

BOOK REVIEW

“JEWELLERY TECHNOLOGY” by *Diego Pinton*

This book, written by a metallurgical consultant and teacher of jewellery technology, is primarily intended for students at schools of jewellery as well as for jewellers and manufacturers who will find it useful in providing theoretical and practical knowledge of the subject. It is very wide ranging in that it considers all aspects of manufacture such as equipment, methods of processing, the metallurgical and chemical background, effects on the environment, occupational health and safety, and aspects of business management.

It may be helpful to indicate the substance of the various chapters. The first two deal with measuring systems, the units of size, mass and weight, temperature and pressure; metrology, i.e. the technology of measuring instruments and their characteristics and uses; instruments of particular use to jewellers. Chapters 3 and 4 are concerned with the elements of chemistry and the properties of materials, such as crystal structure, physical and mechanical properties. Generally, these are satisfactory and it is unfortunate that there are errors in the interpretation of a group of stress-strain curves for different materials (Figure 108). Hopefully, a discerning reader would note the contradictory statements concerning toughness but may not know that toughness is the ability of a material to absorb the energy of plastic deformation and this can be assessed by the area under the stress-strain curve to the point of fracture.

Chapters 5 and 6 discuss the characteristics of the metals used in jewellery, fineness and caratage. Chapter 7, 8 and 9 describe the major working processes of rolling, wire drawing, stamping, sheet metal forming and hollow tube manufacture, mechanical jointing techniques and

fastening devices. Chapter 10 is entitled “Welding” but in fact it also includes hard (brazing) and soft soldering. Important information is given on the construction and use of gas-air torches, gases, fluxes, oxy-hydrogen generators and the newer techniques of laser and plasma welding.

Chapter 11 discusses the mechanisms of melting and solidification of metals and alloys and describes processes and melting equipment. Chapter 12 on “Alloys” is generally well written although there is the occasional contentious statement. For example, the Table on p207 quotes eutectic temperatures and compositions for the gold-copper (Au-Cu) and gold-nickel (Au-Ni) binary systems. It is true that the liquidus and solidus temperatures coincide at specific compositions in each of these systems but it is not correct to call these eutectic reactions since the solid product is single phase. A eutectic reaction is where, in a binary system, a single-phase liquid solidifies to two solid phases, say $\alpha + \beta$, as happens in the silver-copper (Ag-Cu) system.

Chapter 13 is a very useful reference since it discusses the properties of many of the chemical substances used in jewellery manufacture and contains information on EEC directives on hazardous chemicals. Chapter 14 on “Heat Treatments” perhaps should have followed directly on from “Alloys” as it continues the discussion of the metallurgy of the jewellery alloys in terms of annealing and hardening treatments whereas the short chapter (Ch 15) entitled “Bleaching” (in reality this should be “Pickling”), and the next on “Environmental Effects on Gold Alloys” logically follow on from “Chemical Substances”. Stress corrosion cracking in low carat gold alloys is mentioned but it is a pity that the author did not go on to discuss the merits of stress relief annealing to

overcome the phenomenon. Chapter 17 covers “Surface Finishing”, i.e. grinding, burnishing, polishing and cleaning.

Chapter 18 deals with “Investment Casting” in great detail and is particularly good in that it discusses the important factors at every stage of processing and looks at the causes and prevention of casting defects. The next two chapters are on gold losses and recovery of precious metal from scrap, assaying and refining. Touchstone testing and cupellation are described but it is surprising that at least a brief mention of assaying using the Inductively Coupled Plasma (ICP) technique was not made. Similarly, in view of the fact that many workshops and factories now have in-house refining equipment, more could have been said on reclamation from scrap. The final two chapters are on “Environment, Occupational Hygiene”, which gives valuable information on occupational hazards and waste disposal, and “Business Management”, which will be a useful introduction to those wishing to set up their own workshop or small factory.

The one major omission is that there is nothing on the principles of electroplating and electroforming and very little on electrodeposition processes. However, almost every aspect of jewellery technology has been covered. Scattered through the text are a number of worked examples of calculations that a jeweller may be required to make during processing. It is true that there are a number of statements that are either wrong, or at least debatable, but these are relatively few. It is clear that the author does have a wide knowledge of the industry and of the metallurgical and chemical background.

The main criticism should perhaps be directed to the Publisher. It is concerned with the English Edition

which contains many errors that may not appear in the original Italian Edition. First, there is a profusion of spelling errors which could have been minimised by adequate proof reading. Secondly, although the translation in general is satisfactory, there are errors that have arisen during translation into English. One glaring example is the reference to the hardness of gold alloys in the molten state which is plainly nonsense. It is highly probable that this should have been hardness in the 'as-cast' condition. Similarly, there are a number of examples where a wrong word has been used. This will be confusing, particularly to students who are not familiar with the subject matter. These could have been corrected by

allowing an English-speaking jewellery technologist to read the translation before publication.

Nevertheless, in spite of these criticisms, Diego Pinton is to be congratulated on what is clearly 'a labour of love' in collating a vast amount of information within one book. It can be recommended for a place in jewellery school libraries and on manufacturer's bookshelves.

Mark Grimwade

'Jewellery Technology' is published by Edizioni Gold Srl, Viale Zara 7, I - 20159 Milan, Italy. It is available in both English and Italian language editions. Price is 95,000 Lire (approximately \$60)