: +1(303) 973 3845, 232 pp.

New products, literature and media showcase, suppliers/consultants, publications and speciality products, alphabetical listing of products/services and SME Membership Directory are included in this annual volume.

Heavy Metal Bulletin, International forum focusing on immuno-toxic effects of dental-fillings and related disorders, Editorial office: Lilla Aspudsv. 10, S-12 649 Stockholm, Sweden. Fax: +46 (8) 18 40 86. 3 issues in 1996, subscription 30 GBP.

The World Bank, *Mainstreaming the Environment*, The International Bank for Reconstruction and Development, 1818 H Street, N.W., Washington DC, 20433 USA. ISBN 0-8213-3481-6, ISSN 1014-8132.

This report documents how the World Bank Group has sought to be an active partner in implementing the Earth Summit in Rio imperatives. The Bank's loan portfolio of environmental projects is 10 000 MUSD for 137 projects in 62 countries. The Bank is now entering a third generation of environmental reforms. It is characterised by emphasis on on-the-ground implementation, incorporating the environ-

ment into sectoral and national strategies and a stronger focus on people and social structures.

Colley, H. & Flint, D.J., *Metallic Mineral Deposits of Fiji*, Mineral Resources Department, Memoir No 4, 1995. Private Mail Bag, GPO Suva, Fiji. Fax: +679 370039., ISBN 982-211-022-7, 192 pp. This Memoir contains information on mineral prospects, and summarises the geology of Fiji. There are chapters on gold deposits, polymetallic veins, skarns and massive sulphide deposits, disseminated mineralisations, manganese, bauxite, and iron deposits. An index list and index plans of all mines, mineral occurrences and mineral prospects are included. The Memoir will undoubtedly provide a guide to future mineral exploration in Fiji and attract investment from the international mining sector. The Mineral Resources Department also issue an "*Exploration and Mineral Digest*", 4 issues a year. The subscription is F\$44 a year.

Thorpe, S., Klijn, N. and Cox, A., *Lead - economic effects on the lead-zinc industry of possible OECD risk reduction measures for lead*, ABARE Research Report 95.6, GPO Box 1563, Canberra 2601, Australia. Fax: +61(6) 272 2001. ISBN 0 642 23342 X, ISSN 1 037-8286, 71 pp.

A major part of the current agenda in international environmental policy relates to the environmental and health effects of metals, particularly lead, and how the risks of exposure may be reduced. This is particularly the case in the OECD risk reduction strategy for lead where a proposal for an OECD Council Act has potentially significant economic implications for the world and Australian lead zinc industries. An economic assessment in made of the impact of possible OECD initiated policy changes on the lead-zinc industry.

Cheryl Simon Silver and Dales S Rothman, *Toxics and Health - the potential long term effects of industrial activity*, World Resources Institute, 1709 New

York Ave, NW Washington DC 20006 USA. Fax: +1(202)-638-0036. ISBN 1-56973-027 60 pp. 14.95 USD.

Researchers around the world are beginning to connect industrial pollution to long-term direct and indirect health problems in humans, wildlife, and ecosystems. This report suggests that what may be needed to solve or prevent such problems in the future is a fundamental restructuring of industrial economics, not just the control of individual pollutants. The environment is becoming far more toxified than the public realises.

International Monetary Fund (IMF), *World Economic Outlook - May 1996*, World Economics and Financial Surveys, IMF, Publication Services 700 19th Street, N.W. Washington, D.C. 20431 USA. Fax: +1(202) 623-7201. ISBN 1-55775-567-1, 190 pp, price: USD 34.

The World Economic Outlook is published twice a year (since 1980) in English, French, Spanish and Arabic, and presents analyses of global economic developments during the near and medium term. The survey of prospects and policies is the product of interdepartmental review of world economic developments, primarily from the IMF staff through consultations with member countries. The country projections are prepared by the IMF's area departments on the basis of internationally consistent assumptions about world activity, exchange rates, and conditions in international financial and commodity markets.

Allen Hammond et al, *Environmental Indicators: a systematic approach to measuring and reporting on environmental policy performance in the context of sustainable development*, World Resources Institute, May 1995, 1709 New York Avenue, N.W. , Washington, D.C. 20006. Fax: (202) 638 0036. ISBN 1-56973-026-1, 43 pp.

"Environmental Indicators" extends WRI's earlier work on indicators - including such reports as "Biodiversity In-

dicators for Policy-makers" and the analyses set forth in the biennial series of World Resources reports. The authors begin by laying out a conceptual approach for producing indicators from mountains of data into a set of simple and significant tools. Creating environmental indicators that the public can easily grasp is the surest way to compel high-level government attention - both to the environment and to the efficacy of policies for protecting or restoring it. The Dutch have made good use of indicators based on national goals to curb such environmental problems as ozone depletion, climate change and acid rain. While economic indicators show the power of a single number for financial decisions, no remotely similar numbers exist to indicate how the environment is faring.

Shane S Streifel, *Review and outlook for the world oil market*, World Bank Discussion Papers 301, 1995. The International Bank for Reconstruction and Development/The World Bank, 1818 H Street N.W. Washington, C.C. 204 33 USA. Fax: +1(202) 477 6391. ISBN 0-8213-3443-3, 157 pp.

The objectives of this study are to review historical developments in world oil and energy markets, past and recent forecasts of oil prices and oil markets, and to project world oil demand, supply and prices to 2010. A major aim of the study is to take a view on long term oil prices rather than present several alternative scenarios. A conclusion of the paper is that significantly higher or lower real oil prices are less likely than a continuance of present price levels. OPEC is expected to continue to limit output to keep oil prices well above the long term competitive costs of production. The author predicts that non-OPEC supplies will continue to increase. The possibility of supply disruptions around the globe will continue to be present but sustained higher oil prices are unlikely. Technological progress could result in impressive advances on both the demand and supply sides of the market.

Lindsay Hogan et al, *Net economic benefits from Australia's Oil and Gas Resources - exploration, development and production*, ABARE Research Report 96.4, Australian Bureau of Agriculture and Resource Economics, GPO Box 1563, Canberra ACT 2601, Australia, Fax: +61(6)-272 2001. ISBN 0 642 2560 2, ISSN 1037 8286, 128 pp.

The exploration, development and production of Australia's oil and gas resources has contributed significantly to the Australian economy and is likely to continue to do so. While coal is Australia's single largest export commodity, the value of domestic production of oil and gas has exceeded the value of coal production the first half of this decade. The objective of this paper is to estimate the net economic benefits to the Australian economy derived from the oil and gas resources, accounting in 1994-95 for over half of Australia's primary energy consumption - 36 per cent for oil and 18 per cent for gas. Petroleum products are used predominantly in the transport sector, while natural gas is used mainly in the manufacturing, mining and residential sectors and in electricity generation. ■