

- He changed chemistry's direction from transmitting things to gold to improving the health of men.

## PARACELSUS

The latter part of the 15th Century was a period of revolutionary changes. America had been discovered. Printing had been invented. Science was shaking off the shackles of tradition.

At the height of this period, in 1493, there was born in Switzerland a man who became a revolutionary leader in chemistry by changing its course from the vain pursuit of alchemy to a realistic search for new chemical compounds and to the investigation of their value in healing disease. He is known by the name which he gave himself, Paracelsus.

His family had christened him Theophrastus Bombastus. To many people, there was significance in that name, Bombastus. In the estimation of the professional class of his age and of some scholars even today, he was indeed nothing but the bombastic knave, a charlatan, an

egoist who saw himself supreme and who arrogantly derided the leaders in his profession as incompetent and ignorant.

The truth is somewhat different. By nature his spirit was a fighting one and he attempted, single-handed, a rebellion in two sciences, chemistry and medicine.

After finishing college, he spent several years in mining laboratories and in them he became proficient in the chemistry of his day. "Why are not chemical compounds of the metals used in medicine?" he wondered. At the age of 24 he decided to study medicine and find out if they could be used.

On returning to the universities, he was appalled to find that the training of a physician included no laboratory work whatever. Medical training was little more than a parrot-like me-

morizing of ancient, mystical writings.

His experience in chemical laboratories had formed the habit of experimentation and of free inquiry as the means of acquiring knowledge. He left the universities in disgust and resolved on an unconventional method of training, to travel and to pick up his medical education as he went.

"In all corners of the world," he wrote later, "I questioned people and sought for the true and experienced arts of medicine. Not alone with the doctors; but with barbers, surgeons, learned Physicians, women, magicians, alchemists; in the cloisters with the noble and the common, with the wise and the simple, I sought for a foundation of medicine which should be unspotted by fables and babble."

His travels carried him over the greater part of Europe. At the end of nine years, some of which had been spent as army surgeon and physician in the wars of the day the fame of his cures had become widely known. In 1526 he was appointed city physician of Ba-

sel in Switzerland and made professor at the University in a new department of Chemical Medicine. Its emphasis on chemistry as the important factor in the treatment of disease, represented the philosophy of medicine which Paracelsus wished to establish.

He saw in it an opportunity for his fighting spirit. Tall, stocky, he had the strongly molded head of a Cicero but the face of an Old Testament Prophet, a man of passionate convictions, with the sense of a mission. Appreciating the abyss that separated him from the physicians of the day, he decided upon an outright break with the accepted order. He denounced and derided the old school. His lectures were not in Latin, the accepted language of scholars, but in German, the language of the people. His appeal was to the younger generation.

He emphasized continuously the importance of chemistry. As he put it, "I praise the chemical physicians, for they do not consort with loafers or go about gorgeous in satin, silks and velvets,

gold rings on their fingers, white gloves on their hands, but they tend their work at the fire patiently day and night.

"They do not go promenading but seek their recreation in the laboratory, wear plain dress and aprons on which to wipe their hands; they thrust their fingers amongst the coals, into dirt and rubbish and not into golden rings. They are sooty and dirty and hence make little show, they do not gossip with their patients, they well know that words and chatter do not help the sick nor cure them. Therefore they busy themselves with working over their fires and learning the art of chemistry."

When violent opposition arose, he redoubled his attacks upon the older school in remarks that became more and more virulent. He showed his derision for the ancient books by burning one of them in a public bonfire.

Not satisfied with having one good fight on his hands, he undertook another. He sought authority to inspect the offices of the local apo-

thecaries, with the aim of improving the purity of their drugs and of reducing the price. The opposition which this excited, aroused another important element of privileged society against him.

His lectures continued for a year and a half and then were suddenly closed by an incident that had no direct connection with his teaching. This incident led him to attack another important element of society, the judiciary.

A wealthy citizen had long been troubled with a baffling disease. Fearing that it would prove fatal, he offered 100 gulden to Paracelsus to cure him. After a few treatments, the man recovered, so rapidly that he considered 100 gulden as altogether out of proportion to the medical treatment. With some derogatory remarks, he offered to settle for six gulden. Paracelsus was enraged and took the matter to the courts. The Judges, however, were as unimpressed as the patient with the value of the medicine used, just a few small pills, resembling nothing so much as sweepings from a pantry infested

with mice. At this, Paracelsus' sense of injustice burst out of bounds. He denounced the Judges in Court in such terms as to warrant charges of treason against him. Warned by his friends, he saw that the game was up. He left Basel that night and resumed the wanderings of this early years.

The remaining 13 years of his life found him continually unsettled, staying in no one place for long and encountering opposition from those in authority wherever he went. His one outstanding thought was to reduce to writing his revolutionary philosophy of the use of chemical compounds in the treatment of disease.

Of the many manuscripts that he wrote, however, few were allowed to be published because of the interference from universities. Occasionally his fortune was up but it was mostly down. Sometimes he would reside in a town for a year or so, sometimes he was feted at a public dinner as the guest of honor, but for the most part his life was one of wandering, and his only home the inn where travelers stay-

ed. It was in Salzburg at such an inn that he died in 1541 at the age of 48, an old man, sick and worn out, his adherents few, his aims seemingly unaccomplished.

He was not to perish, however, with the death of his body. Unknown to the world at large, his rebellious spirit was still sputtering, enclosed in his manuscripts. It was they which were destined to accomplish his revolution. It was indeed 20 years before any search for them was made. An official inquiry from Vienna brought some to light and their publication aroused a demand for others. Soon a complete edition of his books appeared.

Then began the second period of Paracelsus' life, with his books renewing the revolution. The pen proved to be mightier than the tongue. The number and repute of his adherents increased.

Many of his writings are surprisingly modern in their point of view; a treatise, for instance, on the occupational disease of miners, smelters and metallurgists, emphasizing means of prevention as

well as of cure; another on nervous diseases, insisting on physical cause rather than demon origin; another on surgery, opposing the practise of closing wounds with poultices and stressing the prevention of external infection.

It had been his insistence on the value of mineral remedies that aroused the strongest opposition. They included many salts of metals, largely mercury and antimony and also lead, arsenic, copper and iron. The human body is a combination of three properties, he maintained, and disease is due to the presence of a foreign parasite which disrupts the normal correlation between the three properties. The function of a medicine is to stimulate and strengthen the vital force within the body so that it may suffocate the parasite.

Such conceptions were a complete break with the theories of the old school, which he discarded as well as their practises of blood-letting and purging. It was in chemistry, however, that his real revolution was effected.

Chemistry as a science had fallen to low estate. Its main attention had been given to alchemy, in the vain aim of transmuting base metals into gold. "The object of chemistry," as Paracelsus put it, "is not to make gold but to prepare medicines."

New leaders in chemistry arose who devoted their lives to this study, the pursuit of medicines. It is their work which makes up the history of chemistry for 150 years after the death of Paracelsus. These leaders were physicians. In time, they found that chemistry is too broad a science to be simply the hand-maiden of medicine. Their interest was growing in the composition of compounds, in identifying the constituents of matter and in isolating the fundamental elements. They were experimenting so as to understand and explain the processes of combustion and of oxidation.

The outlook of Paracelsus, limited as it was, had invigorated mens' minds and directed them to modern science. — *General Electric Science Forum.*