Dossier: Materia medica and pharmacy.

From medicinal virtues to the active principles of plants

Marcia H. M. Ferraz[1]; Patricia Aceves[2]; Ana M. Alfonso-Goldfarb[1].

The simple drugs listed in works of materia medica and pharmacy were long considered unmixed materials directly originated in nature. At the same time, there was considerable interest in defining and identifying the elementary principles that originated such basic materials. Indeed, the extant sources indicate that the development of the notion of 'material principles' and the search for the origin of the substances included in the materia medica walked hand in hand, since the latter seemingly legitimated the former. In addition, those two aspects also found their way into the laboratory, being operative in the processes presently known as analysis and synthesis.

Along the 17th and a large part of the 18th century it was sought to identify the elementary principles of matter through chemical analysis, in parallel to a trend to enlarge the number of such principles or 'virtues' (a term then commonly applied to the ultimate principles that allegedly characterized matter). In time, some such principles, and more particularly the ones obtained from the organized kingdoms of nature became what today we know as 'active principles'.

According to many scholars the history of modern, essentially experimental, pharmacology started in the beginning of the 19th century together with the isolation of the first alkaloids. To be sure, the notion of alkaloid did not only induce a dramatic transformation within the scope of pharmacology, but represented a fundamental contribution to the development of organic chemistry and boosted the study of the active principles of drugs. Indeed, the history of the alkaloids, full of comings and goings, is a part of a larger picture in which the gradual isolation of active principles turned upside-down the very notion of simple drugs, with consequent implications for the materia medica.

The papers included in the present dossier were selected for a symposium held at the 24th International Congress of History of Science, Technology and Science (ICHSTM), Manchester, 2013. They deal with different aspects of the transition from the traditional notions of simple drugs and material principles to the modern idea of active principles,

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as reflected in the specialized literature, namely, works on materia media, pharmacy, pharmacopoeia, pharmacology and therapeutics. To preserve the spirit of the rich discussions they elicited in Manchester, we chose to present them in their original order.

The first paper, by Liliana Schifter and Patricia Aceves, focuses on the *National Medical Institute* (NMI), the most important Mexican institution at the turn of the 20th century devoted to the study of the national flora traditionally used in folk medicine. More in particularly, Schifter and Aceves analyze the work performed at NMI section of Chemical Analysis, which sought to characterize, isolate and determine the composition of pure active principles. The results of such work represented a tremendous contribution to publications on Mexican materia medica and pharmacology that were the most complete up to their time.

In turn, Vera C. Machline chose as object the search for a cure for scurvy in the 17th and 18th centuries. Thus she describes the ideas then common, mainly among Portuguese and Spanish doctors, on the nature and cause of scurvy, the theories that grounded the diagnosis of disease and the medications prescribed for its treatment. Within that context, Machline pays especial attention to a medicinal herb used in folk medicine known as '*mastruço*', which Portuguese doctors residing in Brazil acknowledged as having significant antiscorbutic properties.

The third paper, by Marcia H.M. Ferraz and Ana M. Alfonso-Goldfarb discusses the difficulties men of science and doctors met in their quest to isolate the medicinal principles of plants at the turn of the 19th century. For that purpose the authors had resource to works by respected French chemists, who suggested different approaches to chemical analysis in a way to preserve intact the substances allegedly able to heal diseases. Such substances, later on renamed 'active principles', gradually earned a place in the materia medica and pharmacopoeia.

Nevertheless, Silvia Waisse and Conrado M. Tarcitano Filho (*in memoriam*) show that far from agreement, different communities with distinct views began to emerge from mid-18th century onwards. While practicing doctors became increasingly mistrustful of the ability of chemical analysis to identify the active principles of plant drugs, botanists emphasized the morphological traits of plants grounding their natural classification, authors of materia medica proved to be rather ambivalent in this regard, chemists insisted on laboratory work, and pharmacists intermediated among these disparate groups.

Like the other papers in the present dossier, also the one by Vera Dorofeeva-Lichtmann deals with medicinal plants, but different from the others the point of departure is not provided by works on materia medica or pharmacopoeias. In her paper, Dorofeeva-Lichtmann criticizes the widely spread practice of looking for modern notions into ancient texts which leads, for instance, to associate a Chinese work from the

1st century BC, the *Shanhaijin* (Itineraries of mountains and seas) to modern works used by pharmacists or doctors. Contrariwise, she shows that the *Shanhaijin* should be approached as a whole, rather than by separating its cosmological, religious, political and topographical dimensions, among others.

Also the paper by Angelica Morales Sarabia and Mariana Ortiz is about the Mexican *National Medical Institute*, however, the focus in this case falls on the experimental procedures applied to the isolation of the active principles of medicinal plants. In particular, they chose two plants widely employed in Mexico as case study: peyote (*Lophophora williamsii* (Lem.) J.M. Coult) and white sapote (*Casimiroa edulis* La Llave & Lex.).

To conclude, the paper by Celia Cabral, Ana-Leonor Pereira and João Rui Pita analyzes the mentions to quina and one of its active principles, quinine, in the Portuguese specialized literature. The study begins by the use made of Peruvian bark in the 18th century to move on to the debates associated with the isolation of quinine in the 1800s and finishes by an analysis of 20th-century pharmacopoeias, which alternately included quina or quinine.

This dossier raises significant points relative to the development of the notion of 'active principles' of drugs, putting into question the traditional historiography that locates the seeds of modern pharmacology in the early decades of the 19th century.