

THE MATERIA MEDICA OF THE NINETEENTH CENTURYWilliam E. Court

As the 19th century dawned, the practice of medicine was still dominated by the Humoralistic-Galenic tradition, a philosophy dependent of the trinity of venesection, emetics and cathartics to cleanse the body functions.

The range of drugs available had widened to include vegetable drugs from the New World and the more toxic chemical emetics and purgatives such as antimonials and calomel (mercurous chloride).

Medicine of the time is arguably well summarised in the typical medical stores list suggested for ships of the Royal Navy by Sir Gilbert Blane, FRS (1749-1834) and reported by Turnbull in his book Naval Surgeon (1806). Naval drugs were issued by the monopoly suppliers, the Apothecaries Hall, between 1703 and 1805. The list was discussed in detail by Court (1987). The drugs cited comprise a combination of purgatives, emetics, carminatives, stimulants, diuretics, analgesics, etc. used at that time. Although not specific cures, these drugs, in skilled hands, could alleviate suffering and encourage healing.

That the old humoral tradition still operated in 1800 was confirmed by the continued belief that it was dangerous to treat haemorrhoids, fever, gout and certain skin diseases because released corrupting humours would attack internal organs. Treatment under the Humoralism of the Eclectics frequently comprised blood-letting, cathartics and emetics together with baths, opium and bark. Bark, cinchona, was not recognised as a specific antimalarial although widely used for all fevers.

Hufeland's observation (1800) that each curative measure is an artificial disease indicated that the concept of curative diseases such as fevers, haemorrhages and eczemas, an idea from the writings of the Hippocratic

school, Galen, Boerhaave and Hahnemann, still influenced some practitioners.

Nevertheless, changes were afoot. In continental Europe the sceptics were questioning the humoral theory. Although not opposing drug therapy, they required nondogmatic investigation which, they hoped, would reduce the number of drugs in use. Therapeutic scepticism was considered as a logical development of the early Hippocratic teaching that employed and supported the healing, restorative power of nature. In theory, therapeutic scepticism was empirical; in practice, old customs and habits were not entirely forgotten. As late as 1857 J.H. Bennett in Edinburgh was still fighting, fortunately successfully, against the practice of blood-letting already debilitated patients, yet Baumgartner in Freiburg 5 years later still regarded the 5 pillars of therapeutics as blood-letting, emetics, purgatives, opium and quinine.

Although the so-called 'rational' therapeutics, such as 'Brownism' or 'Brunonianism' (John Brown, 'Elementa', 1780) and Hahnemann's homeopathy, swept across Europe, and especially Germany, Britain was little affected and continued with its traditional polypharmacy. The pharmaceutical apothecaries still pursued their traditional counter-prescribing, virtually acting as general practitioners of medicine until restricted by the Apothecaries Act, 1815, which officially denied them the right to diagnose their clients' complaints and, in effect, separated pharmacy and medicine.

Typical prescriptions of the time included the following examples:-

Compound infusion of gentian	℥ xij
Compound infusion of senna	℥ vj
Compound tincture of cardamom	℥ ij
Mix.	Dose:- ℥ i - ℥ ii

London Pharmacopoeia, 1836.

This mixture comprised the bitter tonic gentian, the laxative senna and, as carminative and flavouring, a tincture of cardamom, ginger, cinnamon, caraway and cochineal. It was a popular, tonic medicine.

Mist. Cathartica

Black Draught.

Sulphate of magnesia	℥vj
Spirit of sal volatile	℥vj
Tincture of senna	℥iii
Infusion of senna	℥xviiij
Extract of liquorice	℥vj
Oil of clove	gtt vj

Dose:- ℥iiss to ℥ij for adults.

Gray's Supplement, 1848.

In this cathartic mixture senna and magnesium sulphate were the purgative agents, spirit of sal volatile was antispasmodic and stimulant, oil of clove offset the griping action and liquorice extract masked the unpleasant taste, particularly of the magnesium sulphate.

Digitalis leaf, dried	6 grains
Squill, recently dried	12 grains
Mercury Pill (mass)	36 grains
Let 12 pills be made.	Dose:- 5 - 10 grains

St. George's Hospital Pharmacopoeia, 1841.

Digitalis was recognised as a cardiac and circulatory stimulant increasing the strength and efficiency of cardiac contractions, lowering the pulse rate and improving diuresis. Squill acted similarly and mercury augmented the diuresis and was purgative. The result was an empirically successful medicine.

The sceptics, the first true medical empiricists, did not seek causal knowledge of disease, regarding such information as unnecessary, although insisting on clinically controlled experiments for the nondogmatic examination of traditional drugs and healing practices. In France, F. Magendie, a sceptic clinician, turned to scientific investigation, laying the foundations of experimental physiology, pathology and pharmacology. Although sceptics usually opposed excessive drug therapy, Magendie's 'physiologism' supported the use of chemically pure drugs and opposed the old idea that drugs and poisons had fundamentally different effects in man and animals.

Magendie's group exploited the excellent chemical discoveries of, in particular, the French pharmacists, who had isolated the nitrogenous plant substances that Meissner called alkaloids. Morphine (Serturner, 1816) and codeine (Robiquet, 1832) had, by 1855, usually supplanted opium and laudanum, subcutaneous injection being used although oral opium was preferred for the treatment of diarrhoeas.

S.E. Asian nux vomica seeds yielded the bitter, stimulant but very toxic alkaloid strychnine (Pelletier and Caventou, 1818). Although the first alkaloid used in medicine (Magendie, 1821), strychnine is seldom used today.

Cinchona barks from South America were used in Europe from 1632. Known as 'Peruvian bark' or 'Jesuit's bark', cinchona was widely used for all types of fevers. The apothecaries, who worried little about noncompliance with the theory of humours, were great users of cinchona bark. Huxham's Tincture, Compound Tincture of Cinchona, included bitter orange peel, serpentary, cochineal and saffron and appeared in the Pharmacopoeia Londonensis, 1788. Quinine was isolated by Pelletier and Caventou in 1820 but its value in malarial fevers and its side-effects e.g. tinnitus, deafness were not appreciated until the end of the century.

The nightshade alkaloids were isolated early in the 19th century. Atropine ((±)-hyoscyamine) was discovered in 1831 (Mein) and was established as a mydriatic by 1850. (-)-hyoscyamine was isolated from

henbane by Geiger and Hesse (1831). The sedative effect of these alkaloids was soon realised, confirming the long-known sedative 'narcotic' effect of henbane.

Coffee and tea were found to yield caffeine (Robiquet, 1821) and theobromine (Woskressensky, 1840); these purine bases were considered valuable heart tonics and diuretics for dropsy (Squire, 1899).

On investigation, ipecacuanha yielded an alkaloid with some emetic action and it was named emetine (Magendie and Pelletier, 1817). The strongly emetic cephaeline was not found until 1894 (Paul and Cownley). Squire (1899) did not refer to emetine as an antidysenteric and the antidysentery preparation emetine and bismuth iodide did not appear until the British Pharmaceutical Codex, 1923 was published.

The discovery of alkaloids prompted the establishment of the pharmaceutical industry. Leaders were the German pharmacists Merck (1826) and Schering (1855) and the French pharmacist Nestlé (1865). Howards of Enfield were producing quinine in England by 1823. During the 19th century British firms such as T. and H. Smith Ltd., Edinburgh and May and Baker Ltd., Dagenham developed the production of pharmaceutical chemicals, others such as Allen and Hanbury Ltd., and Stafford, Allen and Sons, Ltd., manufactured good galenical products, and there was also a thriving trade in proprietary medicines e.g. Beechams, Carters, Boots, etc.

Slowly the practice of medicine moved forward and experimental methods in physiology and pharmacology gradually developed but the greatest changes occurred in the science of chemistry.

Wöhler's synthesis of urea in Berlin in 1828 initiated the chemical imitation of natural compounds. Coniine, the anodyne active principle from hemlock, was the first alkaloid synthesised (Ladenburg, 1886).

Thorpe in 'Essays in Historical Chemistry' (1894) observed 'The advance in every section of chemistry during this century has literally been by leaps and bounds. No branch has been more fruitful in result, in

suggestion, or in possibility, than that of organic analysis (i.e. synthesis)'.¹

Such developments really bore fruit in the following century but the chemical anaesthetics ether, nitrous oxide and chloroform were in use by 1850 and isolated cocaine was employed in dental ophthalmic surgery by 1844 although the synthetic congeners belong to the next century.

Synthetic antipyretics were in use late in the 19th century. Kolbe's synthetic salicylic acid (1859) was commercially available by 1874 at a much lower price than its natural counterpart from willow bark or oil of wintergreen. Sodium salicylate, being water soluble, was usually used as an antipyretic. Other synthetic antipyretics introduced were antipyrine (phenazone) (1884), antifebrin (acetanilide) (1887), phenacetin (1887) and aspirin (1893).

In suggesting that salicylic acid broke down to yield phenol and carbon dioxide and so produced an antiputrefactive effect, Kolbe was establishing a logical explanation for a specific drug action and thereby setting the scene for modern medicinal chemistry.

Toward the end of the century chloral hydrate (1869) was used as a hypnotic although paraldehyde (1884) was quicker acting and sulphonal (1886) slow acting.

Despite new drugs, treatments remained primarily symptomatic. Pharmacology developed slowly in Paris, Dorpat and Edinburgh and the combination of organic chemicals, pharmacological activity, pharmaceutical formulation and knowledge of disease mechanisms produced its dramatic results post-1930.

But what of everyday medicine? A few prescriptions tell their own story.

Ext. glycyrrh. liq.		℥ iij
Tr. camph. co.		℥ vj
Tr. opii		℥ vj
Oxymel scillae		℥ xvj
Syr. marrubii		℥ viij
Ol. anisi		℥ ss
Aq. dest.	ad	℥ xl

(1889).

This cough mixture included the demulcent, expectorant liquorice, expectorant squill, mildly expectorant camphor, the antispasmodic, analgesic and diaphoretic opium and horehound, a soothing agent for catarrhal states. Although empirically derived, it was effective in the alleviation of a normally self-limiting condition.

Potass. brom.		℥ iss
Tinct. hyoscyami		℥ iij
Spt. ammon. aromat.		℥ iij
Aquae chloroformi	ad	℥ vj

M. ft. m. A sixth part to be taken every two hours.
(1892).

This recommended migraine mixture comprised sedative potassium bromide, sedative and antispasmodic hyoscyamus and the sal volatile offered some vasoconstriction and stimulation of the respiration.

Fol. stramon.	℥ ij
Fruct. anisi	℥ j
Potass. nitrat.	℥ j

M. ft. pulvis

(1892).

For this asthma preparation the stramonium or thornapple leaves released nightshade alkaloids that relieved spasm of the bronchioles, the carminative anise provided aroma and potassium nitrate facilitated the combustion process that delivered the alkaloids to the site of action. This was another example of empirical success.

Perusal of many such available prescriptions suggests that a sound empirical basis had produced many effective formulations. By the end of the century, isolated active principles e.g. atropine, morphine, were more frequently in use being purer and more reliable.

Scientific medicine was in its infancy but the British Pharmacopoeias of 1867, 1885 and 1898 reveal a trend carried on in 1914 and 1932, the dominant vegetable drugs declining in importance as synthetic chemicals and isolated principles e.g. alkaloids, vitamins, enzymes, etc. increased in number.

Formulations also changed. Infusions, decoctions and waters were superseded by the more concentrated stabler tinctures, extracts, solutions and syrups, valuable components of the ubiquitous liquid medicines. New ideas such as lamellae, injections and compressed tablets were developed but the demise of the pill and the lozenge and the exploitation of new dose forms occurred after 1940.

Perhaps the 19th century is best regarded as a period when good, sound, empirical medicine held sway despite the adventurous experimenters and some poor practitioners, while the disciplines of pharmacology, pathology, chemical synthesis and analysis, and accurate and meaningful assay emerged in readiness for the post-1935 allopathic era, the era, it is claimed, of drugs of proven efficacy.

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