

INTRODUCTION OF CHEMICAL PHARMACOLOGY AND THERAPEUTICS.\*

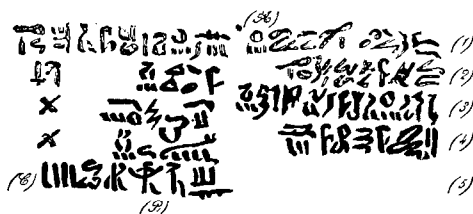
BY CHARLES WHITEBREAD.

ANTIQUITY OF CHEMISTRY.





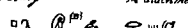

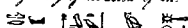

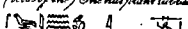
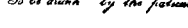
Among the writings of authors who have endeavored to establish the antiquity of chemistry we find many conclusions deduced from an ingenious interpretation of the mythological fables which are supposed to have been transmitted by the Egyptians, who, previous to the invention of letters, adopted this method of perpetuating their discoveries in natural philosophy. Thus, whenever Homer studiously describes the stolen embraces of Mars and Venus, they recognize some chemical secret, some combination of iron and copper, shadowed in the glowing ornaments of fiction. Lord Bacon conceived that the union of spirit and matter



The cut above with the ibis head is the Egyptian God of Wisdom. He is identified in Greek mythology as Hermes.



THE ABOVE TRANSLATED INTO THE HIEROGLYPHIC CHARACTER.

<p>                   Medicine for opening the bowels                    Milk                    Almond (?) Pulverized &amp; drachme                    Honey                    Food for out, eat for four days.             </p>	<p>                   Beginning of the Book of the Medicine                    To cure thickness of the bowels                    (seed of the) The half pint with half worth Vinegar                    To be drunk by the patient                    Food for out, eat for four days.             </p>	<p>(1) (2) (3) (4) (5) (6) (7) (8) (9)</p>
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Courtesy of U. S. National Museum.

Ancient Prescriptions.

Five lines from Papyrus Ebers, said to be the work of Hermes Trismegistus with translations into hieroglyphic characters and English.

was allegorized in the fable of Proserpine being seized by Pluto as she was gathering flowers; an allusion which others say is rendered more curiously exact because oxygen given out by plants is absorbed by man and animals. By the same authority we are led to believe that the fable of Jupiter and Juno, by whose union the Spring showers were said to be produced, was meant to portray the production of water by the combination of its two elements, an opinion which is strongly supported by the fact that, in ancient mythology, the purer air, or ether, was always represented by Jupiter, and the inferior by Juno.

As we review the works of those who have made the history of chemistry, medicine or pharmacy, the subject of intensive study, we find Hermes Trismegistus

\* Section on Historical Pharmacy, A. P. H. A. Miami meeting, 1931.

(thrice-great), who lived about the time of Moses, mentioned as the first chemist. Hermes, the Greek, however, seems to be the same character as Thoth, the Egyptian God of Wisdom, from whom all the arts and sciences emanated. Thoth, it will be remembered, is credited with being the author of the hermetic books which regulated the medical practice of the ancient Egyptians, and from which there could be no deviation. According to Berdoe, the *Papyrus Ebers*, one of the oldest works on medicine and said to date from 1550 B.C., is "one of the number of medical books of Hermes Trismegistus."

Historians agree that alchemy, the search for the means of transmuting base metals into gold and the discovery of an elixir to prolong life, was the beginning of chemistry; that the word chemistry was derived from *chemi* (Black Land), the ancient name of Egypt; that the "black art" was an early name for alchemy because it was practiced in the Black Land; and that the first authentic account of alchemy appears to be an edict of Diocletian about 300 A.D., in which a diligent search is ordered to be made for all the ancient books which treated of the art of making gold and silver in order that they might be destroyed.

It seems that the ancients were ignorant of the internal use and administration of the metals, with the exception of iron, although they frequently used them in external applications. Oribasius and Aetius added "lithargyrium" to several plasters. Whether antimony is the stimmi or stibium of the ancients is a matter of conjecture. However, this stibium was never used except as an external astringent, especially for the purpose of contracting the eyelids, and of thereby making the eyes appear very large, which has been considered from the most remote antiquity as a feature of great beauty. This practice appears also to have been followed by the Jews, for Jezabel (ii Kings, chapter ix, verse 30) is said to have painted her eyebrows to make the eyes appear big.

With whatever ingenuity and success the antiquity of chemical knowledge may be advocated, as it relates to the various arts of life, it must be admitted that not the most remote trace of its direct application to pharmacy can be discovered in the works of the medical writers of Greece and Rome. The process of distillation is not even mentioned by Hippocrates or Galen. The waters of different plants as described by later authors are to be understood, as we are informed by Gesner, merely as simple decoctions and not as the products of any chemical process; while the essences of Dioscorides, Galen and others, were only the extracts produced by the evaporation of infusions.

Upon the downfall of the Roman Empire, all the arts, the sciences and literature, were overwhelmed in the general wreck, and the early Mahommedans endeavored to destroy every record of the former progress of the human mind. It is not a little extraordinary that the same people were destined at a more advanced period to rekindle the light of letters which they had taken such pains to extinguish, and to become the inventors and cultivators of a new science, chemistry, boundless in its views and inexhaustible in its applications. The pharmaceutical profession was particularly selected as an object of reward and encouragement, and we may say that materia medica is more indebted to the zeal and industry of the Arabians than to the learning of the Greeks or to the refinement of the Romans. From this source we obtained manna, cassia, senna and rhubarb, and many plants and aromatics among which may be mentioned musk, nutmeg, mace and cloves.

We are also indebted to the Arabians for our knowledge of camphor. They are also the first upon record who speak of sugar, and sugar candy, extracted from the sugar cane, which they called honey of cane. They also ushered into practice syrups, juleps and conserves. It is well to remember, however, that they introduced many absurd medicines. Gold, silver, bezoars and precious stones were added to the *materia medica*, and extraordinary virtues were attributed to them.

It is not surprising that the Arabians' first researches into the nature of bodies should have raised a hope, and excited a belief, that the baser metals might be converted into gold. They conceived that gold was the metallic element in a state of perfect purity, and that all the others differed from it in proportion only to the extent of their individual contamination, and hence the origin of the epithet *base* as applied to such metals. This hypothesis explains the origin of alchemy, but we are always informed that the alchemists expected, by the same means that they hoped to convert the baser metals into gold, to produce a universal remedy calculated to prolong indefinitely the span of human existence.

The earliest alchemist whose name has reached posterity is Geber, said to have been an Arabian prince of the 7th century but concerning whose identity much doubt is now expressed, whose language was so proverbially unintelligible that one author supposes the word gibberish or geberish to have been derived from this circumstance. At that time the processes of alchemy were always veiled in the most enigmatic and obscure language, and sometimes were expressed by a figurative or metaphorical style of expression. For example, Geber exclaims, "Bring me the six lepers that I may cleanse them," and by which it is said he implied the conversion of the six metals (silver, mercury, copper, iron, tin and lead), the only ones then known, into gold.

From the works of later alchemists it also appears that they constantly represented gold as a sound, durable and healthy man; the imperfect metals as diseased men; and that the means or processes by which the latter were to be transmuted into the former, they designated by the name of medicines. Hence those who were anxious to delve into the secrets of these magicians or *adepts*, as they called themselves, with but meager knowledge of their language, supposed that these descriptions were to be understood in a literal sense, and the imperfect metals might be changed into gold, and the bodies of sick persons into healthy ones by one and the same chemical preparation.

Many years elapsed before the application of chemistry became instrumental in the advancement of pharmacy. Rhazes and Avicenna, celebrated Arabian physicians and pharmacists of the 10th and 11th centuries, were the first who introduced pharmaceutical preparations into their works, or made any improvement in the mode of conducting pharmaceutical processes. Rhazes taught the external use of arsenic, mercurial ointments and copper sulphate, and the internal use of brandy, niter and borax. Avicenna describes, particularly, the method of conducting distillation. He mentions, also, for the first time, three mineral acids, and distinguishes between vegetable and mineral alkalies, and he names distilled water of roses, sublimed arsenic and corrosive sublimate.

#### CHEMICAL PHARMACOLOGY AND THERAPEUTICS.

Early in the 13th century, Roger Bacon, a Franciscan monk, of Westminster

Abbey, one of the first to adopt Arabian methods and transplant them in the West, laid the foundation of chemical science in Europe. He made such prodigious chemical experiments at Oxford and Paris "that none could be convinced to the contrary but that he dealt with the devil." As the result of this he was excommunicated and imprisoned ten years. In his small treatise *De Mirabili Potestate Artis et Naturæ*—one of his 18 books on alchemy—he begins by pointing out the absurdity of believing in magic, necromancy, charms and similar notions which were then universally prevalent. He stated that many of the things which were then considered supernatural were merely so because mankind in general was unacquainted with natural philosophy. Wood, in his *History of the University of Oxford*, says that Roger Bacon was accounted the fourth in order of the chief chemists the world had ever produced. He gave Hermes Trismegistus first place and Geber second.

Bacon was succeeded at the end of the same century by Arnold de Villanova, a Frenchman, who was the first to recommend the distilled spirit of wine, impregnated with certain herbs, as a valuable remedy, from which we may date the introduction of tinctures, although Thaddæus, a Florentine, who died in 1270 at the age of eighty, highly commended the virtues of the spirit of wine yet he never used it as a solvent for active vegetable matter. Villanova played a great part in introducing chemical preparations into medicine. He is one of the few Latin alchemists whose extant writings are genuine. By the end of the 13th century chemistry had added considerable power to medicine and pharmacy.

Johann Thölde, who wrote as Basil Valentine, a German Benedictine monk, led the way to the internal administration of metallic medicine by a variety of experiments, about the middle of the 15th century, on the nature of antimony, and in his "*Currus Triumphalis Antimonii*" he described a number of combinations of that metal. It was said that he was extremely unfortunate in his first experiments upon his collaborators, many of whom he injured or killed. To Basil Valentine we are indebted for the discovery of the volatile alkali, and of its preparation from sal ammoniac. He also first used mineral acids as solvents, and noticed the production of ether from alcohol. He seems also to have understood the virtues of iron sulphate for he says, when internally administered, it is tonic and comforting to a weak stomach, and that externally applied it is astringent and styptic.

Paracelsus (1493–1541), or as he terms himself, Philippus Aureolus Theophrastus Bombastus Paracelsus de Hohenheim, of Switzerland, was the man destined to produce a greater revolution in medicine and pharmacy, and a more extensive change in medical and pharmaceutical opinions and practice, than any man who appeared since the days of Galen. He declared that antimony was not to be equalled for medicinal virtue by any other substance in nature. He used mercury without reserve, and appears to have been the first to administer it internally, for although Avicenna asserted that it was not so poisonous as the ancients had imagined, yet he did not attribute to it any virtues. His advocacy of numerous other mineral remedies gave impetus to the preparation of new medicines and considerably enlarged the scope of pharmacy. The professorship at Basel, which Paracelsus accepted in the year 1527, is said to have been the first established in Europe for the promotion and dissemination of chemical science. He taught that chemistry was to be employed, not in making gold, but for the preparation

of medicines, and he instructed physicians to give tinctures in place of the elaborate polypharmaceutical concoctions which were popular in his time. Paracelsus rendered important services to mankind when he opposed the bigotry of his day, and became the "founder of chemical pharmacology and therapeutics."

By the beginning of the 17th century a strong sentiment in favor of chemicals had been introduced, and the merited success which attended their use soon kindled a more general enthusiasm in their favor. Chemistry now took possession of the schools, and was gradually grafted into the theory and practice of medicine and pharmacy. We cannot but be struck by the tenacity with which chemicals retain their place in the pharmacopœias of the world, or by the new and powerful remedies which chemistry has introduced.

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Interior of the Denny Brann Pharmacy—Des Moines, Ia.

The prescription department may be seen through the openings; the exterior of this pharmacy is shown elsewhere in this issue. Physicians and other patrons have expressed appreciation of this venture and Mr. Brann is pleased with its success.