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Section of Occupational Medicine

President R I McCallum MD DSC

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President's Address

Observations upon Antimony

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Antimony is comparatively little known today although the metal and its inorganic compounds have common applications in everyday life, and its organic preparations are still used for medical treatment in certain parts of the world. Antimony, however, has had a lurid but fascinating history over centuries; many books have been written about it, many bizarre beliefs have been held concerning it and its properties, and it has been used and misused in an enthusiastic and extraordinary fashion.

Antimony ores, usually stibnite (antimony sulphide), are found in many countries, but most of the raw material now used in Western Europe and the United States of America comes from South Africa, Bolivia or China. Little or no antimony has been mined in the United Kingdom for many years, although it has in the past been produced from mines in Cornwall, Cumberland, Ayrshire and Dumfriesshire. For example, the Dumfriesshire Mine (Louisa Mine, Glendinning, near Langholm), which is said to have yielded ore containing 50% antimony (Dewey *et al.* 1920), was discovered in 1760 and worked periodically until the 1920s. In Britain, the only plant processing antimony ore and a major producer of the metal and its compounds in Western Europe is in the north-east of England near Newcastle upon Tyne, and has been in operation since at least 1864.

The toxicology of antimony and its industrial use is primarily a problem of the inhalation of dusts and fumes in the processing of the ore, and to a minor extent of skin irritation; it differs from the action of antimony preparations taken by mouth or given intravenously, where the effect is predominantly gastrointestinal and cardiac.

It is with the ingestion of antimony preparations that I am concerned here, as part of a wider review of the toxicology of antimony in all its uses.

Ancient History

Antimony is said to have been known to the Chaldeans in 4000 BC, and its sulphide has been found in an Egyptian cosmetic case of 2500 BC as a rouge to be brushed onto the lips; it was also used by them as a salve in ointments (Thorwald 1962).

The name antimony has been current since at least 1477 (Oxford English Dictionary) and is regarded as an adaptation of the Arabic *al-kohl*. This was the name given to finely powdered stibnite, the native trisulphide used as a cosmetic both in ancient times and in India today. The meaning of *al-kohl* as the essence or distilled spirit of fluids, or alcohol, came later. The name stibnite comes from the Greek *stimmi* via the Latin *stibium*.

One of Job's three daughters was called Kerenhappuch, meaning 'vessel of antimony', and antimony is referred to as a cosmetic in the Bible in the book of Ezekiel (23:40), and in Jeremiah (4:30): 'When you dress yourself in scarlet, deck yourself out with golden ornaments and make your eyes big with antimony you are beautifying yourself to no purpose' (New English Bible). When Jezebel heard that Jehu was come to Jezreel (2 Kings 9) she used it to paint her face, but with disastrous results. Antimony as a cosmetic was condemned by the early Christians, but it was used as a medicine by the church in the 18th century when Carthusian monks treated smallpox, ague, dropsy and syphilis with kermes mineral (oxide, and hydrated sulphide of antimony with sodium or potassium sulphide).

Antimony preparations were given to produce sweating (i.e. as diaphoretics or sudorifics), as emetics, or purges, or as all three. There is a tale which describes experiments with antimony by the legendary monk Basil Valentine who threw some of the material out of the window where it was eaten by pigs. The effect was purgative but later the

pigs became so fat that Valentine gave the antimony preparation to some monks who had become thin after fasting. The monks all died. The popular belief that the name antimony is derived from *anti-moine* (monk's bane) originates from this story.

References to antimony in medical, chemical and other literature in the 16th to 18th centuries are frequent. Burton in 'The Anatomy of Melancholy' (1628) comments that it is frequently prescribed for melancholy, and tells the story of a parish priest at Prague in Bohemia: '. . . who was so far gone with melancholy that he doted, and spake he knew not what; but after he had taken 12 grains [0.8 g] of stibium he was purged of a deal of black choler, like little gobbets of flesh, and all his excrements were as black as blood (a medicine fitter for a horse than a man) yet it did him so much good, that the next day he was perfectly cured'. With regard to the evident toxicity of some antimony preparations Burton concludes that '. . . antimony is either good or bad, strong or weak, as the party is that prescribes or useth it'.

In spite of fatalities from the therapeutic use of antimony in the 16th and 17th centuries, it was still possible for a reputable physician in the mid-18th century to extol its qualities. John Huxham (1692–1768) of Plymouth, who had been a pupil of the great clinical teacher Hermann Boerhaave at Leyden, published in 1756 his 'Medical and Chemical Observations Upon Antimony'. This book, for which Huxham was awarded the Copley Medal of the Royal Society, reflects an extraordinary faith in antimony, and describes in detail its chemistry and therapeutic use. Antimony, he says, is given in some form or another by dabblers as well as doctors but one must know what one is about; otherwise antimonial medicines may prove to be poisons rather than remedies. Huxham sets out the methods of preparing the *Essentia* or *Vinum Antimonium* from powdered glass of antimony and Madeira wine. This he recommends as '. . . an alterative, attenuant and diaphoretic; not but that the first Doses commonly cause a slight Nausea or Sickishness at Stomach, and sometimes even a small Degree of Puking with a stool, or two'.

Such was the intense interest in antimony, that many books and pamphlets were written about it recommending it as a treatment for a wide variety of maladies, sometimes adding a word of caution about its use and at times condemning antimony preparations outright as poisons. It was particularly highly regarded by the 17th century medical chemists who opposed the theory and practice of medicine according to Galen. One of the first of these iatrochemists was Paracelsus (Theophrastus Bombast von Hohenheim, 1493–1541), who is said to have publicly burnt the works of Galen. In teaching the use of chemicals in medicine, Paracelsus introduced antimony and other inorganic substances.

The best known work on the therapeutic use of antimony was 'The Triumphal Chariot of Antimony' by Basil Valentine published in German at Leipzig in 1604. A Latin version was published in Amsterdam in 1685 which was translated into English by A E Waite in 1893. This has been regarded as a literary forgery, which for long misled and perplexed chemists (Partington 1961). It was claimed to have been written by a 15th century Benedictine monk from the monastery at Erfurt, but was probably the work of Johann Thölde a Thuringian salt boiler who is known to have published a number of medical and chemical books. The first part of 'The Triumphal Chariot of Antimony' has been described as almost unreadable (Partington 1961) and in later parts it is, like the writing of Paracelsus, critical of orthodox medicine. It is a mixture of chemistry, mysticism and metallurgy in which is described the purification of gold with metallic antimony or sulphide. It gives a detailed account of antimony and its various compounds, and the use of antimony preparations in medicine as emetics and purges is dealt with extensively, and their toxic properties are clearly recognized (Partington 1961).

In alchemical literature antimony, as was the custom, was sometimes indicated by a symbol (Read 1936, Partington 1961) (Fig 1), but it was

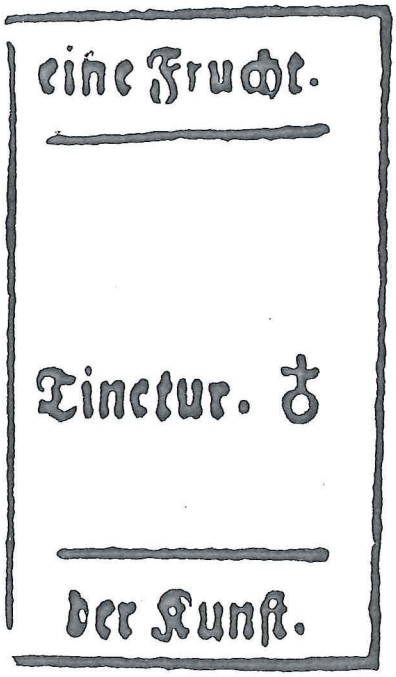

Fig 1 *The alchemical symbol for antimony. (Reproduced from Read 1936, by kind permission)*

Fig 2 *Antimony, the Gray Wolf as depicted in the First of the Twelve Keys of Basil Valentine by Maier 1618. (Reproduced from Read 1936, by kind permission)*

Fig 3 *Star Antimony. The crystalline pattern of the regulus of pure metal*

also depicted as a gray wolf; for example, in a plate from 'Atalanta Fugiens' by Count Michael Maier (1568–1622), published in 1618 (Fig. 2, *see* Read 1936). This illustrates the purification of gold (the king) by treating it with antimony (the gray wolf) who is seen consuming him. In the background the wolf is itself consumed by fire and the purified king steps briskly from the flames. Thus antimony was known also as *Lupus Metallorum*, the wolf of metals, because it 'devoured' or united with, all the known metals except gold.

The old names of antimony preparations are extraordinary and even poetic (Table 1) (Wootton 1910). The *pilulae perpetuae* were an economical form of treatment.

PERPETUAL PILLS: The Pills serve for those that have the Twisting of the Guts, or Miserere Mei, so call'd. When they are returned from out of the Body, 'tis but washing and cleansing of them again, and they'll serve as oft as you please; (Pomet 1748).

The alchemists were also impressed by the star pattern of the Regulus or pure metal (Fig 3), which they regarded as an indication of its virtues.

Valentine (1685) claimed that antimony healed wounds rapidly; cured leprosy and the French Disease; purified the blood, dispelled melancholy, relieved chest pain and breathlessness; cured quotidian, tertian and quartan fever, and the plague. Nevertheless in 1566 the Faculty of Medicine of Paris had declared antimony a poison, which

Table 1

Antimony: Lupus Metallorum (after Wootton 1910)

Preparations	*Composition*
Martial Regulus (i.e. impure gold) of Antimony	Stibnite fused with iron
Lunar Butter of Antimony	The chloride, from stibnite and corrosive sublimate
Powder of Projection	Produced in the Philosophic Egg, an oval glass vessel containing sublimed butter of antimony. Heated on a sand bath for months
Glass of Antimony	The oxide, sulphide and silica
Liver of Antimony	Mainly sulphide
Crocus Metallorum (Saffron of the Metals)	Mainly sulphide
Argentine Flowers of Antimony	Crystalline protoxide
Mineral Bezoar (antidote)	The regulus heated with nitric acid to give the metal and antimonious acid
Diaphoretic antimony	The suboxide from the sulphide and nitre
Algaroth's Powder (mercury of life)	A white oxychloride emetic, from Victor Algarotti, a physician, Verona (d 1603)
Pilulae perpetuae	The family remedy. The regulus recovered and used again
Kermes mineral	Glauber *c.* 1651: antimony oxide plus cream of tartar and hydrogen sulphide, to give an orange red powder (40% oxide with hydrated antimony sulphide and some sodium or potassium sulphide). A popular remedy in France as Poudre des Chartres for ague, smallpox, dropsy and syphilis, amongst other diseases
Golden sulphuret	From the liquor after precipitation of Kermes mineral; further precipitate by addition of hydrochloric acid to give protosulphide and persulphide of antimony with sulphur. With calomel known as Plummer's powder (Æthiops Medicinalis) and Plummer's pills

although mainly forbidden public sale was still available through a physician.

However, in 1657 Louis XIV contracted a fever (probably typhoid) for which he was bled and purged, but grew steadily worse. A group of royal physicians under Cardinal Mazarin decided to give antimony and the king recovered. The Faculty of Medicine then voted 92 to 10 in favour of antimony (Major 1954). Guy Patin, the Dean of the Paris Medical Faculty at that time, was a follower of Galen and Hippocrates, and opposed the new iatrochemistry. He made an impressive list of those whom he claimed had died from the administration of antimony including two princesses, an ambassador, the first physician to the king, a count, an archbishop and many others, and prepared the list as '*Le Martyrologie de l'antimoine*'. One doubts his judgment, however, for he went to extremes in the other direction in favouring bleeding. He is said to have bled his wife 12 times for chest trouble, his son 20 times for a continued fever and himself 7 times for a head cold. According to Garrison (1924), the playwright Molière (1622–73) who satirized the medical profession of his day, believed that the physicians had killed his only son and one of his close friends by giving them antimony. Furthermore Le Sage in his '*Gil Blas*' published in 1716 refers disparagingly to physicians who believed in Valentine's view of antimony.

Nevertheless in the mid-18th century John Fothergill (1712–80), a Quaker physician who was keenly interested in chemistry, revived the use of antimony in medicine for chronic distempers and plethoric conditions (Fox 1918). He favoured mainly diaphoretic antimony (potassium antimoniate and antimonite) with aloes, scammony and extract of colocynth, (Fothergill's Pill), and tartar emetic. Tartar emetic was also used by another well known Quaker physician, John Coakley Lettsom (1744–1815), who founded the Medical Society of London. He gave it at the beginning of a fever as a purgative or as a sudorific (Abraham 1933). The epigram about Lettsom which appeared in a number of versions from 1793 onwards (Abraham 1933) perhaps describes this:

When any sick to me apply,
I physics bleeds and sweats 'em –
If after that they choose to die, What's that to me,
I. Lettsom.

Ramazzini (1713) refers to injurious fumes from smelting antimony and to the use of antimony by coloured-glass workers. However, he describes diaphoretic antimony as a treatment for asthma due to metallic fumes, as a purge in mercury poisoning, in the treatment of fullers' cachexia, diseases of oil pressers and tanners, and to clear out particles swallowed by laundresses, collectors of old clothes and cleaners of mattresses.

Antimony Cups

The properties of antimony were known to the Romans, some of whom, including the emperor Claudius, habitually used it as an emetic after a heavy meal (Thomson 1925). Cups of antimony metal, the *pocula emetica* or *calices vomitorii* became highly popular in the 17th and 18th centuries as a means of inducing therapeutic sweating, vomiting and purging. It has been suggested (Redwood 1858) that the cups, and also the perpetual pills, were introduced at the time that the use and sale of antimony preparations were strictly forbidden, in order that the law could be circumvented. An excellent account of these cups was given in 1925 by Sir StClair Thomson (1859–1943), a distinguished otorhinolaryngologist who was at the time President of the Royal Society of Medicine. Thomson referred to an antimony cup in the Royal College of Physicians, London, and to another in the Museum of Practical Geology in Jermyn Street. He showed two other 17th century cups which he had on loan, each of which had a tooled leather case and had been well used. One of these cups is now in the Wellcome Museum but the whereabouts of the other is unknown.

In spite of the popularity of antimony cups, particularly in Germany, they fell out of use towards the end of the 18th century and have been largely forgotten. Specimens are rare in the United Kingdom, and the antique trade is ignorant of them. I have been able to trace only six examples of antimony cups in the British Isles, all of which are in London. Two are in the Royal College of Physicians, one in the Victoria and Albert Museum, one in the Science Museum, and two in the Wellcome Museum. Enquiries at the Royal Colleges of Physicians and of Surgeons, Edinburgh, the Royal College of Physicians and Surgeons of Glasgow, the Society of Apothecaries of London, the Royal College of Physicians of Ireland, and the Pharmaceutical Society have all drawn a blank. It is possible that continental museums are better endowed with antimony cups, but it is also likely that their survival has been jeopardized by the brittleness of the pure metal from which they were made, which makes them break easily.

The Cups

One of the cups (Fig 4) in the Wellcome Institute for the History of Medicine is described and illustrated by Thomson (1925). This cup was purchased from a silversmith in Bond Street, London, by Mr A de Navarro, a collector of pewter and a president of the Pewter Society, and presented to the Wellcome Institute in 1934 by Madame de Navarro. It is probably a 17th century cup and the leather case is Italian. The cup has been broken and skilfully repaired.

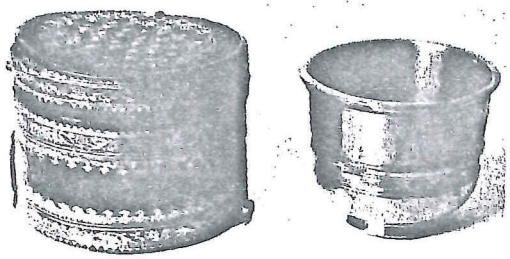

Fig 4 *Antimony cup and case. (By courtesy of the Wellcome Trustees)*

The second cup from the Wellcome Institute (Fig 5) is taller with straight sides, and is much cruder in appearance. There is no information available concerning its origins but it is also considered to be 17th century, and is in my opinion possibly German.

The cup shown in Fig 6 was presented to the Royal College of Physicians in 1824 by Mr Gundry, a descendent of Baldwin Hamey jr (1600–1676), whose cup it was. It is approximately $2\frac{1}{4}$ inches (5.72 cm) high and $2\frac{1}{2}$ inches (6.35 cm) in diameter with a rather rough cast base and surface. The lower part, instead of being plain, is decorated – similarly to one illustrated in Thomson's paper (1925) – and it appears to have been poured into a mold from the base. It has a leather case similar in style to that in Fig 4. The second cup at the Royal College of Physicians is broken, but its edge clearly shows the crystalline structure of the metal and indicates the brittleness of these cups.

Fig 5 *Antimony cup. (By courtesy of the Wellcome Trustees)*

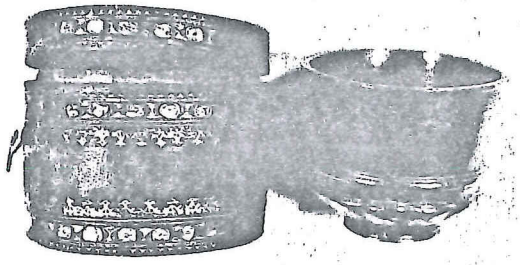

Fig 6 *Antimony cup with decorated base. (By courtesy of The Royal College of Physicians, London)*

The cup in the Victoria and Albert Museum is very similar in shape and size to one in the Wellcome Museum and shows signs of use (Fig 7). It is particularly interesting because not only is its leather case labelled on the inside of the lid with the name 'Ld Peterborough', but with it is a letter addressed to Mrs Ann Shaw, Goodwood, Sussex, with instructions on its use which read:

'Dr Brocklesby's Compliments to Mrs Shaw & in answer to her desire to be informed about the Antimonial Cup & how to use it.

Fill the cup with Lisbon Wine, or Mosell, Wine, set it by to stand 24 hours, and then pour it into a Wine Glafs, Two Table Spoonfuls are to be taken at first, & after waiting from 10 to 15 Minutes, Give a 3rd Spoonful, unlefs the first has begun to operate, but if 3 fail after 15 Minutes, then give a fourth or a fifth if requisite at due intervals, & most commonly the 3rd produces Nausea, Sickneſs & Vomiting. It is to be wrought off like another Vomit by taking at proper intervals (a pint at a time) from 2 to 3 quarts of bitter strong chamomile Tea.

London 13th May 1775'

This cup also has an outer case made of decorated straw basket work.

The Science Museum cup is in many ways the most intriguing, and certainly the most striking of them all. It was first described and illustrated in 1858 in the *Pharmaceutical Journal* by Theophilus Redwood (1806–1892), Professor of Chemistry to

Fig 7 *Antimony cup and case, and letter with written instructions on the use of the cup. (By courtesy of Victoria and Albert Museum)*

the Pharmaceutical Society of Great Britain, after it had been exhibited at a *conversazione* of the Society. It had been bought for one shilling at a sale at Christie and Manson's in April that year and came to the Museum of Practical Geology in Jermyn Street, London. The illustration in the *Pharmaceutical Journal* shows a decorated cup with an inscription in German '*Du bist ein Wunder der Natur und aller Menschen sichere cur*' which Redwood translates: 'Thou art a wonder of Nature And to all men a certain cure'. The engraving of 1858 shows the cup to be cracked in three or four places although apparently entire.

There is now no Museum of Practical Geology in Jermyn Street, but it appears that the Museum was closed in about 1903 and its contents transferred to the Science Museum in South Kensington. Enquiry there resulted in the cup and its wooden case being produced almost immediately, but sadly the cup was in six or seven pieces, some of which could be recognized from the 1858 engraving. The edges of the pieces showed the crystalline structure of the metal. Fortunately the inscription was still intact and the yellow colouring of the cup and its decoration were in good condition. The interior was smooth and gave no evidence of use. The Science Museum has repaired the cup and it is now in excellent condition (Fig 8). It is about $3\frac{3}{4}$ inches (9.2 cm) high and the top is about $3\frac{1}{4}$ inches (8.2 cm) in diameter. This cup is quite unlike the others previously shown and perhaps is more in the style of continental cups; at least four of the others are probably of English origin.

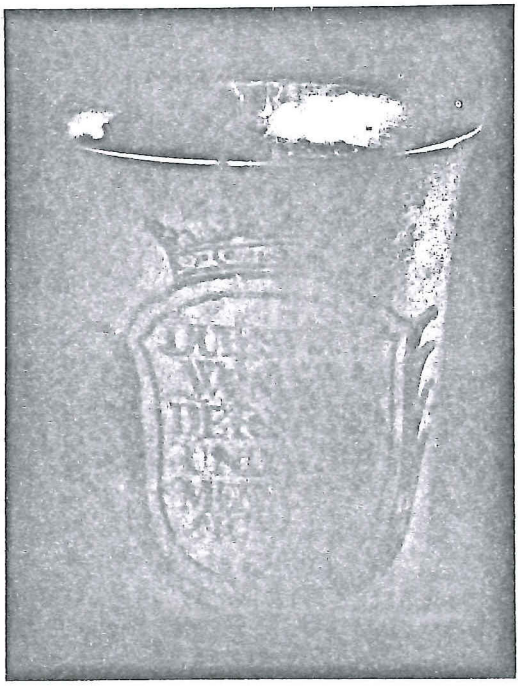

Fig 8 *Coloured antimony cup with inscription. (Crown copyright Science Museum, London)*

Wootton (1910), in referring to this cup, quotes a statement that antimony cups were made of an alloy of tin and antimony. Thomson (1925), however, had a scraping from the base of a cup analysed chemically and it was reported to him as being made of commercial antimony with only very small quantities of tin and lead. The opportunity was taken of analysing samples from the base of the Science Museum cup spectrographically and chemically at the Research Laboratories of Associated Lead Manufacturers Ltd at Perivale. On comparison, the metal of the cup was found to be remarkably similar to the company's own brand of antimony metal (Tables 2 & 3), so it was concluded that the cup was made from commercial antimony and not from an alloy, thus confirming Thomson's observations.

Experiments with a Facsimile Antimony Cup

Thomson (1925) described an experiment carried out for him in which white wine was allowed to stand in an antimony cup for 17 hours. A rough estimate, and not a quantitative determination,

Table 2

Chemical analysis of material from the Science Museum cup and modern commercial antimony metal
(Associated Lead Manufacturers Ltd)

Element	*Antimony cup* %	*Antimony metal* %
Antimony	97.60	97.60
Lead	0.68	0.65
Bismuth	—	—
Copper	0.39	0.40
Tin	—	—
Arsenic	—	<0.50
Iron	—	<0.10
Silver	—	—
Zinc	—	—
Nickel	—	<0.02
Sulphur	—	—

Table 3

Spectrographic analysis of material from the Science Museum cup and modern commercial antimony metal
(Associated Lead Manufacturers Ltd)

Element	*Antimony cup* %	*Antimony metal* %
Antimony	—	99.00●
Lead	0.65	0.80■
Bismuth	0.45	—
Copper	0.40	0.02■
Tin	0.40	—
Arsenic	<0.50	0.20■
Iron	<0.10	0.05■
Silver	<0.05	—
Zinc	<0.04	—
Nickel	<0.02	0.02■
Sulphur	-	0.20■

● Minimum
■ Maximum

suggested that there was half a grain of antimony as oxide to an ounce of wine, or 1.5–2 grains (130 mg) in all.

In this study, an experiment was carried out on an antimony cup made from a mould, kindly provided by the Wellcome Institute, of the cup shown in Fig 4. The copy was cast from commercially pure metal in the Department of Metallurgy at the University of Newcastle upon Tyne.

About 2¼ oz (62 g) of Moselle wine was left in the cup for 24 hours then decanted into a clean stoppered glass container. Wine from the original bottle was put directly into a similar container. Both were then analysed for antimony by atomic absorption spectrophotometry. No antimony was detected in wine direct from the bottle but the sample from the cup contained 72 parts/10^6 (4.7 mg). In a similar experiment with a second facsimile cup 120 parts/10^6 (6.8 mg) were found. These amounts are much less than the quantity estimated in Thomson's paper, but both the cups were slightly porous and a small quantity of the wine leaked from the base of each, so the results are probably too low. The wine contained 8.4 g/l of tartaric acid and the antimony was presumably combined with it. The therapeutic doses of antimony and potassium tartrate (Martindale 1941) are 2.8 mg for diaphoretic or expectorant use and 30–60 mg for emetic use. Mrs Shaw's 3, 4 or 5 spoonfuls would probably therefore have given her at least the diaphoretic dose.

Accidental and Deliberate Poisoning

In 1929, during a spell of hot summer weather, a Newcastle upon Tyne firm employing 500 workers provided them with lemonade made from crystals in new 2½-gallon (11.25 l) white enamelled buckets not intended for the purpose. These had stood overnight and were dispersed throughout the premises suitably covered and with ladles for the use of staff the following day. Altogether 70 employees drank some of the lemonade and nearly all were promptly sick; 56 of them were ill with a burning sensation in the stomach, colic, nausea, vomiting and collapse severe enough to be sent to hospital (Monier-Williams 1934). A dose-response relationship was noted and some hysterical overlay in a few of the younger women. Recovery was rapid, usually within three hours, and only 2 patients remained in hospital overnight. The lemonade crystals were found to contain sugar (81%), tartaric acid (18%) and sodium bicarbonate (1.5%); the pail enamel which was of poor quality and relatively low in silica contained 3% of antimony oxide. There were 1½ grains (0.09 g) of tartar emetic in a tumblerful of the lemonade, which is more than the emetic dose of ½ to 1 grain (0.03–0.6 g). This was one of three outbreaks of poisoning in similar circumstances reported by the Ministry of Health in 1934, in one of which 9% of antimony oxide was found in the enamel. As a result total prohibition of antimony in hollow ware was recommended.

Medicolegal Aspects

Antimony compounds have also been implicated in incidents of alleged deliberate poisoning on a number of occasions. A celebrated case of poisoning by antimony occurred in April 1876 when Charles Bravo, a young barrister who had recently married a wealthy widow, was taken seriously ill after dining at his home at Tooting Common with his wife and her paid companion. Within three days he was dead. Ten grains (6.0 g) of tartar emetic were found in his vomit but Professor Redwood estimated that Bravo had taken between 20 and 40 grains (12–24 g) altogether (Bridges 1956). Two inquests failed to decide whether the poison had been administered by Bravo himself, his wife, her former lover Dr Gully (a well known and fashionable London physician) or the companion. An ingenious and convincing suggestion (Bridges 1956) is that he had intended to poison his wife with tartar emetic but took it himself in mistake for epsom salts, and he was unable to admit this even on his death bed.

Antimony Compounds in Tropical Medicine

Since 1918 tartar emetic has been regarded as a valuable and efficient treatment for schistosomiasis (bilharziasis), the disease caused by trematode worms, particularly for mass treatment in endemic areas (Woodruff 1974). However, the treatment is prolonged, must be given intravenously and is potentially toxic; in addition to nausea and vomiting, for example, there can be serious effects on the heart with changes in the electrocardiograph and perhaps fatal arrhythmias. Since 1928 other less toxic trivalent antimony compounds requiring shorter courses have been used, for example: stibocaptate (Astiban), which is the only antimonial used for schistosomiasis in the United Kingdom; stibophen (sodium antimony III bispyrocatechinol disulphonate); sodium antimonylgluconate (Triostam); and antimony lithium thiomalate (Anthiomaline). An antimony compound, sodium stibogluconate (Pentostam), is the drug of choice in the treatment of leishmaniasis (kala-azar), the diseases due to infection by protozoa.

Therapeutic Antimony

In spite of a decline in the reputation of antimony preparations – other than those employed in tropical medicine – because of their potential toxicity and scepticism about their value, their use probably continued to some degree until 30–40 years ago. For example, several antimony preparations

were included in Martindale's Extra Pharmacopoeia (1941). These included antimony oxidium (BPC) as a diaphoretic, expectorant and emetic in a dose of 0.06–0.12 g; pulvis antimonialis (BPC) or James' powder which contained 33⅓% antimonious oxide in calcium phosphate (dose 0.2– 0.4 g); antimony and potassium tartrate, and antimony and sodium tartrate; and Liquor Antimonii Chloridi (BPC) which is described as being 'formerly used as an escharotic, now used mainly in veterinary practice and in furniture polishes'.

The Paradox of Antimony

What is the explanation of the paradox that over several hundred years antimony preparations remained such an obsession both with respectable physicians and rogues, and with the general public and the clergy, in spite of their evident toxicity, of fatalities and of attempts to ban their use entirely by fairly stringent measures? Although antimonials have been shown to be of great value in tropical medicine in this century, it seems unlikely that the same therapeutic effect in an unrecognized form could be the basis of their almost indiscriminate use for many different and ill-defined conditions. The influence of ideas put forward in the writings ascribed to Valentine and others may well have been powerful in the 17th century but it would be surprising if it had lasted into the 19th century. Antimony, according to these theories, contained the three principles proceeding from nature: mercury (the Regulus), sulphur (red colour) and salt (residual black earth), and from it could be made the Philosopher's Stone or Elixir Vitæ, the potent transmuting agent in which men believed for more than a thousand years (Read 1936). Secondly, it was believed that as antimony purged or purified gold, so it purified the bodies of men or animals. Thirdly, antimony, although a poison, could attract poison to itself more effectively than anything else.

As Sigerist (1941) points out 'A doctor thinks in the concepts available in his time and that is why medical theories have been magical or religious, philosophical or scientific'. In contemplating the extraordinary power of ideas which to us seem strange and incredible, one is prompted to consider whether some of the medical orthodoxies of today, however well based in current science they appear to be, may not turn out to be just as odd to our medical heirs a few centuries hence.

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