

Meeting May 5 1971

## Paper

### Memories of Lord Lister

by A Clifford Morson OBE FRCS (London)  
and Basil C Morson DM FRCPATH  
(St Mark's Hospital, City Road, London EC1)

Lister was born in 1827 and died in 1912 at the age of 85 years. This paper is concerned with correspondence between Lister and the firm of T Morson & Sons Ltd, manufacturing chemists, about the development of certain antiseptic substances. The letters cover two separate periods, 1889-90 when Lister was 63 years old, and 1907 when he was 80. They are 15 in number and together with some other documents were presented to the Royal College of Surgeons of England in 1967. Clifford Morson, now in his ninetieth year, accompanied his brother, a chemist in the firm of T Morson & Sons Ltd, at a personal interview with Lord Lister in 1907 to discuss the manufacture of antiseptic substances used in the preparation of catgut. An interesting document also found among the Lister papers of the Morson family refers to links between Lister and the Martindale

family of pharmaceutical chemists who were concerned with the manufacture of gauze dressings in the 1870s and 1880s.

The correspondence with T Morson & Sons does not give the details of experiments which Lister himself conducted from 1884 onwards when he abandoned the carbolic spray for an antiseptic dressing. In 1889 he consulted Mr Robert Taubman of T Morson & Sons about the substance double cyanide of mercury and zinc which Lister thought could be incorporated in gauzes (Fig 1). In fact T Morson & Sons pointed out that he was working with zinc cyanide and not the double salt, a suggestion which, as Sir Rickman Godlee states in his biography of Lister (1918, London), he hailed with delight. Though cyanide of zinc had definite antiseptic properties it was far inferior to those of the double salt. But Lister's difficulties were not at an end for it was found that the double cyanide was irritating to the skin, for the simple reason that the gauze was not impregnated throughout its texture with the same percentage of salt of which the cyanides *per se* were the irritants.

Now here we realize what a good knowledge Lister had of recent successes in chemistry. Perkins, an Englishman, had just discovered the aniline dyes. One of these, called 'mauveine' not only coloured the gauze to distinguish it from the plain material but had a strong attraction for the double cyanide.

Among the letters given to the Royal College of Surgeons is one from Perkins to the family

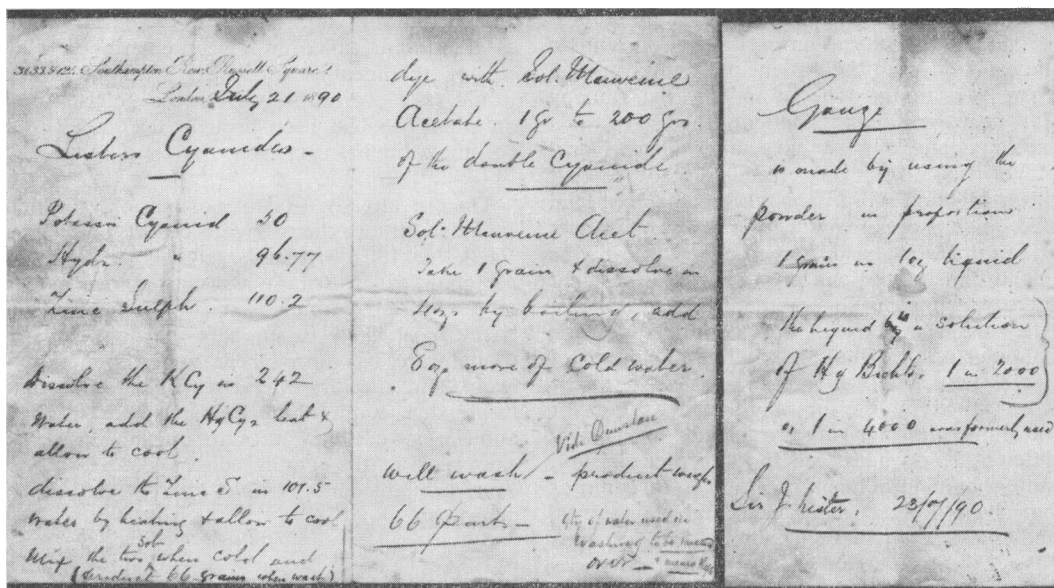


Fig 1 Formula of Lister's cyanide and gauze dressing prepared by T Morson & Sons in July 1890

firm stating how difficult it was to obtain any aniline dye on a commercial scale. Not a single British manufacturer had realized the commercial value of Perkins' discovery, although the Germans did. Lister's antiseptic dressing, we must admit, was never a complete success, for the skin of some patients was burned by it. Moreover, the late T D Morson was consulted by the War Office at the beginning of World War I with regard to its manufacture for the army in France, but the suggestion came to nought for Eusol composition proved to be much more effective than double cyanide.

In 1907 Lister contacted T D Morson, who was then leading chemist of T Morson & Sons, because he said that he had had such pleasant dealings with the firm in 1890 about the problems of antiseptic gauze, already referred to.

In 1907 at the age of 80, and in poor health, Lord Lister was still investigating the action of various chemicals in the prevention of sepsis in surgical catgut. For a number of years he had been a firm believer in the substitution of this suture material for silk and thread but he had failed to persuade surgeons to change their ways. Even his nephew and biographer, Sir Rickman Godlee, to Lister's great disappointment, failed to use catgut.

The following extract from a letter to T Morson & Sons from Lister dated August 20, 1907, has special interest because it reveals Lister's great depth of knowledge about chemistry as well as his difficulties in persuading manufacturers to use the correct preparation of chromium sulphate in the production of surgical catgut:

'I am greatly obliged to you for the information you have given me regarding neutral Sulphate of Chromium, and for the trouble you have taken in the matter. I learn that the salt is somewhat difficult of preparation unmixed with allied forms, and that even when it has been produced under the best possible management, its intensely hygroscopic nature makes it liable to considerable variation in the amount of water associated with it. Thus I am confirmed in the opinion which I formed many years ago that the Chromium Sulphate as sold in the market is not suitable for the preparation of catgut for surgical purposes, where the precise amount of salt in the preparing liquid is a matter of the utmost consequence. For that special purpose, the method of adding Sulphurous Acid to solution of Chromic Acid till the red orange brown of the latter has passed through green and just begun to resume the pure blue of chromium Sulphate is greatly to be preferred. Various important though simple details have to be attended to in preparing

*Copy made for me lately by Mr. Matthews, surgical instrument maker, of directions given to them by me in 1894, and since acted on constantly with uniformly satisfactory results.*

*The preparing liquid must be 20 times the weight of the catgut. So for 40 grains of catgut 800 grs. of preparing liquid are required. It is made by mixing two liquids, viz. the Chromium Sulphate liquid and the sublimite liquid.*

*The sublimite liquid is*

*Chromic Sulphate 2 grains*  
*Distilled Water 320 grains*

*The Sulphate may be dissolved by heat, but the solution must be used cold.*

*The Chromium sulphate liquid is prepared thus.*

*Chromic Acid 4 grains*  
*Distilled Water 240 grains*

*Add to this as much Sulphurous Acid (P.B. solution) as gives a green colour. If more is added, the colour becomes blue, which shows that rather too much Sulphurous Acid has been used. It is well to reserve a few drops of the Chromic Acid solution, to be added after the blue colour has just appeared and restore it to green. Then enough Distilled Water is added to bring the green liquid up to 480 grs. Then add the sublimite liquid.*

*The catgut is kept 24 hours in the preparing liquid, and is then dried on the stretch."*

*N.B. It is essential that the CrO<sub>3</sub> and SO<sub>2</sub> solutions be mixed before the H<sub>2</sub>O solution is added.*

*The reason for not adding any more SO<sub>2</sub> solution to the Chromic Acid solution than is exactly enough to cause the blue colour is that free Sulphurous Acid precipitates with Bichloride of Mercury, and would thus, in proportion to its amount with... the germinants from solution when the two liquids are mixed*

*Lister 3<sup>rd</sup> Sept 1907*

Fig 2 Lister's formula for chromic catgut prepared by him in 1894, written in his own hand

catgut. These I communicated to some makers in 1894, and I should be glad to give them to you, if you were disposed to undertake the process.'

Lister subsequently sent these details to T Morson & Sons and his manuscript, written in his own hand has survived (Fig 2).

In September 1907 Clifford Morson accompanied his brother, T D Morson, at an interview with Lord Lister to discuss the manufacture of chromic catgut. During discussion about the use of catgut he had to admit that his then chief, Mr Bland-Sutton (later Sir John), was refusing to use it because he feared his patients might get tetanus. Lord Lister's reply was that if surgeons themselves sterilized the catgut according to his formula there should be no anxiety about sepsis. The surgical catgut as sold by manufacturers could not be trusted. It was not until the London Hospital sold catgut on a commercial scale about 1912 that surgeons in general felt safe to use it. More than 16 years elapsed before catgut was adopted in place of silk or thread as suture material.

When Clifford Morson was resident at St Peter's Hospital for genito-urinary diseases in 1910 he had to spend much time struggling with forceps to remove silk from loin sinuses following nephrectomy. The complete healing of such wounds would be held up for many weeks due to the presence of the silk.

It is a matter of historical interest, as stated in the letter to T D Morson dated August 20, 1907, and quoted above, that as long ago as 1894 Lister had produced a sterile surgical catgut. It would seem that manufacturers had failed 'in various important though simple details', to quote Lord Lister, to prepare catgut according to his formula.

Two things stand out in Clifford Morson's memory of the interview with Lord Lister. First, this great man's humility and, secondly, his remarkable knowledge, though a surgeon, of chemistry. He discussed on equal terms with T D Morson, an expert in the subject, the actions of many chemical substances.

Another interesting document found among the Lister papers of the Morson family refers to links between Lister and the Martindale firm of manufacturing chemists. This is an extract from a letter to the *Pharmaceutical Journal and Pharmacist* dated May 28, 1927, from W H Martindale whose father, W Martindale, was intimately concerned with the manufacture of Lister's antiseptic dressings in the 1870s and 1880s. Indeed it seems probable that Martindale never received adequate reward for his efforts. The whole matter of finding the ideal antiseptic was a gradual process of

development. Lister tried many chemicals during this period of time before he finally adopted mercuruzinc cyanide. This chemical was suggested to him by W Martindale. The following quotation gives an interesting view of the rather crude manufacturing methods used in the preparation of absorbent wool swabs at this time as well as a good idea of how intimately Lister was involved with the whole process of production. It is one of Martindale's assistants who writes:

'You may recall the pound fleeces of wool more or less evenly coloured strung out to dry. You may imagine how anxious we felt when it was foggy, and perhaps you do not know how we got over the difficulty of getting the wool evenly coloured and with the exact quantity of medicament to the pound. We had no press to begin with and used two ointment jars, one fitting into the other, then the governor, James the porter, and young Umney stood on a plank while I watched the result, and when I got 16 oz. out, we left the other pound to dry off the wool, then we made up to 32 oz. fluid and started over again on the next pound of absorbent wool. Lister, it was I think, who suggested or insisted on the wool being coloured, and I think I may claim having thought of the method of getting an evenly coloured result. Till we did this, it was almost impossible to get the wool evenly impregnated. I got a bit hurt at the job, and used to say afterwards that Lister was due me a free operation for the pain I suffered and for the sore finger nails while wetting the wool with perchloride and alembroth.'

In these pioneer experiments James Hunter, a laboratory worker, poisoned his hands with mercury. They swelled up, and a loaf of bread was needed as a sop to take away the inflammation and remove the mercury. In Cockney fashion Hunter said: 'We used to work *with* Sir Joseph. Anything he wanted the Guv'nor used to do for him.' Amongst other occupations James Hunter was handed the task of making 30 or 40 lb (13-18 kg) a week of boric acid ointment, which was sent to King's College Hospital for Lister's use.

*Acknowledgment:* The Lister letters are published by kind permission of the President and Council of the Royal College of Surgeons of England.

#### DISCUSSION

**Mr Clifford Morson:** My son has told you all I know about Lord Lister. The family firm which carried out experiments for Lord Lister was founded by my great-grandfather T N R Morson. It was he who, after studying chemistry in Paris in 1820 and learning of the discovery by Pelletier and Caventou of the active constituent of cinchona bark, namely quinine, returned to London in 1821 and manufactured

it on a commercial scale. The bark had been previously brought to Europe from Peru by the Jesuits and was known as Jesuits' powder.

T N R Morson was also an authority on the manufacture of morphia from opium. He told my father that he himself always went down to the docks to purchase the cakes of opium brought in ships from China. He said where opium was concerned you could not trust a Chinaman and before buying the cake he thrust a knife into it to make sure the interior did not consist of wood.

The following paper was also read:  
**The Signature Book of the Royal  
 Medico-Botanical Society of London**  
 Dr Richard Hunter and Dr Ida Macalpine  
 (London)

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*Meeting April 7 1971  
 with the Society of Apothecaries*

## Papers [*Abstracts*]

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### A Short History of Spectacles

by G T Willoughby Cashell FRCS  
 (Reading, Berkshire)

Possibly as long ago as 5000 BC, before lenses were made of glass, pebbles or semi-precious transparent stones were used as reading aids. In 1500 BC the Egyptians manufactured glass but there is no evidence that they made lenses. Pebbles dating from about 609 BC which were found in the ruins of Nineveh could have been used as magnifiers.

In AD 54 Pliny records Nero wearing a lens of beryl or emerald attached to a thumb ring. Ptolemy in AD 150 described the path of light rays through lenses and in AD 1000 the Arab, Alhazen, described magnification through the segment of a sphere.

By the eleventh century the reading stone was thinner and was held in front of the eye as a reading glass. A rough frame and handle were fitted at the end of the century. In 1270 Marco Polo recorded the use in China of convex lenses by the elderly for reading small print. Roger Bacon, a Franciscan Friar of Oxford (often quoted as 'the father of Western optics') in 1268 also recorded the magnification of letters through glass or other transparent substances. Spectacles to fit the nose were cumbersome and

probably first made in Italy. They were made by riveting two reading glasses together. They may have been invented by Salvino d'Armato; his epitaph, in Florence, reads: 'Here lies Salvino d'Armato, the inventor of spectacles. May God pardon him his sins.'

Some early fourteenth century relics including spectacles of the bridge or nose type in wooden frames were found in 1953 under the chapel floor of the Wienhausen Convent, Lower Saxony.

With the approach of the fifteenth century the invention of printing increased the demand for spectacles and inventories made after the death of famous persons and royal accounts indicate that the craft of spectacle-making existed.

Up to the sixteenth century spectacles were usually held in the hand. Then various devices such as the spring bow were used for a better means of support. In 1535 the Nuremberg Guild of Spectacle Makers was formed, followed in 1581 by the French Guild. Other methods of fitting such as nose grips, cap spectacles, strap spectacles to tie round the head – still used today for infants – and string spectacles to loop round the ears were used. The power of the lenses was classified by the wearer's age.

In 1629 our own Spectacle Makers Company was granted its charter by Charles I. There is an interesting record that Samuel Pepys used green glasses to protect his eyes from the light.

In 1730 the first mention of side pieces occurs in a catalogue of Edward Scarlett, optician to His Majesty King George II. The side pieces were short, not reaching as far as the ears, but were held by gentle pressure on the temples. The monocle became fashionable about this time.

The discomfort of wearing spectacles was always apparent. In the early days the nose bore the brunt – now it was the temples. In 1752 James Ayscough produced double-length side pieces with a parietal grip which rested lightly on the skull.

In 1784 Benjamin Franklin introduced bifocals – having his glasses cut and half of each kind, distance and reading associated in the same circle enabling him to see distinctly 'far and near'.

During the Regency very beautiful quizzers were made. Occipital spectacles became popular, with fine workmanship and joints, some with sliding extending sides. Unusual shapes were used made in frames of different substances – brass, silver, tortoiseshell, &c. In 1827 the Astronomer Royal, Robert Airy, and a little later Donders and Bowman with their work on refraction, did much to put the prescribing of spectacles on a firm basis. Folding spectacles and the pince-nez became popular about 1900.

Looking back, in the early days it was the presbyope who required a simple convex lens for