

# The Revolutionary

"The physician's duty is to heal the sick, not to enrich the apothecary", wrote an angry young Swiss-German doctor in the early sixteenth century.' His name was Philippus Theophrastus Bombastus von Hohenheim (1493-1541), although he was more often known as Paracelsus. He was a child of the great revolutionary age that produced Calvin (1509-1564), Luther (1482-1546), and Zwingli (1484-1531), and just as these contemporaries castigated the abuses and corruptness of the medieval church, so Paracelsus devoted much of his enormous, restless energies to thundering against the follies and glaring abuses of medicine in his time.

His background was humble and unusual. Born at Einsiedeln near Zurich, in Canton Schwyz, he was the only son of the local physician, a quiet and serious man who seems not to have been very successful as a doctor. The family was not well off- Paracelsus was brought up used to rough food, coarse peasant clothes, plenty of fresh air - but his interest in medicine began early. On long walks in the lovely Alpine countryside, his father would point out the medicinal plants, explaining how the local peasants used them to treat their ailments. He was pleased by his son's evident interest, and began to give him some of the proper grounding for a physician - little discourses on the teachings of the great Greek and Latin masters, some Latin, basic astrology, hints at the mysteries of alchemy.

Much of his father's income probably went for books. He was passionately interested in alchemy, and had a large library filled with works of the famous alchemists like Albertus Magnus, the Arab Geberr, Villanova, Lullius, and Trimethius, through which the solitary and precocious child browsed.

When Paracelsus was nine years old, his father's reputation for chemical expertise earned him a new job - that of teacher in the mining school at Villach, in Karinthia, with which was combined the function of town physician.

Karinthia is mining country, its mountains - as Paracelsus wrote later - "like a strong box which when opened with a key reveals great treasure." Iron ore, zinc, cinnabar, even gold were among the minerals being mined locally, and at nearby Bleiberg, they mined "a wonderful lead ore which provides Germany, Pannonia, Turkey and Italy with lead".<sup>2</sup>

The Bleiberg mines were owned by the Fuggers, who had also founded the Villach mining school to train technicians in metallurgical processes. Paracelsus attended the school where his father gave classes in analytical chemistry and the treatment of minerals - and seems to have been instantly fascinated. He mastered the elementary techniques of chemistry, learned how to build a small furnace, handled retorts and alembics, and watched acids reacting and inter reacting with metals. Chemistry burst on him like a revelation, at once an irresistible hobby and a sublime new science. At home, in his father's consulting room, he studied another aspect of mining: the human cost of the Fugger fortunes in the shape of men wasted by the special-occupational diseases of lead-mining. This was an interaction of another kind, of man with metal.

Paracelsus' early interest in alchemy was reinforced by such studies, and - probably with the enthusiastic encouragement of his father - he seems to have spent some time formally studying this secret science with a well-known alchemist, the Abbot Trimethius. Paracelsus' fascination with alchemy was more than purely speculative, however; he had already determined to devote his life to medicine, and he had seen enough of contemporary doctoring, with its theoretical approach and costly apothecary compounds, to be convinced of its utter uselessness. Might not alchemy, with its insights and techniques, make possible the fresh start that was so urgently needed?

Probably his father could not have undertaken the financial burden of a conventional medical training, with its years-long course of elaborate studies. Thus it was very likely by deliberate choice that Paracelsus, instead, spent years of his young life endlessly zigzagging across Europe working as an army surgeon - into Italy, Portugal, Prussia, Holland, Belgium, and even further afield in Scandinavia, Asia Minor, and Tartary where his bizarre experiences may have included initiation into the Buddhist faith.

At Idria, in Slovenia, he visited the newly-opened cinnabar mines where the ore mercuric sulphide was obtained, and saw miners suffering the classic symptoms of mercury poisoning: tremors of the hands and feet, frightening grimaces, debility, loss of teeth. Even the rats and mice who entered the mine developed the same symptoms, and died in convulsions.

Paracelsus noticed such details - he had an extremely observant eye - and his years of practical medical work in the field - what we should now call "clinical experience" - combined with a natural gift for healing, not only gave him a thorough-going contempt for doctors trained exclusively out of books, but turned him into a first-class doctor who impressed patients with his instinctive understanding of their cases. Very few of his colleagues can have had such wide-ranging experience of chronic or occupational disease, epidemics, field surgery and syphilis, as well as more everyday afflictions. "I have not borrowed from Hippocrates or Galen or anyone else", he could later claim, "having acquired

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my knowledge from the best teacher, that is, by experience and hard work".<sup>3</sup>

One of his few friends, a gentle Greek scholar and former pupil named Johannes Oporinus, has left us a vivid picture of this forceful and unconventional personality. Paracelsus, he said, was not in the least scholarly or pious, making rude remarks about the Pope, about Luther, about all theologians. He spent most of the day busied with his furnace and his chemical equipment: nobody knew what he was up to, but his assistant was once completely knocked out by the violent fumes from a flask which Paracelsus made him sniff. He seemed to have plenty of money to spend on good meals and expensive new clothes, but he wore the clothes till they were so filthy they fell off him, and he never seemed to care where he slept, flinging himself down fully-dressed on a bed only to spring up again three hours later: his energy was phenomenal. So was his capacity for alcohol: he could drink solid peasants under the table, and then late at night sit down and dictate for hours, apparently almost senseless with drink - but what he had dictated read like the work of a perfectly sober man. His most successful cures were of ulcer cases: instead of restricting his patients to low, bland diets he would sit feasting with them all evening - seemingly with the same results.<sup>4</sup>

By the time Paracelsus settled in Strasbourg in 1526, to practise, to take on a few pupils, and to produce some of his vast flood of writing, he had a growing reputation both for his unconventional views on medicine, and for his professional skill. His fame had even reached Basel, where the important publisher Frobenius faced death from a gangrenous leg that the surgeons were totally unable to cure. As a last hope, he sent for the extraordinary physician at Strasbourg.

Paracelsus arrived, took charge, dismissed the surgeons, and saved Frobenius' leg. The humanist Erasmus of Rotterdam happened to be with Frobenius at the time, and was so much impressed by these medical talents - "you have recalled Frobenius from the underworld"<sup>5</sup> - that he consulted Paracelsus later, by post from Rotterdam, about his own problems - debility and pain in the liver and kidneys, for which his doctors had prescribed violent purges, both vegetable and mineral. Paracelsus advised other remedies — "you do not need evacuations" - prescribing strengthening medicine instead.<sup>6</sup>

The city of Basel at this time needed a municipal physician - a post that carried with it the right to lecture at Basel University. Probably at Frobenius' urging, the city fathers offered the post to Paracelsus, who accepted it. On 5 June 1527 he stood for the first time before the University's medical students. "I have been called here to Basel by the city fathers, with the incentive of a large salary," he told his delighted audience — not in the customary Latin but in their own German. The programme he outlined was bold, imaginative - and strongly abusive of current medical practice, with its emphasis on theory and tradition. "Who does not know" demanded Paracelsus, "that many doctors in this time have ignominiously failed their patients? Because they adhered too anxiously to the sayings of Hippocrates, Galen, Avicenna and others. . . . With these authorities they could become splendid university doctors . . . but never real physicians."

Titles, eloquence and book-learning were equally unimportant, Paracelsus continued: what mattered was a thorough familiarity with the causes and symptoms of disease, and the ability to prescribe successfully for them. He himself would not be teaching the students the work of these old authors, but rather his own experience, recorded in a number of his books. In his lectures there would be none of the usual insistence on the four humours and the complexions and all their subdivisions — "the ancients wrongly attributed all disease to them", and contemporary physicians in consequence were so distracted by theory that none of them, "or very few, have attained exact knowledge of diseases, their causes and the critical days."<sup>7</sup>

His audience loved it. Soon his lectures were the talk of the University, and even the barber-surgeons, who usually made a point of despising academic studies, flocked to hear them. His popularity with his classes probably reached its zenith when, during the students' midsummer festival, Paracelsus tossed the fine fat volume of Avicenna's works onto a bonfire.

But the faculty seethed with indignation. They refused Paracelsus the use of the lecture-hall, denied his right to send forward candidates for the doctorate, and questioned his qualifications. They were soon joined in active hostilities by Basel's apothecaries, whose shops had been inspected by Paracelsus who exercised his duties as town physician with a dismaying thoroughness. (Paracelsus was always particularly rude about apothecaries - "their shops are nothing but foul sculleries, from which comes nothing but foul broths".<sup>8</sup>)

As relations between Paracelsus and the faculty went from bad to worse, his pupils began to drift away, afraid of compromising their chances of a degree, and when his influential friend Frobenius died in October, Paracelsus was obliged to leave Basel. For the thirteen years that remained of his life, he travelled from town to town, sometimes working as healer and lay-preacher among the poorest of the Swiss peasants, occasionally settling in cities for another feverish spell of writing and chemical experimentation, before yet another angry outburst would antagonize yet another influential acquaintance or wealthy patient, or the local doctors and apothecaries - outraged by his success and by his scorn — joined forces to manoeuvre him out of town. He died in Salzburg in 1541, possibly from a tumour of the liver - or perhaps from systemic mercurial poisoning, the result of working for long

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years in the laboratory with this dangerous mineral.

Like the modern critic of drug therapy, Paracelsus inevitably found himself up against the vested interests of big business. Just as cancer today has been called an "industry" since it keeps so many thousands employed in the pharmaceutical companies, so in the early sixteenth century there were plenty of merchants and quacks making what could literally be called a killing out of the prevalent plague of syphilis. The Fuggers of Augsburg, for instance, had made fortunes from the guaiac boom. Paracelsus, who was anyway doubtful of guaiac's ability to cure syphilis, and strongly critical of such methods, had written a pamphlet denouncing guaiac, and sales had suffered in consequence. But the Fuggers had already hedged their bet. Scenting the impending collapse of the guaiac market, they had adroitly moved into mercury. In exchange for their underwriting of Charles V's election expenses as Emperor, they had secured an interest in the important Spanish cinnabar mines at Almaden. Many practitioners had never stopped using mercury, and since it was still the favourite remedy of the quacks, sales were rising steadily.

The Fuggers might close their eyes to the general reckless abuse of mercurial syphilis cures, but Paracelsus could not and did not. In his travels and in his army experience he had seen too many needless agonies inflicted by a course of mercury, and too much lasting damage from mercury absorbed into the body's tissues. ". . . it runs together again from the bodily heat and lies in the hollow places of the body. . . with what damage . . . is evident at Idria: all those who live there, are deformed and lame, easily out of breath, easily chilled, and never in good health. . . ."9

Both guaiac and mercury, he thought, could be used to cure syphilis - but in small, carefully calculated doses, and in chemically treated formulations, together with a great deal of supportive treatment. In 1529 Paracelsus proposed to publish these opinions in a major work on syphilis. The prospect so alarmed the Fuggers that they persuaded their old friend Heinrich Stromer, Dean of the Medical Faculty at Leipzig, to issue a decree banning publication. Stromer was happy to oblige the Fuggers, who had cut him in on the guaiac boom, and although Paracelsus had an edition of the first three chapters rushed through the presses in defiance of this decree, he was obliged to leave town before the work could be completed or published in its entirety.

The unholy alliance of medicine with commerce at the patient's expense always made Paracelsus angry, and he repeatedly denounced it. He found it ridiculous that German patients should be paying vast sums of money for plants imported from remote countries, when "there are many more and better medicines here than in Arabia, Chaldea, Persia, and Greece."<sup>10</sup> Moreover, the practice of resorting to exotic, imported drugs led to fraud on a grand scale: "he who brings this to the German nation and takes advantage of those who buy it, is a fraud. Such merchandise . . . is rotten and useless when he gives it to the sick."<sup>11</sup>

But if patients who were too poor to go to the doctor or the apothecary looked for reliable guidance to doctoring their own complaints with local herbs, they looked in vain, according to Paracelsus: the herbals they turned to were so much waste paper. The earliest herbals to be printed, only a few years before Paracelsus' birth, were the medieval compilations with a long and solid history of popular appeal, like the rhyming herbal of Macer Floridus, and the sixth century Herbarium of Apuleius Platonius, which plenty of readers probably knew by heart. These and other works were at first printed in Latin, but the eagerness of the response had taken publishers by surprise: obviously there was a huge lay public, avid for information about native medicinal plants for domestic use. Following the lead of Peter Schoeffer of Mainz, who in 1485 published a German herbal, the *Cart der Gesundheit (Garden of Health)*, printers all over Europe began bringing out herbals in the vernacular.

These herbals dealt chiefly with home grown medicinal plants — "what may be found in the grounds of private gardens, in the woods and in the fields. . . . By their efficacy a sick person or one who is not perfectly healthy may be brought back to a state of health". They all followed orthodox medical teaching, many of them carrying little discourses on the humoral theory and the importance of astrology for the benefit of their readers, but the information they contained was largely anecdotal, and almost never original. This was hardly surprising, since all compilers were drawing on the same sources — Galen, Dioscorides, Avicenna, and Serapio - each editor borrowing texts and systems of classification and even illustrations from the other without acknowledgement. Despite these limitations, new editions, copies, pirated editions and translations continued to pour off the printing presses in Europe in a steady stream, constituting a publishing boom which even a century later had scarcely begun to slacken.

Paracelsus denounced these works with bitter scorn: ". . . scraped together from histories, poets and old women . . . useless except to book-publishers who in this way become rich and healthy in the kitchen. . . ."12 Of the German *Herbarius*, the first "new" herbal to be printed, in 1484, he pronounced: "He who put together this book understood nothing . . . he has patched together rumours which are fun to read and tell of great feats. . . if it were all true, nobody could be sick or die . . . he has no knowledge of diseases or the herbs for them . . . it is a work to empty the peasant's pockets".<sup>13</sup>

So much emphasis has been placed on Paracelsus' advocacy of chemical medicine and of drugs prepared from minerals, that it comes as a shock to discover the degree to which his thinking was

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influenced by the traditions of Swiss-German folk medicine. In the first place, he saw clearly that herbs used according to elaborate humoral theory were a blunted weapon: ". . . with time the humorists have arisen, who do not heed the natural mysteries, but only their unfounded theory without recognition of the natural, correct properties. . .,"<sup>14</sup> In their authoritative *History of Pharmacy*, Kremers and Urdang point out that Paracelsus "stressed the need for a treatment that would be specific for that particular disease. The action of a remedy, he felt, did not depend upon its qualities such as moistness, but on its *specific* healing virtue, which was determined by its chemical properties".<sup>15</sup> This approach - far from being original - is that which comes naturally to the folk healer, who although happily ignorant of the four humours, is well aware that lesser celandine is useful for piles, while a dose of male fern may get rid of a nasty case of tapeworm.

Again, Paracelsus' advocacy of mineral poisons like mercury and antimony, which has been seen as one of his most distinctive contributions to the evolution of medicine, is in fact based on a belief common in Swiss-German folk-medicine at the time — and three centuries later to become famous as homoeopathy - that like is cured by like, the effects of a poison remedied by doses of another poison: "It depends only upon the dose whether a poison is poison or not."<sup>16</sup>

Yet another strongly-held belief of folk medicine, to which Paracelsus subscribed, was that medicinal plants grew where they were needed, and that there was no need to travel far to find the remedy for a disease: ". . . They want medicaments from overseas, and better things grow in their own garden."<sup>17</sup>

Paracelsus was also a firm believer in the doctrine of signatures, and in illustration of it explained every single part of St. John's wort (*Hypericum perforatum*) in terms of this belief. ". . . the holes in the leaves mean that this herb helps all inner and outer orifices of the skin . . . the blooms rot in the form of blood, a sign that it is good for wounds and should be used where flesh has to be treated. . ."<sup>18</sup>

If the inaccuracies of herbals, the frauds of herb-importers and the uselessness of apothecary confections made Paracelsus angry, it was because, as a result, herbs were seldom properly used, while their real virtues remained undervalued or unknown by foolish men who thought they could improve on nature. "To what purpose do you superadde vinegar to the root of Comfrey," he asked surgeons, "or bole, or suchlike balefull additaments, while God hath compos'd this simple sufficient to cure the fracture of the bones?"<sup>19</sup> And writing of the healing powers of St. John's wort, he adds that the simple balsam prepared from it "puts to shame all recipes and doctors, they may yell as they wish, they will only break their teeth."<sup>20</sup>

It is clear both from his writings and from the assurance with which he speaks of them that Paracelsus used herbs knowledgeably and confidently in his own practice — which may account for some of the successes which made other doctors so envious. Among his most neglected works is the rough outline of a new authoritative herbal "of herbs and roots or seed and leaves as much as I have so far experienced and known."<sup>21</sup>

Just as Paracelsus never assumed that the learned knew everything, he never imagined either that the unschooled were ignorant — a truth he tried hard to impress on his pupils. "A Physician", he told them, "ought not to rest only in that bare knowledge which their Schools teach, but to learn of old women, Egyptians, and such-like persons; for they have greater experience in such things than all the Academians".<sup>22</sup> Few doctors before the time of Paracelsus - and even fewer since - have bothered to try tapping this fund of inherited knowledge of plant remedies. But during his long wandering apprenticeship as a surgeon, and throughout his life, Paracelsus went out of his way to cultivate these country healers and gypsies, and to study their methods of treating the sick.

All revolutions need a figurehead, and by the end of the sixteenth century, the name Paracelsan had been firmly linked to the medical revolution that was bringing chemically prepared mineral medicines into the apothecary's shop, and calling in question the value of the old Galenicals. Paracelsus must have seemed the obvious choice for this role, since his name was identified by everybody with opposition to the entrenched bastions of medical conservatism. ". . . an epitome and rallying-point of the diverse forces rising against the old authority in medicine".<sup>23</sup> For all his personal idiosyncrasies and absurdities, no other medical thinker of the time had a tenth of Paracelsus' driving energy and authority, and certainly nobody else had written so entrancingly and imaginatively of the application of alchemy to medicine.

Moreover, among the hundreds of thousands of words - some in German, some Latin, others in a strange mongrel language of his own - that he had dashed onto paper, could be traced the cloudy, suggestive outline of an apologia for the new chemical medicine that was all the more impressive for being only moderately comprehensible. "I must confess" admitted the English Paracelsan surgeon Clowes "his Doctrine hath a more pregnant sense, than my wit or reach is able to construe."<sup>24</sup> As with the Bible, it is possible to prove almost anything by Paracelsus' writings. Many of the Paracelsans of the sixteenth century had not even read his works. It was not until 1598 — nearly half a century after his death — that his papers were finally collected by Johann Huser, and printed in Basel (delightful irony) in ten substantial volumes. Another fourteen years passed before the first comprehensive Latin edition appeared, although various works or fragments had been translated into different European

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languages before that time.

The sheer volume of his prose output is daunting — the complete Sudhoff edition of his medical writings, published in 1929-33 runs to fourteen fat volumes. To make matters worse his prose style - intricate, turgid, maddeningly obscure - is no help to anyone trying to work out what he actually meant. Some scholars, in desperation, have suggested that as a practising alchemist himself, Paracelsus was deliberately writing to be understood only by other alchemists.

But neither the inaccessibility nor the obscurity of his writings prevented the "chemists" of the time from claiming him as their patron, and attributing to him their own violently anti-Galenic views. It came to be assumed that he depended much more on metallic medicines than on those of vegetable origin, and by the twentieth century, he was firmly established as "the founder of chemical pharmacology," the patron saint of the drug companies, the man who flung open the windows to let in a new scientific age, and pointed medicine firmly down the path to the pharmaceutical laboratory.

Whether Paracelsus would have found himself in entire sympathy with the revolution that has been credited to him is open to question. Far from being in a hurry to discard the simples used in traditional medicine in favour of powerful new chemical preparations, Paracelsus argued that alchemy offered new possibilities for penetrating the medicinal secrets of these plants, and using them more effectively.

He believed what we now know to be true, that the specific medicinal action of each plant often depends on a single chemical constituent — the "active principle" of the plant.

He believed equally strongly something which we have learned by disastrous experiment not to be true — that the active principle extracted from the plant and used in isolation will be even more effective, even more powerful medicine, while remaining as safe as in its original form. This was the tempting delusion that danced before the eyes of the medical alchemists, and Paracelsus believed in it as implicitly as any of them: "what the eye perceives in herbs or stone or trees is not yet a remedy; the eye sees only the dross. The remedy must be cleansed from the dross, then it is there. This is alchemy. . . ." <sup>25</sup>

Since alchemy had not yet turned this vision into fact, Paracelsus continued to use plants as he found them compounded by God - and to exercise the utmost caution when he treated patients with the perilous new preparations of mercury and other dangerous minerals. Iatrogenic disease — the sickness that ignorant doctors visit on their patients - always seemed to him the worst of felonies. And even Paracelsus might have been lost for words to express his indignation at the reckless slaughter for which, over the next three centuries, the new chemical medicine was to be responsible.