

For the PH. Eur. to continue to play its role as a reference in the definition of the quality of medicines, it is essential to supplement its monographs with a number of mechanisms by increasing the transparency of monographs either by giving the names of specific impurities in the monographs, if possible, especially for toxic impurities or by elaborating monographs that are as exhaustive as possible taking into account all the different methods of synthesis and procedures of preparation.

The introduction of a certification scheme of conformity of the quality of substances with regards to the Pharmacopoeia monographs is also under consideration.

But the European Pharmacopoeia not only satisfies the needs of the EC and the EFTA countries, which are all parties of the Convention, since its geographical application directly and indirectly goes far beyond these boundaries.

The Convention is open to all European countries and it may be expected that the European Pharmacopoeia will become a real Pan-European Pharmacopoeia which already is and will continue to be the guarantee of European quality for medicines *Made in Europe*.

Correspondence should be addressed to P. J. Schorn, Commission Européenne de Pharmacopée, B.P. 431 R 6, F67006 Strasbourg Cedex.

THE ITALIAN PHARMACOPOEIA FROM 1800 TO 1892

ENRICO CINGOLANI

Segretario Generale della Commissione Italiana di Farmacopea

While in the rest of Europe national entities were already consolidated with the creation of independent states, the Italian peninsular, at the beginning of the nineteenth century, was still divided in numerous states, each with its own autonomy: the kingdom of Sardinia, the kingdom of Lombardy -Venetia (as part of the Austria- Hungarian Empire), the Dukedom of Parma, the Dukedom of Modena, the Dukedom of Lucca, the great Dukedom of Tuscany, the Pontifical state, and the kingdom of the two Sicilies.

The most important states among these had their own official Pharmacopoeia, compiled, that is, by order of the authorities and recognised by the rulers and governors, and valid throughout the territory.

It was precisely these official compilations that served as a basis for the formation of the first unitary pharmacopoeia of the Italian kingdom, which however only came to light in the thirtieth year of the Italian kingdom.

In other European countries, which had long since reached or conquered unification, the first national pharmacopoeia, which substituted regional ones, had already been formed by the beginning of the eighteenth century.

The Danish Pharmacopoeia is of 1772, the Rossica Pharmacopoeia is of 1782; in France, the *Codex medicamentorum* became national in 1818, substituting many local Pharmacopoeia.

In Switzerland, in 1855, the Swiss Pharmacists society published a Helvetic Pharmacopoeia, which was adopted in nearly all the cantons and was made obligatory in July 1894 and came in

the footsteps of the previous Helvetic Pharmacopoeia, published in Basel in 1771 (preceded, it seems, by the *Pharmacopoea Helveticorum* of 1677).

In Austria, after the *Pharmacopoeia Augustana* which, in its successive elaborations and editions, became official throughout the Empire, the *Dispensatorium Austriaco-Viennese*, was published in 1769. This led to the *Pharmacopoea Austriaco-provincialis*, which was printed in Latin, in Milan in 1794 and used in the Lombardy Venetian kingdom.

In England, after the *Medical Act* of 1858, the unification of the London and Edinburgh Pharmacopoeia brought into being the *British Pharmacopoeia*.

In Germany, the *Pharmacopoea Germanica*, which derived from numerous local pharmacopoea, was published, in Latin in 1872, followed in 1890, by an edition in German with the title *Arzneibuch für das Deutsche Reich*.

In 1820 the pharmacopoeia of the United States is published, in 1862 the Romanian and Belgian Pharmacopoeia, in 1871 the Hungarian one, and in 1886 the Japanese and Dutch ones.

Even if the official Italian pharmacopoeia is the youngest among European ones, its historical evolution is of great importance, because it is the result of the work of unification of the divers official Pharmacopoeia existing at that time in Italy, of which the most important were:

- the *Farmacopea degli Stati Estensi* del 1839,
- the *Ricettario Farmaceutico Napolitano* del 1845,
- the *Farmacopea per gli Stati Sardi* del 1853,
- the *Codice Farmaceutico per gli Stati Parmensi* del 1858,
- the *Codice Farmaceutico Romano* del 1868.

Naturally, other pharmacopoeia were still available, but were, after the modification to the Italian political state, no longer official. Such examples as the *Antidotario Milanese* of 1729 and the *Codice Farmaceutico Veneto* of 1790 which in Lombardo-Veneto, were substituted by the *Pharmacopoea austriaco-pro-*

vincialis, the *Ricettario Sanese* of 1795, the *Antidotario Bolognese* of 1800 and also the *Ricettario Fiorentino* of 1789, which was the first Italian Pharmacopoeia to reform the criteria which had been at the basis of the previous Pharmacopoeia. At last the new systems introduced in chemistry, and in particular the new nomenclature, were considered. These were already widely employed in the pharmacopoeia of other foreign states and in Italy were taken up in the private works and treatises especially by pharmacy and chemistry professors such as in the *Farmacopea Ferrarese* by A. Campana, the *Farmacopea generale ad uso degli speciali e dei medici moderni* by L. V. Brugnatelli, the *Pharmacologia teorica e pratica (Farmacopea Italiana)* by G. Orosi, the *Farmacopea di A. Ferrarini*, the *Farmacopea nazionale e generale* by G. Ruata.

In southern Italy, especially in Sicily, as well as the *Antidotario Napoletano*, the Italian translation of both the French Codex as *Codice Farmaceutico ovvero Farmacopea francese* (Palermo 1819) and the London Pharmacopoeia (*Farmacopea Londinese*, Palermo 1815) led to the diffusion of these works.

Pharmacopoeia for the Estensi States (1839)

At the beginning of the nineteenth century the Duke of Ferrara, Francesco IV of Austria-Este, founded a commission to compile a general Pharmacopoeia for his state and to create indicative tariffs for the price of medicines. Some years later a second commission followed composed of four professors from the University of Modena.

The commission's work lasted a long time, but on the 7 Novembre 1839 the State's *Ministro di Pubblica Economia ed Istruzione* approved the *Farmacopea degli Stati Estensi* as well as the relating tariffs which came into vigour on 1st January 1840.

The 38 page long preface provides a key to the comprehension of the text, together with the reasons for which this Pharmacopoeia, is different, in part from the others. This preface

should today be considered the most important part of the work, because it shows how the curators applied the new nomenclature in chemistry and the new terminology in Latin and Italian with rigour.

Even though the authors recognised the importance of the new chemical terminology, they feared that, it being a novelty, it could in time undergo important modifications. They were concerned, therefore, about both doctors, imbued in the traditional nomenclature, and pharmacists, and the risk that incomprehension could engender mistakes and confusion. So, while simple compounds and products of fixed composition were designated, if vegetable, with the Linnean name and, if not vegetable, with French or Berzeliann synonyms, with some minor modifications, those of undetermined composition, are still listed with the officinal denomination.

Although the authors tried to respect tradition, they excluded every product which had an uncertain or unreliable action avoiding the risk that doctors might prescribe inefficacious remedies, or damaging ones if taken at high doses. Among the factors responsible for unreliability, ways of conservation and methods of preparation are considered.

As a matter of fact, the old tried methods of preparation, sometimes erroneous, were preferred to the new procedures, because the traditionally prepared compounds had a demonstrated efficacy. Chemists, it was stated, who modified the methods of preparation, often altered, or destroyed the beneficial properties of the medicine. The authors cite the case of virose extracts, originally prepared according to Storck's method, which are inactive if prepared according to the modified methods of Parmentier or Mirabelli, with Certosin powder, or zinc flowers (*flores zinci*) or flowers of benzoin (*flores benzoini*) or benzoic acid, which are active if prepared with dry methods (oxides) but which are not so if prepared with the wet method (hydrates). Isomers are discussed at length, with the correct affirmation, and anticipating what has now been demonstrated that two bodies, obtained with different methods, despite a quan-

titative and qualitative equality after chemical analysis, don't always have the same chemical and physical properties; the example is given of two tin oxides obtained through precipitation, one from chlorine, which is soluble in nitric acid, and the other from nitrate, which is insoluble. From this, they conclude that two isomeric medicines under examination, are not always necessarily isoatrogenic, or in possession of the same therapeutic properties.

These anticipations of what has now been demonstrated concluded that pharmacological and clinical experience be applied to products obtained with very defined methods, and that whenever these methods are changed, not only will the chemical identity have to be demonstrated, but also the clinical and biopharmaceutical ones.

The other important innovation, that differentiates this pharmacopoeia from the others, is the description of the posology: the recommended doses are in fact divided according to the age of the patient.

The normal dosages refer to adults, who are those within an age range of between 40 and 50 years old. The dosages are reduced to two thirds or three quarters for individuals at the height of their youth (30 years) or at the beginning of their old age, and to a third or two quarters for youngsters (15 years) or for the weak and decrepid. The medical practitioner is also advised to reduce the dosage whenever signs of intolerance become manifest with the suggestion to test the dosage in order to prevent such phenomena.

Simple medications and compounds are listed in alphabetical order in two distinct parts. Simple medications are, for the most part, vegetable, and are described with their names in Italian and Latin, together with their common traditional synonyms and scientific names, according to the Linnean classification. After the description of the properties, the most common applications are described, the dosages and the administration.

Some animal compounds are also described, such as *cantarella* or *cantaride* (*cantharis*) from the powder of which one

can extract *cantaridina*, and *cocciniglia* or *coccinella*, which we also find in the Parmense, the *latte vaccino* (*lac vaccinus*), gastric juice (*succus gastricus*), vipers, etc.

Mineral and chemical compounds are also listed with their Italian and vulgar Latin names, together with their scientific names according to the French (F.) and Berzelian (B.) classifications. Thus, for example *borace* or *crisocolla Tinkal* (*chrysocolla*) is the sodium sub borate (F.) or sodium borate (B.), the *calce*, or *calcina*, is the calcium sub carbonate (F.) or calcium oxide (B.), the *cerusa* or *biacca* or *bianco di piombo* (B.) is the lead carbonate (F.), or leadish carbonate (B.), and so on.

When the elements are described their origin is mentioned, and how they are found in nature, and hence the monograph, even when it carries the headings of three elements, often refers to the compound most widely diffused; for example, it is said that *antinomio crudo* is a metal found in nature as an oxide, or hydrosulphate sulfur and the description refers to the latter; for *manganese* it says that it is a metal present in nature as an oxide, a carbonate, and a phosphate, and the monograph entitled *Manganese*, refers in reality to the oxide, as appears obvious from the Latin name (*oxidum manganesii*), from the vulgar synonym (*sapone de' vetraj*) and from the chemical name (manganese peroxide F. or superoxide of manganese B.). Under the heading *Mercury*, although it mentions that the element is found in its natural state as an amalgum, as sulfur and as chlorine, it is described as a metal in its natural state.

Among the simple medications, compounds prepared by others are not lacking, as for example *Lithargirium* or proto oxide of semi vitreal lead (F.) or leadish oxide (B.) which one obtains in factories cementing in fire minium or lead until the metal reaches a composition of seven percent in oxygen; red precipitate of mercury or mercury dioxide; minium or deutoxide of lead; green copper or bicopper acetate.

There is also a description of naphtha, which contains naftaline and which, like petroleum, is used for friction in cronic rheumatism and to reduce pains and aches produced by dental decay.

Compound medications are listed in alphabetical order. These are not simply officinal preparations, but also definitive chemical preparations, such as salts of alkaloids (morphine acetate etc.) or chemical compounds (acids oxides or salts etc.), which can be obtained easily from simple compounds in any laboratory, such as boric acid or boron, citric acid (from lemons), muriatic acid (hydrochloric acid) or sea salt spirit (*spiritus salis marini*), ossalic acid (from refined sugar), liquid chlorine (from sodium chloride) limestone chloride, bismuth (*magisterium bismuthi*) or sub bismuthic nitrate (from bismuth and nitric acid), or various purified salts such as marine salt and potassium nitrate which are obtained through recrystallization of blank salts, the *sal Glauberii* or sodium sulphate, which is obtained as a sub product in the preparation of muriatic acid etc.

The Galenic preparations are listed in this part.

Although this *Farmacopea*, which follows along the foot steps of the *Ricettario Fiorentino* of 1789, is innovative because it takes into account the new chemical wisdom of its age, it also includes, as indeed all of the other pharmacopoeia of the last century, many curious prescriptions and elements from ancient cultures. For example: aromatic acetate or of the four thieves (*acetum aromaticum vulgo quatuor latronum*), antiseptic anti pestilence, Frambose acetate (*acetum rubi idaei*), antiscorbutic, refresher; among the waters, distilled water, or hydrogen protoxide and many other vegetable waters, we find *aqua alluminosa Fallopii*, made up of alum, sublimated corrosive mercury, rose water and plantain, to which is ascribed the property of corrosive poison, used by surgeons to clean venereal ulcers, *aqua hysterica Quercetani* or hepatic water (*aqua epatica*), which is obtained from ferric sulfide and diluted sulfuric acid anti herpetic, sweetened teriache water (*aqua teriacale dulcificata*), which is a very simplified potion, the *acqua vulneraria*, composed of ten recently flowered summits; purgative biscuits (*crustuli purgantes*), fever flee bangles (*epicarpia pro tertiana*), containing an incense base, shiny soot, common salt, and oriental crocum; Goulard's poultice, with a grated bread base and water,

resolver; the *Diascordio* syrup (*Diascordium Fracastorii*), with only eleven components plus opium in Malaga wine, the antidote (*teriaca*) syrup with 23 components, the long life potion (*elisir ad longam vitam*), stomachic and purgative; aromatic poultice with calamus base, orange peel, mint, sage, Melissa, Hyssopum to be used with cold tumours on the parts affected by atony or risking necroses; *Manauschristi antihysterici*, sweets with carnation base, ginger, cinnamon, castor and nutmeg, to be used for hysteria tummy troubles, and flatulence etc; cinchona tree tooth-powder, vegetable coal Florentine Iris, dragon blood, oil of lark, egg yolk oil, louse oil, vermin oil, caustic stones, divine, infernal; Stomachic syrup with teriacic base; purified serum with bovine serum base; albumen and cream of tartar, which, added to water-cress becomes an anti scorbutic serum; Mother's unguent, which is a cream compound composed of lard, butter, yellow wax, olive oil and litharge for facilitating the supuration of tumours.

In the alphabetical index medications which absolutely every Pharmacy should not do without are marked with an asterisk. There follows a medication tariff table as well as a fee table for every single prescription; the prices for the substances which are not sold separately, but which are used for the preparation of galenic prescriptions are not included in these prices. These also include some natural products: (lemons, frogs, vipers and leeches) which have variable prices.

The Neapolitan Pharmacopoeia (1845)

This was compiled by the Collegio Farmaceutico Napoletano, following approval by the ministry of internal department and under the auspices of the *Commissione Protomedicale* and was published in Naples in 1845.

In the preface there is a request by the President of the Chief Physicians commission, Cavalier Franco Rosati to the Deaken of the Italian Pharmaceutical College Gaetano Angioni to take

responsibility for the second edition of the new prescriptions book. Among the various principles stated, one in particular is highlighted for compounds, and that is that there should be a sole method of preparation which, substantiated by experience is the best in order to obtain a uniform product, both in its composition and pharmacological action. The theoretical and academic aspects are left aside in order to put the emphasis on the medicinal properties of each substance and its appropriate dose.

The book opens with a list of the medicinal substances which every Pharmacy within the kingdom of the two Sicilies is required to possess. There follow the actual prescriptions which constitute the first part of the book.

For every compound we find an explanation of the preparation methods together with a description of its general and medicinal properties.

Among the many compounds cited we may mention aromatic vinegar, anti pestilent of the four thieves (*acetum quatuor latrorum*) made up of various drugs soaked in vinegar and used as an anaesthetic; Sydenham's liquid Laudano (*Laudenum liquidum Sydenhamii*), in which all the various components were soaked in wine, and not as we do today, in alcohol at 60°; crab eyes (*oculi cancerorum*), small calcareous concretions which are found in the ventricle membranes of river crab (*cancer astacus*), present in various European rivers, and used as an anti acid and absorbent.

Andromaco's Teriaca (*Teriaca di Andromaco*) is described, but the preparation procedure is not given, because this was done exclusively by the royal institute for the encouragement of Natural Sciences of the Kingdom, and the pharmacist was required to buy it, on the basis of two librae, if the pharmacy was located in the capital, or one libra, if it were in the province.

The second part deals with the price tariffs of medications which were sold in the kingdom of the two Sicilies.

The third part, divided under five headings, discusses the legislation concerning the operation of a pharmacy. Under the

first heading the composition, election and duties of the Neapolitan Pharmacy College are discussed. The second deals with the opening of a pharmacy: new pharmacies could only be opened with the permission of the Royal Chief Physicians Commission (*Regio Protomedicato del Regno*), which was given only if the new premises were beyond seventy foot steps from any nearby pharmacies; once the permit was obtained, the pharmacist had one month in which to open the new pharmacy, otherwise the permit expired. Furthermore, apprentice pharmacists could not open a new pharmacy near their tutor during the latter's lifetime.

Under the third heading, the sale of medications is discussed. Drug vendors (*Droghieri*) could not sell compound medications, but only drugs weighing less than one ounce. Pharmacists, on the other hand, were not allowed to prepare medications without a physician's prescription, and whoever disobeyed risked five years imprisonment; it was pointed out in conclusion that the prescription recipes and the tariffs had to be renewed every two years. Under the fourth heading, annual taxes for pharmacists, drug vendors and all other health workers are discussed (herbalists, unqualified health practitioners, doctors surgeons and extractors). Under the fifth heading pharmacists are obliged to give cheap, but effective, medicinal remedies to the poor. Furthermore a maximum fee was set above which the poor were no longer obliged to give recompense: twenty grains for those acutely ill, and ten grains for those with chronic illnesses. Further costs were at the pharmacist's own expense and for this only wealthy pharmacists were chosen for the dispensation of medicines to the poor, and those who did not abide by this regulation were subject to a fine, the proceeds of which went to charity.

This section concludes with a list of 18 articles concerning the operation of a pharmacy. The approval from the Ministry and the royal undersecretary of the Internal Affairs Department is printed on the last page of the book.

Pharmacopoeia for the Sardinian States (1853)

The pharmacopoeia for the Sardinian States was published in Turin in 1853. It is the last of the Sabaude Pharmacopoeia, published before the constitution of the Italian kingdom.

It is approved by Royal decree on the 1st June 1853. This edition substituted the earlier Torinese Pharmacopoeia of 1833, which was no longer very useful, having been outstripped by the scientific and medical evolution of the previous 20 years. The opportunity for the revision arose with the new law of 26 March 1850 concerning the new weights and measures, which imposed a change to the metric decimal system.

The *Consiglio Superiore della Sanità* del Regno Piemontese nominated a commission with the task of drawing up a new Pharmaceutical Code, to be updated with the latest scientific knowledge, and compiling a list of the safest and most effective medications in use, so that this could be an accurate and reliable guide to pharmacists for their preparation, and that there should be a complete uniformity in each pharmacy throughout the state. There were 7 members on the commission among whom Prof. Schiapparelli, president of the new Pharmaceutical Society of Torino. At the end of its work the *Consiglio Superiore della Sanità* passed a resolution on 18 May 1853 approving the new Code and submitting it to Royal approval. In the promulgation decree further details are highlighted: the obligation to possess a copy of the same decree, the prohibition to send prescriptions (recipies), if the doses for them are not written in letters, and this is valid for prescriptions written in either Italian or French.

As in all the other pharmacopoeia, compiled in the second half of the nineteenth century, in this one too, the denominations based on the new rules in chemistry are adopted, thereby aligning the work to the Berzelian scientific denomination.

All of the medications are therefore listed with their common Italian names, their Latin and French names and even their ancient and traditional ones, especially for compound or galenic medications.

At the beginning two conversion tables are provided between the *Piemontese* and *Genovese* medical weight systems with metric-decimal and vice versa, with values approximated to the centigramme, from which one sees that a piedmontese grain corresponded to 5 centigrams, a piedmontese dramma to 3.2 grams, a Genovese dramma to 3.3 grams, a piedmontese libra to 307.40 grams, a genovese libra to 316.75 gram etc.

The Pharmacopoeia is divided into two parts.

The first part shows in alphabetical order a nominative list of so called simple medications and preparations which are available commercially, without any other kind of information, (not even, when applicable, a chemical formula), beyond the denomination. They are indicated with their Italian name, followed by their synonyms, if they exist, including traditional ones, with their Latin and French names as well as their respective synonyms and traditional names. For example:

Acetato di Rame Basico, [Copper Acetate (Basic)], Green copper, *Subcetas cupri*, *Acétate basique de cuivre*, *Acétate de cuivre brut*, *Sous-acétate de cuivre*, *Verdet gris*;

Bitartrato di Potassa, [Potassium bitartrate] *Cremortartaro*, *tartaro depurato*, *Tartrato di potassa - Bitartras potassae s. potassicus - Crème de tartre*, *Subtartrate de potasse*, *Tartrate acide de potasse*; etc.

For vegetable drugs, alongside the three denominations (Italian, plus synonyms, Latin and French) the specific part of the plant utilised is specified; eg. *Fuco Crispo - Fucus Crispus - Carragaheen*, *Mousse d'Irlande* (the entire plant)) *Rhatany - Krameria trianda R. et P. et Krameria ixina L. - Rathania du Pérou*, *Ratanhia des Antilles* (the root).

Among the simple animals, in common with the other pharmacopoeia of the times we find, alongside cod liver oil (not mentioned in the other pharmacopoeia) millipedes or water slaters, the snail, crab eyes, and cuttlefish blood, the viper and the leech or *Hirudu*.

Among the minerals we find included antimony, bismuth, iron, phosphorous copper etc. and numerous salts.

There is a total of 298 plants, and 58 spices of vegetable origin, 28 of animal origin, and 63 of chemical origin.

The second part (*Medicamenti composti o Formulario*) lists in alphabetical order 622 galenic preparations, indicating their names in Italian, Latin and French, and their respective formula synonyms, where appropriate, and their methods of preparation.

Isolated alcaloids are very common: aconitine, atropine, asparagine, codeine, digitaline, morfine, nicotine, and santonin.

As in the other Pharmacopoeias of the same period, numerous mineral and organic salts are considered, which were in those days, prepared extemporaneously, like the acetates (of ammonia, chinine, morphine, zinc and sodium carbonate etc); the acids (among which we find for the first time in the *F. Sabaude* lactic acid, tannic acid and valeric acid) hydrochlorides, chlorates, chlorides, iodides sulphurs and tartrates etc.

For these salts only one method of preparation is illustrated, even for those in which more than one way has been proposed, which reminds the pharmacist that he cannot substitute a product obtained with one method, with another produced with a different method, and so, for example, vaporous calomel with the precipitated one.

Every monograph gives useful guidelines for the conservation of preparations, for example: *this medication is impaired easily and should be prepared in small quantities*.

Chemical compounds, for their number and variety, are those which leave a characteristic mark in this Pharmacopoeia: ethyl chloride, the cyanides, the chlorides, sulfuric ether, iodines, sulfates, tartrates, urea (extracted from urine) etc.

The galenic preparations, that is the formulations, described in this part are for the most part those of traditional ancient practice. Among these many are common to the other pharmacopoeia, even if they differ in a slight way in their composition and preparation method. Some examples mentioned are, *acqua di scordio composta* (water germander) or *acqua teriacale* which differs greatly from the *acqua teriacale* of the *F. estense*;

the *acqua stitica clementina*; the *alcolato carminativo del Silvio*, made up of 18 components, dissolved in white wine *ottimo* and alcohol, *alcolato del Fioravanti*, *alcolato the vulnerario*, as examples of complex mixtures, formed through the soaking of 15 - 20 ingredients; the last one, the *vulnerario*, corresponds to the *acqua vulneraria* of the *F. estense*, but contains in addition, angelica, basil, calamo, fennel, organ, savory, wild thyme, thyme and does not contain camomile; the *Birra antiscorbutica* or *Coke beer*, the broths (of snail, frog, viper and turtle); the aromatic confections (with red coral, base crab eyes, deer horn and Armenian boles), Alchermes confection, which is very different from the *F. Estense*, the *Elettuario Diascordio*, the *Elettuario of Mitridate*, the *elettuario teriaca* (with 63 components, which is much more complex than the one reported in the *F. Estense*; the long life potion, with a *teriaca* base, but which differs from the *F. Estense* potion; bile extract and meat extract or *osmazone*, earthworm oil, Quercetano pills, and Granduke of Tuscany powder, Dower's powder, prepared, as in the *F. Estense*, with liquorish as an inert powder base, rather than lactose which differentiates them because instead of antimoniac potassium, it contains potassium nitrate and sulphate, aromatic spices, Diascordio's spices (*le spezie di Diascordio*), Iera's spices, and prepared sponges, sauces (of asparagis, chicory, peach flowers, etc.); pills (of catechu, titbits, lavender, rhubarb, for the throat etc.); dyes (alcohols and ethers wines and enols, water dyes like *tintura di Marte tartarizzata*, with an iron filing base and *cremor-tartaro*, the *tragemi* or *confetti* of arranged holy seed; *Noah's cream* (*l'unguento di Noè*), and mothers cream (*unguento della madre*).

Many of these preparations are inspired by an ancient cultural tradition, mainly Greek and Arab, and are in stark contrast with the renewing fervour of the times; their presence is a sign of the difficulties met in trying to eliminate completely these abundant remains of empiricism.

However alongside these are preparations which will continue to be used, such as the cod liver oil and castor oil emulsions,

ammonia and camphor lineaments, fern extract, made with a percolator, which is also used in the preparation of atropine from *bella donna*, creams *della bella donna* and of digitals.

Substances which should be locked in the cupboard are marked with an asterisk, and their sale is registered in a registry which includes substances such as certain acids cyanides and digitaline, arsenic liquor and Gardane (a solution of chlorine mercury and ammonia), etc.

Medications marked with a cross could not be sold or administered by pharmacists without the prescription from an authorised person of the art.

In the appendix, along with the aerometer tables of Baumé there are mineral water analysis (36) from the most accredited areas among the Sardinian states. These waters are described as powerful therapeutic aids and so the pharmacist, knowing their composition could prepare them artificially.

Included in the lists are the waters from Crodo, Perrière, Evian, etc. and for each one the province of origin and the characteristics are indicated, (eg. thermal saline, cold sulphurous, cold saline etc.).

With the new pharmacopoeia came also a new tariff, printed in both French and Italian, this too under Royal decree; herein 12 rules valid for the application of the tariffs at intermediate prices are illustrated. This tariff refers to the medications listed in the pharmacopoeia and the prices refer to 1000, 100, 10, 1, and 0.1 grams. There is also a handling tax, or rather a professional fee to be charged for the preparation: eg. for a plaster the pharmacist received from ten to fifty centimes, according to the type and quantity, for a decoction from 2 to 25 centimes, for a pill, from 2 to 45 centimes, for a lotion from 5 to 40 centimes.

This Pharmacopoeia, which opposes chemical pharmacy to the officinal pharmacy will become the principal model for the compilation of the first edition of the *Farmacopea del Regno d'Italia*.

Pharmaceutical code for the Parmensi states (1858)

After the editions of 1798 and 1822, the governor of the Parma's state asked the chief physicians (*Protomedicato*) with a decree of 1850 to map out a new Pharmaceutical Code.

A commission composed of scientists and pharmacists was constituted, and when their work was complete it was submitted for approval to the *Consiglio del Protomedicato*. The code was adopted with Ducal decree on 4 March 1858. In this code too, the rules of the modern nomenclature were adopted both for organic and inorganic compounds, making reference to the French one and the most recent texts.

Included next to the Italian name was its Latin one, and an absolute novelty, the chemical formula taken from the doctrine of the equivalents, as they were given by the most illustrious *Maestri* of the times. The formulas are still a little crude, (eg. CaS5 for Calcium pentasulphate, HO for water, KO, OH for potassium hydroxide, HS sulfuric acid, etc.). The new denominations therefore, substituted the old or vulgar ones, apart for a few sporadic cases, as for example mercury compounds. The new decimal weights and measures were also adopted, abolishing the old ones, which however are included for reference in conversion tables. Other tables show the density of liquids mentioned in the Codex, and Reamur degrees, which are compared with centigrade. The subject matter is divided rationally in three parts. The first part is made up of a list of simple herbs and mineral and organic compounds, which are used as such and serve for the preparation of medical compounds, listed in alphabetical order with their Italian names followed by their Latin ones.

This list is similar to the that which constitutes the first part of the *F. degli Stati Sardi* but it is more complete, because for the most important ones we find beside a brief description, also the distinctive physical or specific characteristics and ways of recognising the frequent adulterations. For some products the chemical formula is also provided as well as the dosage.

The second part shows the chemical medications divided into 9 chapters, which in turn are subdivided into sections, where, beside the description of the element, some simple preparations are given:

1) Undecomposed or simple bodies, which is divided into two sections: (a) metalloids; (b) metals.

2) Combinations between metals and metalloids: oxides, acid oxides, hydric acids eg. pure water or hydrogen protoxide, hydrates, oxides, acids (sulfuric SO² hydrosulfuric SO³. HO, diluted sulfuric acid, nitric acid, arsenic AsO⁵, chloridric HCl etc.), salts, many of which, such as black sulfur of mercury or Ethiopian mineral, mineral Kermes, golden sulphate of antimony and still many others are present in the *F. Estense* and in the Sardinian States.

3) Mineral salts: a) salts from alkaline and earth metals among which potassium chlorate KO, ChO⁵ diaforetic antimone which is an antimone of potassium anhydrous, potassium nitrate b) Salts from the oxides of manganese, of zinc, or iron and cadmium c) salts from zinc, silver bismuth oxide and mercury.

4) Organic acids and their combinations with mineral bases (salts): a) monobasic acids and their corresponding salts b) polybasic acids (tartaric, citric, lactic and succinic etc.) and their corresponding salts.

5) Alkaloids and their combinations with mineral acids and organic acids (salts): a) vegetable alchlynes (morphine, narcotine, chinine, caffeine, stricnine, atropine, veratrine) b) animal alchlynes (urea).

6) Neutral or indifferent organic substances and some of their derivates (derivates of cellulose, starch, mannite, sugar, and others such as santonine, cantaridine, etc.).

7) Alcohols and Ethers: a) ethyl alcohol (wine) and simple ethers b) compound ethers, c) derivates of methyl alcohol (chloroform and iodoform).

8) Pyrogenic products (creosote, volatile oil of deer horn, benzine etc.).

9) Artificial mineral waters (of seltz, Recoaro, etc.).

For all of these medications the preparation methods are provided, and where more than one procedure was common, the one which gave the purest product experimentally was chosen.

Many of these guidelines seem superfluous, especially when they refer to rarely used concoctions or ones which, because prepared on a prevalently industrial scale, will not ever be prepared in Pharmacies.

The third part lists medicines for which the chemical action was either still unknown or not present. These are the galenic or traditional medications, taken for the most part from the ancient Codex or from other formularies. These too are divided into 7 chapters which in turn are subdivided into sections:

1) Medications obtained from simple mechanical preparations or mixtures, such as simple powders or compounds (the *polvere dentifricia* is very simple and has a vegetable soot and cinchona bark extract base, while that of the *F. Estense* contains also Florentine iris and dragon blood, and that of the *F. Sarda* is much more complex, the *polvere di Dower* is very simplified because it is composed of only sugar, ipecacuanah and opium), pills or pilular masses, juices, etc.;

2) Medications obtained with the use of solvents: mucilages, emulsions, lemonades, dyes, wines, broths and decoctions;

3) Extracts of natural vegetable juices, produced by sifting and maceration, or by infusion; of animal liquids (bovine bile, osmazoma of meat extracts) etc.;

4) Hydrolytes, Mirolei and Alcoolati: distilled waters, volatile or Mirolei oils, alcoholic spirits among which an elixir antiscorbutic, a *balsamo del Fioravanti*.

5) Liquid *saccoroliti*, which are moist or dry: syrups, conserves and electuary, pastes tablets, and pills etc.;

6) Fat bodies and its compounds: oils, liniments, creams and ointments, soaps poultices and plasters;

7) Medications, usually prescriptions and other various ones: poultices, fomentations, gargles and eye drops, suppositories and other types, including a depilatory powder, the *acqua saturina*, and the *bagno arsenicale di Tessier*, etc.

In every section and for every pharmaceutical type a general preparation method is given. These are short succinct monographs in which preparation instructions for each single form or group of formulations belonging to the same class are given conservation instructions are also given: for example, about powders it says that, in general, powders are not prepared in large quantities, and they should be stored in closed jars. Green vegetable powders and salts alterable by contact with light should be kept in coloured bottles or black painted jars. For compound powders, as well as the above precepts one should follow these instructions

It is also pointed out, that whenever a doctor should not specify on his prescription a preparation method, the one in the Codex should be followed by the pharmacist.

Despite its modernity, we still find in this second part of the Code the *elettuario Diascordio*, the *elettuario triacale* or *teriacca*, which is very simplified and includes only 36 components (without vipers, parsley, *terra lemnia*, red roses etc.) the *spirito del Minderero*. We also find curiously enough, the *empiastro adesivo dell' ospedale di Piacenza* (adhesive plaster), the *Depilatorio di Martins*, which is a green blue mixture obtained by passing sulphuric acid through lime wash, the *Elisir del Giacomini* or *tintura di gomma gotta*, the *Polvere dentifricia* with a carbon vegetable base, similar to the *F. Estense* one, but different from the *F. Sarda*, the *Massa deostruente dell' ospedale di Parma* which is a mixture of ammonia resin, rhubarb powder, medicinal soap, potassium acetate and wormwood extract.

Codice Farmaceutico Romano (1868) and Formulario (1869)

The edition of the *Codice farmaceutico romano Teorico Pratico ad uso dei farmacisti, dei giovani studiosi e dei poveri infermi accolto negli spedali dello Stato Pontificio*, is of 1868-1869. Its compilation was ordered and approved by Pope Pius IX.

This Pharmacopoeia is a modern practical and theoretical manual, which because of its perfection was used alongside the *Farmacopea Torinese*, up until the publication of the first *Farmacopea Ufficiale del Regno d'Italia* (1892)

Because of its thoroughness (it has 803 pages another 115 dedicated to formulas and supplements), and its modernity, which characterised it and differentiated it from all the other pre-unification pharmacopoeia, perhaps it would have deserved more fortune, if it had been taken as a model for the *Farmacopea Ufficiale*.

The editors, aware of the vastness of their subject wrote that when this work was begun, it was held that it should be simply a limited pharmacopoeia: but with time it was decided to give it the title of Code.

The descriptive section is divided into two parts. In the first part (Pharmacology) simple medications, for the most part vegetable, are described in alphabetical order, showing for each their botanical and chemical-physical properties, their origins, a brief description of their use and action, and eventual incompatibility (eg. in the monograph on Ipericon (*Hypericum perforatum*) it warns that since this plant contains gallic acid it should not be administered with martial preparations (of iron or mercurial ones) possible falsifications, and warnings, mainly for their conservation.

The description of vegetable drugs are completed with illustrated tables, with drawings of each single plant. There are few simple animal or mineral preparations: starch, antimonium, cantharidin, castor, honey, fish-glue, spermaceti, and sugar; vegetable are however very numerous. Neither frogs nor vipers are to be found any more, although we still find cantarides and gastric juice etc.

In the second part (chemical - pharmaceutical) chemical compounds are listed, together with the latest scientific descriptions and preparation processes, with a lot of illustrations showing the equipment necessary, and with logical explanations of the reactions, of physical - chemical properties, and advice about

eventual purification, about incompatibility, about the reactions and use, together with dosage indications.

Next to the acids, alkali and alkaloids extracted from vegetable drugs, and the numerous organic and inorganic salts, many traditional preparations are still described, derived as they are, from consolidated medical practice.

In this section all of the fundamental chemical procedures are described, such as calcination, clarification, combustion, decantation, decolouration, dissolution, distillation, fermentation, maceration, trituration, porphyzation, reduction and evaporation. The corresponding equipment necessary is also described; aerometers, bain-marie, barometers, alcoholometers, lactometers, Florence flasks, polarimeters, thermometers, and each description is complete with illustrations.

As was the case in the *F. Parmense*, for every pharmaceutical form, an introductory monograph is provided, which is sometimes exhaustive. Furthermore, the most commonly used or recommended preparations are given. Although some ancient formulations are still found these are, most often, modified both in their composition, and in their effects. For example, under *elettuario diacatolicon* it says that this compound to which the ancients gave such a bombastic name, in effect that of a universal cure-all, is a laxative, and not only, it is also stomatic and aids the digestive organs.

Once again the *Elettuario Diacordio del Fracastoro* is described, which however is different, in its secondary components from that described in the other pharmacopoeia. Others included are the *Elettuario diatartaro del Castelli*, which, apart from *cremor di tartaro*, is prepared with different ingredients and preparation method, or the *elettuario lenitivo*, which is similar to the *F. Parmense*, but different from the *F. Sarda* or the *elettuario theriaca di Andromaco* the preparation of which is methodically described, and which again is different from that described in the other pharmacopoeia. However the *elettuario Mitridate* which is a type of potion of which the medical use is almost totally banished is no longer found.

There is an ample description of mineral waters or saline hydrolytes, with a complete description of their chemical compositions. The system chosen for weights and measures is the metric one, but the roman system is also provided, together with the relevant conversion tales.

Advice for pharmacists is also provided, with a month by month guide for the preparation and collection of ingredients to be made throughout the year. In January, for example, as in December and February, which are the cold months, it is advised to prepare alcohols, alcolytes, volatile acids and so forth; the trituration of aloe, opium and musk, resins etc. Operations, that is, where it is necessary to contain the vaporous molecules which by their very nature are vaporous. In April, May, June and July, when vegetable products are growing ripe, one will have to harvest, choosing the period in which each crop is at its ripest. In September one should prepare honey products because new honey will be available, while in October, it is advised that one prepares conserves, and fruit syrups in general.

To the doctor and surgeon advice is given on how to prescribe together with indications about the abbreviations used and their meanings. Emergency remedies are also described, among which we find haemostatic water, camphor, mannitol, liquid silver nitrate or *pietra infernale*.

There are 103 reagents listed and for each one the properties are described as well as their use and the reactions which they promote. There is a long description of poisons: how to recognize them, how to diagnose their effects, and how to counteract them.

A long chapter is dedicated to recognising medications together with a description of adulterations and falsifications and how to recognize such frauds. Included for every product in a chemical pharmaceutical table is the name, the symbol and the *formula*, the equivalents, the centesimal composition, the density and the solubility in water, in alcohol and ether.

Some curious hygienic operations are also mentioned, such as the disinfection of latrines.

Some of the volumes printed before 1869, have the *Formulario, ossia raccolta di ricette di accreditati Autori* as an appendix, which comprises preparations common in State hospitals, and copied from other texts, even though written under the author's name. They are generally traditional preparations which had fallen into disuse in traditional medicine such as the *elettuario Mitridate*. These are briefly described with particulars regarding their preparation, for although they are no longer official, they could still be requested. Among these which completed those listed in the Code, we find a balsam for chilblains (*balsamo contro i geloni del Lejeune*), aperitif beer, the 5 depilatories, the purification of water to make it drinkable, disinfection during periods of choleric influence the *opiato dentrifico col carbone* cosmetic powder for hands, Fontanella dust, Veschy powder, which is used to make artificial Veschy mineral water, Dupuytren's cream against baldness, the *Tisana di mezzereo* del Tompson etc. Their description is very simple and restricted to their preparation instructions. In a supplement to the formulary, various simple bodies are described, principally vegetable ones which are not included in the Code, and among which we find, garlic, wild prune, celery, guaranine, fennel, cedar, coca, erthioxylon; lycopodium (witch meal), poplar, polygola, paeony, wall rue, mullein, viper, and arsenical papers.

The *Codice Farmaceutico Romano* was, in short, a modern treatise, which does not cut a poor figure, alongside its contemporary University treatises and, in fact, is sometimes better. It was therefore useful not only to pharmacists and doctors, but also to students and, as is specified, to the sick themselves.

Correspondence should be addressed to E. Cingolani, Via Panvinio 16, 00162 Roma