

## A CLASSIC AND A FOUNDER

- I. The Scientific Grammar of  
Michael Faraday's Diaries
- II. The Tripartition in the Life  
of Theophrastus Paracelsus

Contributions to the Philosophy of the Sciences

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## FIRST PART

### I. THE CLASSIC OF SCIENCE

#### 1. The Scientific Grammar of Michael Faraday's Diaries

For sixty years, the managers of the Royal Institution of Great Britain held in their care the daily manuscript records of the researches of Michael Faraday (1791-1867), leading physicist and chemist of the first half of the nineteenth century. The sheets cover more than four decades. He was in the habit of describing each experiment and every observation inside and outside his laboratory, in full and accurate detail, on the very day they were made. Many of the entries discuss the consequences which he drew from what he observed. In other cases they outline the proposed course of research for the future. Thus this diary is supplementing our general conception of science. We sometimes are inclined to look into a science not our own as into a catalogue of results. In Faraday's Diary, it becomes again what it really is, a campaign of mankind, balancing in any given moment, past experience, present speculation, and future experimentation, in a unique concoction of scepticism, faith, doubt, and expectation.

Therefore, our interest in this diary lies quite outside the range of propositions and proofs for any specific content or aim. It centers round the logic of Faraday's mind, round the method of his strategy, both in thought and experiment. Seven thick volumes were printed a decade ago handing over to the general reader this diary for general use. What might seem merely a physicist's special theme, really may be used as a symbol of the true passions of the human mind. An experimental logic derived from this and similar documents will show that all Greek logic is an abstraction void of the sense for time. We never reason in the void of timelessness. Faraday thinks from day to day, against a background of older thinking, and anticipating new facts of tomorrow. In other words, he thinks in three dimensions of time; past, present, and future. Scientific logic becomes meaningless, when we dissect it and analyze any one of its statements or conclusions outside the interplay of past knowledge, future experimentation, present day speculation. The famous doubt of the scientist is the shadow cast on the past by the expectation of future better knowledge. Without this relation it would be sterile. Experiments are based on what he knows already. Finally he speculates because he has to pause between future experiment and previous knowledge. To reestablish the elementary fact that the human mind cannot think except in the three dimensions of time, is one of the most burning scientific needs of our age,

so that the centuries of pure physics may be continued by an equally successful series of biological centuries. As long as we talk of the dimensions of space only, and use the obsolete and wholly unrealistic Greek and Roman tools of logic, the biology of the human mind remains under the spell of an irrational conception. Faraday, then, by his untiring faithfulness in keeping his diary, contributes to our understanding the objects of his scientific research in magnetism, electricity and light, but he also makes us understand the scientist himself, as a living subject, the mind in action.

The questions which we had in mind when we analysed the seven volumes, (seven students in my course on "University Life, Past and Present, A Philosophy of the Sciences", helped me. Among them, Mr. Symmons, from Phoenix, Arizona, did most of the work.) were for example, what was the driving urge behind all the steps of all the experiments. The wonderful humility of Faraday - he never sought distinction in society, always kept the faith of his Sandemian friends, a good Christian sect of poor people, - makes it possible to discard all external causes or motives. His inner desire, then, what was it behind so many failures and so few successes? For in forty years the blunders, mistakes, miscalculations, and wrong hypotheses far outnumber the lucky shots. This fact is so impressive, that it leads to a more general recognition: Sciences when not treated as a catalogue of results but as a process of collective action, are in fact a systematic and voluntary relapse into errors. "We must allow the scientists to err", said Pope Leo XIII. Science as a process is the organization of all thinkable errors in order that, as a later result, error may be overcome. No shepherd could survive, if he made one hundred part of the blunders Faraday made during his life. A shepherd's life can hardly forbear more than five percent of error and experiment. It takes the complete isolation of a laboratory to give us the privilege of making mistakes at random. Now this voluntary creation of a maze would be unexplicable were it not for the anticipation of something behind the confusion which is apt to reward us for this voluntary relapse into ignorance. The scientist is like a man who purposely marches many steps backward before he jumps a trench. Scientists- in the midst of their experimental avatar-, must be able to know less than common sense and every day technique take for granted already. Why? Because they anticipate some unknown element outside our present day knowledge that will prove the narrowness of its diameter. Against a too narrow circle, their vision tries to enlarge the facts of interplay, relation, dependence and interaction. More unity of nature we may call the dogma of science; in this formula, unity is nothing absolute, and it has to be compared to the previous opinions on unity before it makes sense. The logic of science

is a relative logic of infinite approximation. It increases relations, it unifies twenty experiences by chaining them to the triumphant chariot of systematic experimentation. Fifty guinea pigs investigated one after the other, cease to be fifty cases of murder. Fifty acts become one unified effort; in this way, experimentation is absolutely different from mere experience: It organizes experience by anticipating unity.

As Faraday exclaims: "Surely this force (gravity) must be capable of an experimental relation to electricity, magnetism, and other forces, so as to bind it up with them in reciprocal action and equivalent."

In this realm, then, of creating unity, Faraday speaks, as any complete human being, all the three languages of emotion, command and narrative. The emotions are those of wonder, admiration, and doubt or, against doubt, emphatic assertion. The imperatives are directed to himself. The narratives fix experiences.

Faraday's scientific grammar with regard to the imperative is simple: "I must look at Weber's result to see how they build in with these considerations and what the results are." Later he says: "Astonishing how great the precautions that are needed in these delicate experiments. Patience. Patience." Probably a rare entrance in any man's diary, because so few people allow it to contain more than descriptions or analyses of feelings. Again he writes: "Want to try a mass of something to ascertain whether it will sensibly affect the directions of the lines of force of the earth - that it may approach a step to the action of oxygen." In reference to an experiment already undertaken: "Have arranged a check- shall make this adjustable by hand. It is an important adjunct in experiments of observation." As an aid to his poor memory he frequently says: "Query these results." or: "Remember the dip." and: "Must clear all this up by further experiments." He may write: "The hypothesis is not so much mine as one renewed from old times. Look at Euler's letters and what he says. Look for cases to prove it." These Imperatives directed to Michael Faraday only lead up to more general rules of wisdom: "Let the imagination go, guiding it by judgement and principle, but holding it in and directing it by experiment." And the grammatical form of the imperative is not even used in this comforting sentence: "To point out or lead to a knowledge of what it either cannot explain or has not explained, is quite as important for the progress of knowledge as to establish what it can do." In the quotation on the unity of gravity, electricity and magnetism quoted above, he ends with a remark that is equally general and personal: "Consider for a moment how to set about touching this matter by facts and trial."

Since the diaries were kept primarily for Faraday's own benefit, they frequently betray his emotions of wonder and surprise. Thus: "I have been analyzing certain experiments in reference to the notion that gravity itself may be practically and directly related by experiment to the other powers of nature and this morning proceeded to make them. It was almost with a feeling of awe that I went to work, for if the hope should prove well founded, how great and mighty and sublime in its hitherto unchangeable character is the force I am trying to deal with, and how large may be the new domain of knowledge that may be opened up to the mind of man." Later he says: "After all, there is much which renders these expectations or similar ones hopeless: for surely, if founded, there must have been some manifestation of such a condition of the power in nature. On the other hand, what wonderful and manifest conditions of natural power have escaped observation, which have been made known to us in these days." When something unexpected would come of an experiment, his excitement would be intense: "But now came forth a new and striking result. Strange! Must find out the cause of this. What effect does this force have in the earth? His experiments meant more than technical proof to him:" It is exceedingly beautiful to see in all these arrangements how beautifully the lines of force represent the disposition of magnetic power." Or "Such beautiful delicate indicating curvatures." "The results are beautifully near and proportionate." Words of emotional description frequently used were "astonishing, I durst not, excellent, it was not easy because of imperfect eyesight, interesting, remarkable, curious, I begin to despair."

In his scientific grammar, certainty and doubt, naturally alternate. "Surely this force must be capable.." he said in the sentence on gravity. Of some conclusion reached he might write: "Hence this method seems defective in principle, or at all events in sensitiveness; and yet it is very sensitive. Certainly there was no hopes for any optical results since there are none here. I think Plucker must have been mistaken in his result and that my old observation was right." And again: "I think that I may trust the reality of these negative results." At times he is quite positive and says: "I have no doubt," or "I have proof," or at least, "from all these experiments, I am led to conclude." More often than direct questioning he replaces his own conclusions, obviously vivid in his own imagination, stolidly with an appeal to the judgement of others. "I refrain from extending these views, as might easily be done, to the atomic theory, being rather desirous that they should first receive the sanction or correction of scientific men." or "I have refrained from all reasoning on the probability of the compound nature of nitrogen or upon what might be imagined to be its elements, not seeing sufficient reason to justify more than private opinion upon that matter."



In the laboratory, the description of his experiments is more or less a sequence to his own arrangements. Evidently these descriptions then, are no pure, unpremeditated narratives. All laboratory-facts are man-made, i. e. secondary experiences. Lest we exclude the best and most immediate source from which to know his power of narrative, and the delicate way by which a vigorous impression was transformed into expression, we must turn to the pages of the diary where he tells of unexpected phenomena in the street, or on the sea shore. Of course, they are much longer than the short imperatives; however, we should keep in mind that, in the system of thought, one short command: 'patience' equals a long tale about the past. Retrospection is bound to be long; the plunge into the future is its very opposite. Here, then, follow some examples of descriptions: Experimenting one day with chlorides he writes: "Not with Magnesia; only chloride and proto-chloride produced. There was a fire on Thursday evening in Broad Court, Anny Lane. The clouds were low and received a strong illumination from the fire beneath them. The angle taken from the top of the Royal Institution by a quadrant formed by the clouds, the Institution, and the fire, was  $24^{\circ}$ . Hence the height of the clouds will be.....equal to....." Again spending the day in the laboratory deep in chemical analysis he says: "Phoenician coin analyzed- is composed of copper and silver. It was a small cast coin weighing about 120 grains, having a rough white surface but brittle coppery fracture. It contained no lead, tin or antimony. The design was bold and well preserved and consisted apparently of characters or symbolic marks. A whole bag of these coins were found at- and were bought for a pound." Still another day he walks out of his laboratory and sees: "At Folkestone the atmosphere clear and fine view of the cliffs of Dover. Soon after sunset (the wind being about S. S. W. so as to blow on land) observed a cloud forming just the brow of Shakespeare cliff. It streamed inwards, increasing in size, but all seemed to pour nearly from the same spot; the air which came from over the sea there taking on a visible form and passing in to the interior as a cloud. By degrees the generation of clouds took place along the whole line of cliff from Dover to Folkestone hill, the wind still carrying the portion formed over the land. We ascended the cliffs about  $\frac{1}{2}$  a mile beyond Folkestone hill about an hour after sunset and found all above developed in dense, moist mist, so as to deposit water on our clothes; the temperature also low to the feelings. We walked back towards Folkestone and on descending a little way down the hill by the road emerged from the cloud and found all clear beneath. The cloud was extended a considerable way in land, covering the tops of the hills. Was not this effect produced by the cooling of the surface of these hills after sunset by radiation into the clear space above, and the consequent cooling of the moist

air brought by the wind from the sea below its point of deposition?" Again the next day, his lack of departmentalization allows him this entry: "At times when the wind has been rather strong, I have frequently watched the gulls who were flying over the waves looking for food, and have often seen them move slowly against the wind or remain stationery facing it, balancing themselves on their wings but without flapping them. This has lasted for 1, 2, 3 or more minutes, and I think could not be due to any previously acquired momentum because they would suddenly sweep round, going down with the wind, and then again return against it, all without flapping the wings; I have also remarked hawkes over land advance in a similar manner in similar circumstances, without having been able to detect any motion of the wing calculated to support them. They seem to remain suspended in the air by an apparent balancing of the body on the wings against the wind. How do these birds fly? And why may not a man or a machine fly in the same way in the same circumstances?" A year later he returns to the same place. And again has the opportunities of remarking the balance of the gulls in strong wind: "Many of them would rise together and there seemed to be a sort of emulation among them; all had their heads to the wind which was here parallel to the cliffs... Perhaps the effect which may sometimes be observed in flying a kite may be connected with this subject. Sometimes a kite when badly rigged will, upon rising, not cease to ascend when the string forms a certain angle with the current of air, but will continue to mount, taking nearly a horizontal position in the air, and that till the string is nearly vertical when the kite generally falls over and comes down." At yet another time while in his laboratory making experiments on light...." and then oxide of zinc seemed fixed and unchanged by the high temperature produced." Suddenly this paragraph is inserted: "John and George Bonnard being in a hay field where many large cocks of hay were, had occasion to notice the effect and progress of a powerful whirlwind; it took up the whole of a hay cock, raising it in the air, whirling it around and expanding it over a space 6 or 7 times its original diameter and then letting it sink a little in advance on the neighboring ground or trees. It is evident that the progressive motion of this whirlwind (and the same with most of them) was not due to the advancement by a general wind of that portion of air which was first put into rotation but that of a general mass of air; nearly quiescent, contiguous portions assumed the rotating motion in succession, so that when the air over a haycock had rotated and taken up the light matters beneath, its motion gradually ceased whilst the neighboring parts revolved and the just raised hay fell again." Again later, he leaves his laboratory: "This evening a magnificent aurora borealis occurred. At 11 o'clock it was like a powerful clear twilight or the break of morning from behind a low ridge of dark, pictur-

esque clouds towards the North West to East North East and 40 or 50 degrees in height. Sky otherwise clear, wind from the south west but slight in power..... A fine, broad pillar of red light gradually formed....after innumerable changes the light both as to color and intensity, the whole gradually assumed the appearance of faint columns or rays. ..dancing or flashing perceived. It appeared as if part of the sky towards the zenith suddenly glowed with a phosphorescent light.... A remarkable fact relative to the lines of direction toward the one spot south of the zenith was that, even when the blush did not proceed along them, but across them or simultaneously over a large space, still they were 'visible and apparently as fixed in their position as ever." And once more: "A beautiful aerial phenomenon observed about St. Paul's Church, from the shadow of the dome, and the part above cast on very thin clouds moving at that height. The moon at full and rising.... The effect was very beautiful. Many persons went away fully convinced that rays of darkness were issuing from the church. Time about 8 o'clock."

The classical case for this respiratory process between experience and experiment occurred when a friend gave Faraday a large Leyden jar. It was broken by a shock of electricity in an experiment. Instead of bemoaning the loss and discarding the jar, he proceeded on an intricate series of new experiments to determine why and how the electricity broke the jar. He made drawings of the break, and though thoroughly excited by the accident, he conducted his series of investigations as if he never had planned anything else.

William Blake called division the sin of man; Faraday was a great man because he was utterly undivided. His whole, very harmonious, very well balanced, to be sure, still his whole nature, and not a brain, a slave of the intellect, was at work through the years; though we owe his diary, partly at least, to his one weakness, his unreliable memory, it reflects the rare character who merged completely, soul as well as body, into the intercourse with his world, and used the brain in the limited way in which it is useful, and for those ends for which it is given us. On the basis of imperatives, emotions, and narrations, he built up his few but precious speculations. Their simplicity rivals with their forcefulness.

Words frequently used to express doubt and speculation were: "it has occurred to me, perhaps I am in error, it would appear, upon consideration, I suspect, would this imply, I think, I believe, a correction needful, at times it seemed so, it is not sure, I want clearly to understand, suppose that this were so."

"I am learning how to observe." "I have not

found it so." "The point will require investigating." "This does not accord with the facts -; but I want more and more distinct results, and only reason thus to preserve under the disadvantage of a sadly failing memory the ideas that I may want to reconsider hereafter. The facts, as far as they go, are I believe good." He balances his explanations even in the moment he is formulating them for the first time: "Many interesting points would arise here for consideration.... Is the diminution permanent or is the full charge restored on lowering the temperature? Either answer would be important in the consideration of the nature of steel magnetic charge." Or he faces the negative: "I think that I may trust the reality of these negative results. The whole day almost in vain; for after the end of it all discovered a source of error which vitiated all the results and also those of yesterday-but it was well to know the error. No wonder the results of yesterday were incomprehensible." Or this: "So now I believe that all the effects I had heretofore obtained were due to the falling or rising loop of wire and not to any effect of gravity. At all events, we are purifying the inquiry from interfering causes." Cancelling his efforts, he might write: "Of a sudden all wrong and I see not why."

We gave his statement on gravity before: "Surely this force must be capable of an experimental relation to electricity, magnetism, and the other forces, as to bind it up with them in reciprocal action and equivalent effect." This faith in the unity of the elements composing different phenomena is called today, with an understatement, working hypothesis. The term is not exact; because it suppresses a number of essentials that such a faith must contain in order to make people work. It is, then, not a hypothesis for the objects, but an imperative for the subjects who do research: It makes them work. Again, it does not make work one man or another; to the contrary, such a subjective assumption is not the faith required by science. It must be a faith that may be shared by many, eventually by all scientists. For that purpose it must be in accordance with the main dogma of science: unity of nature behind all the phenomena. And even here the faith does not end. It must reach people not as individuals, one, ten, a thousand. It must make them cooperate in an integrated division of labor. We use the word faith rightly in all instances where people of different thinking and convictions cooperate. A child and his father, a police man, a farmer and a scholar, may have the same faith, though this faith is reflected in their brains in completely different concepts and words. Science is able to make cooperate catholics and mechanics, students and Nobel prize winners, because a common faith distributes the functions of workmanship despite all differences of rational formulation.

Faraday was a classic because the faith into the unity of nature came to him not as a heresy, but as the precious acquisition of two centuries, with the certainty of a social code, embodied by his master, discoverer and promotor, a member of the best society, Sir Humphrey Davy. The son of the blacksmith who was Michael Faraday, was not asked to fight the prejudices of the upper classes; he was invited to share and to advance their living faith and their most sincere and valuable endeavors. This fortunate constellation produces the classic, the type of man who is allowed to add to the trends of his times the integrity, strength and harmony of one especially well organized individual. We shall see, in the second case here under consideration, how unique Faraday's position was, how rarely society and individual are in the balance embodied by Sir Humphrey's pupil.

It needs scarcely saying that in our own days, scientists begin to assume so much power that they are threatened by the same cancer that kills any powerful group or clergy, simply by imparting power.

The classic serenity of Faraday is equally far distant from dawn and sunset of the day of science. By the absence of any fighting element in his mind, of any attack against the pre-scientific age, or of any self-defense of professional claims for power, in the whole diary, Faraday's life proclaims the hours before noon when the domination of the new sun is ascertained already; however, the zenith of science is not quite completely reached, the light is still united and concentrated, not diffused in the thousand colors of the afternoon sun.

Here are some more short expressions of Faraday's faith. "No doubt a larger law of action would bring both or all three cases under one expression, but still that would not as yet show that bismuth is diamagnetic." Or: "Still, I think there must be some relation between these functions of light and electric forces." Again, he speculates: "Universe magnetism. Earth, Sun, Moon, probably all lie as mutually related magnets in common medium of space. In view of media, may very well speak of atmospheric magnetism in relation to earth."

"This space or state of space is new to our knowledge. So also is the space filled with lines of force new to our knowledge, i. e. to the knowledge of philosophers generally." About another phenomenon he muses: "Time in relation to magnetic force- probable existance of a medium; if time concerned, it will most probably be exceedingly short like that of its relation to light, and so perhaps for ever remain insensible to us." "If considering the reasons before given, there be the least hopes of finding the time, these hopes ought to be verified or exhausted."

Can that be done thus?"

And so we are led on to two utterances; one is connecting the whole universe of man's mind;- and let it be clear that the problem now is enlarged from the different departments in the individual mind of Faraday, emotions, dreams, volitions, memories, and ideas, to the more complex stage where mankind must survive as undivided whole, with science, art, religion, and legislation as immense units and organs of life.--- And the other is bringing together the external universe into one dynamic system, united in the way Laotse spoke of the unity of the wheel produced by the one point in which there is no wheel.

I. "If there should be any truth in these vague expectations of the relations of gravitating force, then it seems hardly possible but that there must be some extraordinary results to come out in relation to celestial mechanics - as between the earth and the moon, or the sun and the planets, or in the great space between gravitating bodies. Then, indeed, Milton's expression of the sun's magnetic ray would have a real meaning in addition to its poetical one."

II. "The Aurora borealis may now become connected with magnetic disturbances and storms in a very distinct manner; and if the variations of the atmosphere cause both, it will also tie both together by a common hub."

The last paragraph of Faraday's daily report on his work bears the figure 16,041. And one of his last public utterances was: "for all the phenomena of nature lead us to believe that the great and governing law is one."<sup>1</sup> 16,041 and One -- this is the great paradox of his life, faith and grammar. "When we consider the life work of Faraday it is clear that his researches were guided and inspired by the strong belief that the various forces of nature were inter-related and dependent on one another. It is not too much to say that this philosophic conviction gave the impulse and driving power in most of his researches and is the key to the extraordinary success in adding to knowledge."<sup>2</sup> As to 16041: "A good experiment would make him almost dance with delight." And as to One: "The Contemplation of Nature and his own relation to her, produced in Faraday a Kind of exaltation."<sup>3</sup>

<sup>1</sup> In "The Correlation and Conservation of Forces" by E. L. Youmans, New York, 1867 p. 376. See further W. H. Bragg, Michael Faraday, 1931 p. 22 and 25. T. H. Gladstone, Michael Faraday, London, 1873 S. 123 ff: "His Method of Working".

<sup>2</sup> Lord Rutherford in Report on The Faraday Celebrations 1931, London, 1932, p. 39.

<sup>3</sup> John Tyndall, Faraday as a discoverer, London, 1870, p. 186.

## 2. The Three Dimensions of Time.

It will be our final task to establish the "respiratory process" between the 16,041 and the One as the most important contribution of the diaries to our understanding of the mind in action. For 16,041 reasonable doubts, we may say, were experienced, considered, tested and cleared against the background of One faith.

Before deepening his meaning of his respiratory process, we must listen once more to Faraday himself. For he knew that the mind in action, his own mind, differed from the mind outside the body of science. "What a weak, credulous-incredulous, unbelieving-superstitious, bold-frightened, what a ridiculous world our is, as far as concerns the mind of man. How full of inconsistencies, contradictions and absurdities it is. I declare that taking the average of many minds that have recently come before me (and apart from that spirit which God has placed in each) and accepting for a moment that average as a standard, I should far prefer the obedience, affections and instinct of a dog before it."<sup>1</sup>

Therefore we should try to view his lucid and keen mind against the society in which he as a scientist had to live. In his later years, a committee inquiring into the state of education, asked him, with many distinguished scholars, to express his opinions on the best training of the mind. The report, long forgotten, would deserve a complete reprint. Since our specific purpose is to show the isolated existence of a "classic", in the midst of the society of his day, one paragraph may suffice.<sup>2</sup>

Faraday stated that he had not the "training of the mind" usually expected from regular education in the classics and continued:

"The phrase "training of the mind" has a very indefinite meaning. I would like a profound scholar to indicate to me what he means by "training of the mind" in a literary sense, including mathematics. What is their effect on the mind? What is the kind of result that is called "the training of the mind"? Or what does the mind learn by that training. It learns things, I have no doubt. By the very act of study, it learns to be attentive, to be persevering, to be logical, according to the word "logic".

<sup>1</sup> Letter to Schoenbein, July 25, 1853, ed. by G. W. A. Kahlbaum and F. V. Derbyshire, London, 1899.

<sup>2</sup> From Edward Livingstone Youmans, The Culture demanded by Modern Life, a Series of Addresses and Arguments on the Claims of Modern Education, New York, 1869, p. 463.

"But does it learn that training of the mind which enables a man to give a reason, in natural things, for an effect which happens from certain causes: or why, in any emergency or event, he does, or should do, this, that, or the other? It does not suggest the least thing in these matters. It is the highly educated man that we find coming to us, again and again, and asking the most simple questions in chemistry and mechanics; and when we speak of such things as the conservation of force, the permanency of matter; and the unchangeability of the laws of nature, they are far from comprehending them, though they have relation to us in every action of our lives. Many of these instructed persons are as far from having the power of judging of these things as if their minds had never been trained."

Finally, in his observation on Mental Education, Faraday himself turned toward the analysis of scientific judgment. He showed the beauty of "errors" if they were to be considered honest efforts between a dark, ignorant past and a more enlightened future, and defined error as "a presumptuous judgment", rendered too early.<sup>1</sup> We are now, I think, in a position, to state our most important result.

In the grammar of this scientist, doubt, reasonable and experimenting doubt, retains its place between the great certainty with which he marches into the future and the seamfree aloofness towards the past and its social routine. The scientist is freed from the responsibilities for routine and repetitive work. In the case of Faraday, this delegation of an experimenting mind by society worked beautifully, because his loyalties towards this same routine--society, his certainty of faith into a promised future, and his equanimity in his present stage of doubt, all were in perfect balance. Our faith into the future plus our loyalty towards the past are the parents of legitimate scientific doubt. This parenthood separates organized, scientific doubt from all scepticism or cynicism. It reveals what any "present time" of a civilization or a man really is. The present time is not the result of the past nor is it the 'cause' of the future though this is the most current fallacy of our era.

This deserves our special attention. In natural science, it is true, the objects are treated as if the future depended on the presence, according to the famous formula of Laplace: "We ought then to regard the present state of the universe as the effect of the anterior state and the causation of the one which is to follow. (*Theorie Analytique des Probabilités* Engl. Translation 1902, p. 3.)

<sup>1</sup> In Lectures on Education before Prince Albert, especially p. 47.



Only, what is true for the objects of natural science is meaningless for the living subjects of science. They are able to do research, to be puzzled by "problems", to wonder, because they are driven towards a future goal that lies beyond their personal physical existence. Science is possible because man knows that his body is bound to die. The most important fact that we know of, every individual's physical death, is not a fact of the past or of the present but of the future. It has been said rightly that the root of all our knowledge is to be found in this prescience because it forces upon man the distinction between that part of him which is bound to pass away and those other elements of his existence which are not finished by this future event. "The future is the basis of our present evaluations," exclaimed the rediscoverer of the future, and its logical function, Friedrich Nietzsche.<sup>1</sup> It is, of course, an insight that has always operated; however, natural science, by looking backward on recurrent processes of the past, found no motive to mention this law of subjects. And our times, saturated with natural science as they are, ruin the very conditions of a prosperous natural science by carrying over to the subjects the rules that apply to objects only.<sup>2</sup>

The misunderstanding about the dependance of science on the power exerted by the future, and the pressure brought to bear upon men by our prescience of death, is a very serious one because it deprives the scientists of their dignity. On the other hand, it must be admitted that there is one particular reason why science in process should put aside this relation between the future and its actual operations. We don't know the future in the same way we know the facts of science. We know all facts of science because we know that we must die. Our belief in this future event is the basis of our scientific work in the field of matter. But we never must mix this belief with our method of research. Science is perverted if any rational concept of this future event would enter our thinking. When we die, where we die, all specific fears and hopes about the material realization of the future, must be kept out of our speculations. No scientific thought must be stained by speculations upon the material shape the future might show. Otherwise, prejudice, predilection, fear or hope would bias the scientific experiment. In this sense, the process of science is of

<sup>1</sup> Nietzsche, Werke XVI, 359.

<sup>2</sup> Some remarks that point in our direction, may be found in William Stern, *Allgemeine Psychologie*, Haag 1935, page 386 f., 551, and, with special application to the method of science, on p. 770f. The principle is stated in Rosenstock, *Soziologie I*, Berlin 1924, and in *Angewandte Seelenkunde*, Darmstadt 1923.

that divine integrity of which Shakespeare speaks of in Troilus and Cressida (IV, 5). Here the Greek king bids welcome to Hector, his enemy, for half an hour of complete armistice and mutual enjoyment. He praises the divine integrity of the extant moment in terms that sound as though they recall the happiness which we relish whenever we are steeped into the freedom and solitude of scientific research.

"What's past and what's to come is strew's of husks  
And formless ruin of oblivion;  
But in this extant moment, faith and troth,  
Strain'd purely from all hollow bias-drawing,  
Bids thee, with most divine integrity,  
From heart of very heart, great (nature), welcome."

Lest we misinterpret this welcome given to Hector by Agamemnon in a breathing spell between two battles, it begins with the significant pair of future and past: "What's past and What's to come". This should put us on the right track. It is from just this fact that both future and past are put aside for a moment that the interval which we call presence and which Shakespeare more rightly calls "the extant moment" draws its thrill. Science is the sublime freedom of man to surrender to his astonishment about the laws of life in face of the fact that his physical death is rapidly approaching and that the past is unalterable. It would be strange indeed, if this place of the scientific effort as a half way house between journey's end and journey's beginning had escaped notice among the scientists. Therefore, we need not be surprised that the first clear statement of scientific method is quite outspoken in this respect. In a famous passage, René Descartes tells us that he considered himself to be placed in three simultaneous domiciles, patiently recognizing his loyalties to the social past, fervidly believing in a final solution of nature's secrets and in the meantime consecrated to the pursuit of scientific doubt. Here we have the half way house of the scientific laboratory, of the scientific mind in the midst of its campaign. We may say then that Faraday and Descartes are in complete agreement as to the three tenses into which human time must be divided.

Any present time is created by a reaction of our faith in the future upon our loyalties towards the past. The presence is that portion of our life that we by our feeling certain about the future, can wrestle from the repetitive and recurrent part of our system, that portion won away from the laws of gravity so that we become free to grow, to add, to be changed. The present tense is a delicate product of a struggle between the pull from the future and the push from the past. The pull from the future is represented within a group or an individual by their beliefs. The push from the past is represented within

their mind by consciousness and knowledge of facts. We said at the beginning of our investigation that the grammar of a scientist should lead to an understanding of the three dimensions of time. By an analysis of Faraday's grammar, and that is to say by an investigation carried out in a great center of the scientific process itself, one old long forgotten truth is re-established that mankind's future and mankind's past both precede its present tense logically. What we call present, is a result of the struggle between future and past. A mechanism has no future and therefore no presence. It exists as a repetition of the past. All mere recurrence belongs to the past. Science itself is not repetitive. The mind itself is alive; that means, it does not belong to the merely recurrent processes. Faraday expressed this, in his own language, but with great force when he said: "Electricity is often called wonderful, beautiful. But it is so only in common with the other forces of nature. The beauty of electricity or of any other force is not that the power is mysterious and unexpected but that it is under law, and that the taught intellect can even now govern it largely. The human mind is placed above, and not beneath it, and it is in such a point of view that the mental education afforded by science is rendered super-eminent in dignity."<sup>1</sup> This term "Law" is pointing to the recurrent past, "above" is Faraday's term for our 'alive'. Man, being alive, is 'suspended between future and past. He is able to create a presence, as an intermediary stage of transformation between believed destiny and innate fate. The present tense is a state of tense pressure between destiny and nature, finality and causation. Any one scientist fills this state with his doubts, his transforming ideas lest the ends that attract us from our goal, be missed by too narrow and too casual Causation. Any "error", any "preposterous judgment", indeed, is endangering the fullness of our life, because it narrows the accessible means for our ends.

By discovering wider and deeper causes science eliminates unnecessary defeat and retreat. It is able to predict the equations of force and matter which supply us with the means for life. However, these predications have nothing to do with the 'future' of civilization, the destiny of mankind, the goal of creation. Science only predicts the encroachments of all lawful processes upon his future. It can't wish to predict our future since that would deny its own vital importance. Michael Faraday's contribution to our knowledge is just that unknown quantity which makes prediction of the full future impossible, and science would defeat its own ends if it undertook to predict what difference its own achievements will make to society. "Faraday believed the human heart to be swayed by a power to which science or logic opened no approach."<sup>2</sup>

<sup>1</sup> Silvanus B. Thompson, Michael Faraday, 1898, p. 185.

<sup>2</sup> John Tyndall, Faraday as a Discoverer, London, 1870, p. 185.

Naturally, he must hold this belief. For science originated when modern man put his heart into settling in the present in the form of organized and cooperative doubt. He hereby tried to keep the vital balance between the believed future and the known past by enlarging the past and all its predictable processes infinitely.

## SECOND PART

### II. THE FOUNDER OF THE SCIENCE OF LIFE

The Tripartition in the Life

of

Theophrastus Paracelsus von Hohenheim

1493 - 1541

1. Humanism versus Natural Science
2. The Antecedents of a New Life
3. Theophrastus becomes Paracelsus
4. After - Life
- 5a. 1526 and 1540: Two Portraits
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## Humanism versus natural science

The times from 1450 to 1550 saw the rise of humanism and a new outbreak of fervor for the study of the classics. This interest in Rome and Greece did not discriminate against the pagan elements in classic civilization. The humanist fell in love with Homer and Virgil for their own beauty, with the city state and the empire for their own strength, without accusing the great heroes of the ancient world for not having being orthodox christians.

The way in which this wave of humanists made its inroad into the Christian schools that after all, depended on the church at that time, was simple. The Bible existing in Greek and in Hebrew, the Digest of Roman Law in Latin, and the great physicians Galenus, Celsus, and Hippocrates, as well as Plato and Aristotle and Seneca and Cicero in Greek and Latin, the general war-cry was raised: ad fontes; back to the original sources. Translations, commentaries, anthologies, summaries, were swept aside. Read St. Paul, not St. Thomas Aquinas, read the emperor Justinian not the gloss of his thirteenth century commentator Accursius, read the Hebrew text of the psalms, not the latin Vulgate old as it may be - these were the demands of an era of grammatical, linguistic and manuscriptal purism.

Luther's success in opposing Rome was intimately connected with his retrieving the Bible according to humanistic principles. For the new method approached the oldest layer of our traditions immediately everywhere. 1000 years of oral tradition and slow growth were pushed aside as a blind avenue that had led away from the classical texts. The New Testament after having been for a thousand years the first and oldest text of all the texts copied and edited and studied, now became the youngest book of the ancient world, or at least the contemporary of Plato, Caesar and Virgil. Any test was welcome provided it was old. The movement did not halt at any special field, mathematics, or botany. The Greek Theophrast became once more, in his Greek garb, the authority he had been in the Middle Ages, for plants, Ptolemaios for geography.

It is easy to see why progress in the understanding of the classic texts was a draw-back in the field of natural science. Here, it repressed the drive for direct observation and experiment. Since Celsus taught that four humores (saps) filled the inner part of the human body and produced, by their divers concoction, the four tempers of human character, it seemed superfluous to begin the study of life all over again. No wonder, then, that the first real scientists were persecuted and scorned not by the church but by the humanists. The humanists being

as eager as any Don at Oxford today for writing and speaking an immaculate Latin, found fault with any member of the profession who neglected these formal arts and preferred the soiling contact of reality to elegance of style. The nearer a scientist came to the problems of biology and psychology, the more difficult became his position. Anatomy, Mechanics, and Astronomy were less imperiled than research in the field of living substances where many more ancient prejudices survived. The tradition of Humanism in later centuries was generous toward the anatomical findings of Leonardo da Vinci or Vesalius, towards Kopernicus and Galilei. It never pardoned the pioneers in the field of life. Almost, one is tempted to say that the humanists living in a world of printed books, of dead paper, little objected to additional discoveries in other departments of dead matter, such as stars or stones. They turned a deaf ear to all attempts at rediscovering the secrets of life. The result of this humanistic prejudice was a colossal predominance of mechanics in the last four centuries. The study of the dead by far prevails the study of living substance even today.

Humanism, in order to defend its birthright of dealing with classical texts, did not shrink from lies and legends to monopolize fame. Modern textbooks on the history of science are filled with these distortions of facts, the arbitrary choice of heroes, the suppression of real pioneers.

The most illustrious victim of Humanism was Paracelsus, the founder of modern biology, biochemistry, pharmacology and internal medicine. His fatal conflict with the Humanists of his time is of so gigantic dimensions that modern scientists like Dampier who try to give a history of science, remain helpless before this tragedy. Since they are convinced, at the start, that Humanism was progressive, they cannot conceive of any falsehood in the official record.

Still, the sources are all available now- and were available when Dampier wrote in 1927 -. They disclose an example of the reckless terror practised by any victorious body of thought, and of the torments of real genius that has validity for all times.

Fascinating as the life of Theophrastus of Hohenheim undoubtedly is - its greatest importance lies in suggesting the true relations between books, life, progress, and legend.

#### The Antecedents of a New Life

In 1493, Paracelsus was born as the son of a physician in Eastern Switzerland. He was ten years



younger than Martin Luther. His birthplace, the village of Einsiedeln, is a center of pilgrimage famous even in our days, because of a miraculous Madonna in the Benedictine Abbey. One might compare such a center at the end of the Middle Ages to a place like Saratoga Springs or Karlsbad today, or to the temples of Asklepios on Rhodus in antiquity, instead of comparing them to modern Lourdes. For no dividing line then separated medical treatment and religious elation. This division to which we are so devoted today, between physician and priest, did not mean very much.

The father, William of Hohenheim, was a great admirer of botany, and the surroundings of Einsiedeln offer a rare opportunity of finding the alpine flora in all its wealth. "On the meadows, banks and in the woods by the Sihlstream and in the valley where swamps abound spring, summer, autumn, and winter bring countless plants to bloom and fruition. In the meadows, primulas, gentians, daisies, salvia, ranunculus, orchids, camomile, colchicum, borage, angelica, fennel, kuemmel, poppies and martagon lillies succeed each other. In the woods, pirolas of five varieties, woodroot, belladonna, datura, violets and wild berries are plentiful. On the banks and roadsides are campanulas, foxgloves, chicory, centaurea, many different veronicas, plums, mint, thyme, vervain, smilax lychnis, St. John's wort, potentillas, ribwort, and witch herb; on the swamps are the mealy primrose in great patches of lavender and purple, sundews, myosotis, pinguiculas mallows, equisetums, selaginella, a rare orchid, and on the moors and mountain slopes erica, azalia, alpenrose, saxifraga, grass of Parnassus, dianthus, wild plum and wild berries again. And these are but a few out of a much larger list" (compare the book of Miss Stoddart, p. 25 f.) All this surrounded the child and in honor of this environment he was baptised Theophrastus, with the name of the greatest botanist of antiquity.

This vegetation blossomed around the sanctuary of a medieval clerical community where healing, prayers, immemorial wisdom of the universal church and local therapeutical experience all were blended together.

From this first environment Theophrastus was transferred into a second of no less extreme character. After the quintessence of medieval civilization the most modern and radical industrialism. William of Hohenheim moved to Villach in Karinthia as a teacher of chemistry and a physician. Here the wealthy Fuggers, the Pierpont Morgans of the times, operated mines. These mines, Paracelsus described gladly: "At Bleiberg is a wonderful lead-ore that provides Germany, Pannonia, Turkey, and Italy with lead; at Huettenberg iron-ore full of specially fine steel and much alaun ore, also vitriol are of strong

degree; gold ore at St. Paternion; also zinc ore, a very rare metal not found elsewhere in Europe, rarer than the others; excellent cinnabar ore which is not without quicksilver, and others of value....and so the mountains of Karinthia are like a strong box which when opened with a key they reveal their treasures." At Villach, the technique of production anticipated by centuries the capitalistic and industrial forms of our days. Big water pumps, complicated screwing machines, and elaborate processes of chemical precipitation were in use. Even the forms of business were radically modern. For the need for capital had forced upon the mining industry the system of Kuks, i. e. of anonymous ownership of stockholders. Furthermore, the miners were working in shifts, regardless of sun or moon. And a free market for the goods sent over Eastern Europe, and for the labor supply that took in capable men of all nationalities, rounded off the picture of an absolutely modern society.

These two phases left Theophrastus von Hohenheim with all the existing information that the Middle Ages and Modernity were capable of offering. As a matter of course, he learnt Latin, and wrote a terse and precise Latin ever after.

The particular constellation of his antecedents did not end here. His early life contains a third chapter. And here, the great new principle emerged, a new kind of intellectual intuition developed, combining the rare advantages of his education with the impressions of the Wanderjahre that now followed.

Today, we are accustomed to assume that a man who talks about mushrooms will look up the places where mushrooms grow. On the other hand it is widely known of the 16th century that students would travel and rove between the seats of higher learning. So when we hear now of a period of travel in the life of our hero, we may think of it as very natural. It would be a mistake to deal with this third chapter in a casual way. Between 1514 and 1526, Paracelsus travelled through every country of Europe and the Near East. He was in Venice and Stockholm, in Spain and Greece, in England and Denmark, and of course, in France, sometimes studying at a university, mostly, however, earning his way as a physician in one of the armies during the many campaigns of those years. Now, in at least a dozen passages, Theophrastus deals at great length with the significance of his journeys. When we recall that Columbus asserted to himself and others that he went on a Crusade for converting the heathen, and that most of the wandering scholars begged alms on their way from one "Generale Studium" (i. e. University) to the other, we will understand the following quotations to be highly original.

"That I travelled widely and resigned me to a life of migration without any stable place or home, is reproached me by the regular scholar. They say that I am less useful. But you will understand my resenting to see a merit turned into a crime. At home nobody learns his craft nor will he get wisdom from behind the furnace. For the arts are not enshrined in our native place. They are not given to one man only nor to one place only. We have to collect them from different places and to get them there where they blossom best. In this my witness shall be the firmament of stars, where the inclinations are peculiarly distributed, not compiled in one section, but according to the nature of the upper sphere the rays expand everywhere. Is it not righteous, then, to persecute their ends and to observe them in all their filiations? Science is not obtruding itself. We have to look out for it. Hence I was obliged to go in search of science since she would not come by herself. When we wish to be with God it is we who have to go to him who speaks: come to me. When we wish to learn about a person, a city, a country, or the nature of the sky, or the qualities of an element, we must betake ourselves to that place. Could anyone become a good geographer behind his stove?

"The same is true in medicine. For the diseases themselves occasionally migrate and tour the whole world. If a man wishes to know as much as possible about disease, let him migrate. English humores are not Hungarian, and Humores of Naples differ from Prussian. And so you go and look them up each in its place. Wisdom is god's gift. Where god puts the gift there we have to seek it. This knowledge is arduous once we perceive that we must seek god's gifts where they are hidden and that we are in a way compelled to go where he placed them. It is not comfortable and it is no fun to undergo all the hardships of travel. To sit at home in your mother's lap and to eat your fine meals, to have the temperature, hot or cool, in your home to your pleasure, and to wear the clothes you like best certainly is the easier proposition. But to travel is the only way of reading the book of nature. That I can prove from its very character. A man who wants to explore nature, can't help turning the volumes of his library page by page with his feet. Scripture is deciphered through letters. Nature is explored through our feet taking us from place to place. As many countries in the world, as many pages of nature. Such is nature's manuscript and that is the method of turning its pages." In another work, he describes the character of tartar, gallstone, calcoli, all the various solid concretions formed in any part of the human body in excess. (In fact, Theophrastus was the first to give a unified interpretation to these various sediments or "scoria" formed by the process of living. This discovery enabled him to reject the Galenian theory of the four humores

that blinded medicine for another two hundred years against the formative powers in physiology.) In fighting the classical tradition he exclaimed: "Man's calculous disease should be judged with regard to the stones or calculi that are prevalent among the people of a particular country. And since no variety of calculi is described in the libraries containing theoretical books we ought to seek another library in which the story is told by demonstration and which contains the species genuinely and completely. The universe is this library of which not one part only may be read, but we must keep volitant through all its elements, and through its upper and lower sphere.

"The human mind knows nothing of the nature of things from inward meditation. I have to remind you that fantastic imagination does not adorn the physician. That which his eyes see and his hands touch, that is his teacher. Take an example: A denizen of a monastery who lived in it forever and saw nothing except monastic habits and ritual, will find himself ignorant of any other habits when ever they occur. Put before this man the problems of the calculi. He may try to decide them by monastic speculation which springs from mere human imagination. This monk never can read the true fundamentals. Still he can be the best expert for his monastic rules. And this applies to the situation in medicine. We have doctors indulging in speculation and bookreading and they will not hear much more than the monk who listens to the chiming of the bells of his chapel. I mention all this in order that I may explain why I eliminate and reject the description of calculi given by the ancients. We ought not to hand down speculative knowledge, and we should use true demonstration.

"And this is not restricted to the doctrine of calculi. It is required in universal medical theory. For this theory takes its foundations from the things existing in earth and water. So from these two elements all description of tartar will start. I do not establish any limits to this library. Paper with the wrong theory on its sheets may tell us nothing about the true origin. Whereas earth and water, i. e. the material world, are like true matrices and are the genuine books and manuscripts. Since this is the kind of book for medicine, I confess that where I am going to stop a second, a third, a fourth volume will begin until all are conceived and accomplished. In other words, if I claimed to have travelled through Asia or Africa and to have turned their pages that would not be true. Through the larger part of Europe I went and explored. Who could penetrate into all the corners of the world singlehanded? I am writing for Europe; and I doubt if my writings are profitable for Asia or Africa. As every day has its affliction so every place is close to a special evil. This applies to every nation, province, valley or

climate. Hence every one of us is like a cosmographer or geographer, turning some pages of his art with his feet and surveying with his eyes the characteristic element of each place. In this way, we shall build up a survey of all countries so that we may learn how many species in each single country exist. Let every physician collect all data about the peculiarities of his district. When this is done in the same spirit by all doctors of all places and countries, then finally the book of medicine such as it consists in (the material world as represented by) earth and water, could be written out, with a sure foundation, in paper and ink, and be sealed. Even then, this book of paper would not be more than a map of the real world. No map can be read by a man who never saw the real world. However, you may attain the true library of the physician's religion once you amassed your erudition out of the genuine book of nature and tested all your work by this true touchstone of philosophy."

As far as I can see, we here have the first and most glorious program of the things that came to pass in the four hundred years that followed, in terse and pithy language. It belongs, one should imagine, to any history of science that is true to the principles laid down by Paracelsus and accepted by all great scientists as their method of research. Unfortunately, these principles are not applied when scientists write the history of their science. This is not the place to give the interesting causes for this failure. Our quotation gives the lie to the humanistic legend that Theophrastus was "an arrogant quack as ever one lived", as a recent expert on Humanism thought fit to call him. I question Mr. Preserved Smith, the author of the Age of the Reformation, and shall question him again later, as I question Mr. Dampier, if they were acquainted with any of the central works of our man, when writing about him.

Theophrastus transferred his new method from mere geography to the more general field of space when, in his main book on philosophy, he uses these words: "Open your eyes. Do not stare at the stars only and their revolutions as the astrologers do. Observe what is at your feet, also. A man should not turn his eyes to one place only, but let them roam through different spaces and places. Besides, open your ears and try to listen to unheard noises. Nowhere is earth so empty or inane that eyes and ears should not have many things everywhere to look at and listen to. The further your legs take you to foreign countries, the more your eyes see and your ears catch. Everywhere you fall into the midst of god's works and miracles the inspection of which will polish and illuminate you. Neither do all animals stay in one spot nor are all fruits collected in one garden. We must keep roving through all the kinds of the creatures so that we come to know them, as the

expression is: "from beginning to end". God works in heaven and earth, fire and air what he wills. There you turn and spot him where he is at work."

We see that travelling was only the most obvious and external form of the new method. Since any space contained its own text, the infinitesimally small space of a nut shell deserved laborious investigation. Experimentation in the laboratory, then, is pressed by Theophrastus, much in opposition to the ivory tower tradition of the Galenians. He says: "The analysis of those material things that grow from the earth and are easily combustible such as all fruits, herbs, flowers, leaves, grass, roots, woods, etc., is carried out in many ways. By distillation first watery distillate is extracted, then the gaseous products, the third product is resin, the fourth the combustible, the fifth the ashes. When this analysis is performed, many splendid and powerful remedies for internal and external use are extracted. Therefore I praise the chemical physicians. For they do not resort to loafing or going about gorgeously in satins, silks, and velvets, with gold rings on their fingers, silver daggers at their hips, white gloves on their hands, instead, they tend their work at the fire patiently day and night. They do not go promenading, and find recreation in the laboratory wearing plain leathern dress and aprons of hide on which to wipe their hands, thrusting their fingers amongst the coals into dirt and rubbish and not into golden rings. They are sooty and dirty like blacksmith and charcoal-burner; hence they are not showy, waste no words, don't gossip with their patients, and do not advertise their own drugs. Too well do they know that the master is known by his work, not the work by its master. They are convinced that talking and chattering do not help the sick nor cure them. Therefore they leave those things alone and busy themselves with their furnaces and learning the processes of chemistry. And here is a list of these processes: distillation, solution, putrefaction, extraction, calcination, reverberation, sublimation, fixation, separation, reduction, coagulation, tinction." (from his "de natura rerum")

In fact, we owe to Paracelsus the notion of gaseous processes and the terms "reduction" and "reduce" which today are so familiar. Theophrastus, it is true, did not say gas; his first successful disciple, van Helmont, put this abbreviation of the word "chaos" used by Theophrastus in circulation. However, the concept is wholly Hohenheim's. And like his discovery of the unity in all sedimentation, "gas" put an end to the division between air and solid bodies, by definitely proposing the idea of different aggregate status for any substance.

Of this ardent observer of real processes

Mr. Preserved Smith writes, *The Age of the Reformation* p. 513: "He worked out his system a priori from a fantastic postulate." So deeply rooted is the a priori in the mind of the biographer of the King of the Humanists, of Erasmus of Rotterdam, that an adversary of Humanism is not treated with the fairness accorded to any criminal: to be judged by his own acts and words, and not by the slander of his humanistic enemies. The outcome is this fantastic line of criticism.

The new method and the new vocabulary implied new social conditions too. The academic clan never tired of scolding Hohenheim for living with the common man. He roomed in the pubs and taverns like a hedge lawyer, and he talked mostly to peasants. "You are telling me that I should converse with the doctors at Louvain, Paris, Vienna, Ingolstadt, Cologne where I had real personalities under my eyes, no peasants, no tradesmen, aye, masters of theology or medicine. However, I inquired and searched for the true and experienced arts of medicine not from doctors only, also from barbers, surgeons (at that time kept far apart from physicians), learned physicians, women, practitioners of sorcery, alchemists, in cloisters, from the noble and the commoner, from the wise and the simple."

Accordingly, among the seven rules for the surgeon in his *Antimedicus*, the first runs as follows: "He shall not consider himself competent to cure in all cases. Assume the case of a doctor as wise and learned as is conceivable, there will come an hour where a case puts to shame all books and all experiences and startles him by its unfamiliarity so that however learned he may be, with regard to it, he feels lost. For that reason, you and I should learn daily, note, observe diligently, despise no communication, nor trust ourselves too much, and above all, realize how little we can do, even although a doctor and a master. Therefore, you have got to remain in the state of learning because who is able to do everything or who can know where all cures are to be found? You must travel and accept without scorn that comes to your hand."

No wonder that this "arrogant quack", with the "fantastic a priori postulate" wrote, with the humility of genius: "Now it is perfectly true that earth contains many things which I do not know and which are unknown to others also. For I know very well that God is going to disclose many remarkable things of which we all never knew a bit. And it is true also: nothing is hidden which is not to be disclosed. Hence there will come after me, one whose great power is not yet in existence, and he will disclose it." (*Werke* III, 46)

So we see the maturity of a man who stands equally far off from snobbery, from bookishness, from

self-complacency. He had been raised in the arms of all the gods of reality, at Einsiedeln, at Villach and in his Wanderjahre; the living spirits talked to him whose very existence the snobbish, bookish and self-conceited man of society ignores or tries to ignore.

And at this moment, in the 33rd year of his life, A. D. 1526, this man was called to fill a chair at the citadel of humanism, at the recently established University of Basel. A cure that restored the health of the illustrious printer Froben, a friend of the great Erasmus and the political leaders of the city, paved the road to the unusual appointment.

For one moment, both humanism and science, might seem equally modern, equally valuable for the Reformation. Actually, two contradictory forms of thought, of research, of social standards and of faith clashed in the tragedy of which we have to speak now.

### 3. Theophrastus becomes Paracelsus

An unbroken chain of authorities waited to receive the student of an academic community. From the very beginning, he had to sacrifice his wordly ways of thought and speech since all teaching was done in Latin. Any new language implies a new loyalty. This loyalty's meaning was made conscious when a student graduated. He would take an oath "On the book opened and on the book closed," promising to read first and to comment later. No teacher was allowed to teach his own doctrine; down to 1800, and in many colleges even today, teachers lecture "on" certain books written by others. Nowadays, however, the book may be written by a contemporary. This was not done as late as the days of Kant. The great Immanuel Kant had to lecture on an older man's book during all his academic career.

Into this world of Latin lectures "on" authorities, Theophrastus jumped. His proud name was exchanged for a new one, Paracelsus. In his days, any Tailor became a "sartor", Descartes became Cartesius, any number of Latin translations of French, German and English names could be listed. Theophrastus of Hohenheim continued to call himself by his original name; alas, posterity only knows him by his nickname, a name given him by his enemies as a stigma on his academic career. And so everybody speaks of Paracelsus today; I myself am compelled by the weight of tradition to call him that; and yet, I know that the man himself would feel hurt if he heard me quote his enemies. They seem to have taken advantage of his frequent use of the greek preposition para, (praeter) which two titles of book, The Paragranum and the Paramirum contain. So Paracelsus literally means the 'Super-Celsus'; Celsus was a twin of Galenus, the old Roman medical man.



The originality of Theophrast, his aloofness to bookish tradition spurred the academic clan to hail him ironically as the man who made Celsus superfluous, being a kind of Super Celsus. Like an I N R I on a cross, the nickname Paracelsus stuck. It greeted him probably unofficially in his very first days in Basel; and as late as 1800, his disciples would call themselves Paracelsists. And Theophrastus himself, after some reluctance, acquiesced at being called this by others. Since the thing is apparently unknown, I wish to say that he avoided the name for himself in all formal publications and statements till to the end of his life.

This Super-physician who as we saw before simply kept his feet on real mother earth, his mind on real data, delivered his lectures in - plain German. No modern language, in 1500, was trained as a vessel of science. Paracelsus created a terse and simple German style for all he had to say and tried to express. Since it is hardly possible to prove this to anybody unable to read him in his native tongue, the tremendous influence of his creative style, and its enchanting power, again, only may be pointed out by the fury of his enemies who, from his second German name Bombastus (which means: twig of a tree) deduced the word bombastic. In fact, this word for a swollen and exaggerated style is derived from a Greek term for silk, cotton; and the bony and pithy sentences of Paracelsus are everything but cotton. The victim of Humanism, of course, had to pay the price for being not interested in the rules of Golden Latinity (which, by the way, he wrote as easy and as fluently as any one of them; which he yet did not think very important). The first man in the Western World for centuries who lectured in a University openly in his native tongue, was stigmatized not for his simplicity as you might expect but for his "bombasticity".

When we turn to the content of these lectures in the native tongue, we may get our information from his program. Any professor would publish a program of his lectures in those times. In this printed sheet, a list of his authorities, his "assigned readings", so to speak, was given, and the method of his course on these authorities. Theophrastus certainly would have been insincere had he advised his students to read the accepted books. He announced his authorities in these terms:

"Smooth talk in different languages does not make a physician nor the reading of many books; he is made by the knowledge of the material world and its hidden powers. The physician's business is to know the varieties of the processes that take place in the body, and the right remedies that exist in nature, with insight and industry. I, therefore, am going to dictate to you books of which I am the author myself - "quorum et ipse auctor",

for the program, at least was edited in Latin - and which are based on a long and trying courtship of Lady Experience. In case you are willing to be led by me into these new paths of study, come hither to Basel. However, it is not until you have listened to Theophrastus that you may understand and judge his purpose."

Today we know that this was the program not of a professor appointed by a city, but of a genius appointed by god to bring forth a complete system of biology, chemistry, physiology, including new drugs, the greatest connoisseurship of all mineral waters and medical springs, a clear insight into the reforms of pharmacies, hospitals, and the whole practice of hygiene, miraculous healing etc. This man understood - what is rediscovered in our generation -- that mental diseases and psychic wear are two quite different classes of illness. He was an experienced surgeon, too, and strangely enough, here, the envy and hatred of his fellow physicians stopped because this was outside their domain. What I was stressing, by this enumeration, is this: This man's program was modest in comparison to the wealth that was taking shape in this mind during the 34th year of his life. It sounded impossible and arrogant in the halls of tradition. The man, who exalted German for the first time to the range of a spoken scientific and yet pithy language, stated in a few sentences that a life unique in its antecedents and its opportunities was ready to bear fruit in others. In the sudden contact between his new universe of experience and the old requirements of lectures and bluebooks, all his glimpses and insights and his many draughts and designs crystallized. Of course, in the year itself, only particles of this new treasure could be precipitated. Nevertheless, it is a fact that this one year marks an epoch in the whole rich production of Theophrastus. It seems as if every sentence spoken at Basel, every question put to him in these few months, every idea articulated under the pressure of regular teaching here, was, by its belonging to this extraordinary year, indelible, for ever asking to be further developed. Like promises which an honest man makes good, these words were all followed up by weighty and voluminous works.

Rarely may we observe this process of crystallization that is hidden behind the stereotyped term of character. The Greek word "Character" means face of a coin. Now, a man has no character as a child. Character befalls us in our first full exposure to the world. And in the life of real genius, this process leads to a real change of the universe because something new that never existed before is produced by life's melting pot. Theophrastus acquired his character indelibilis, his appointment by God, through his conflicts with the men among whom he had to live by the odd appointment to a professorship.

Scarcely was he appointed when the faculty objected to his academic training and credentials. He applied to the City Council that upheld his good and valid title of doctor, acquired at Padua in Italy a decade earlier. Soon the attacks became more serious. Theophrastus, according to his appointment, was supervisor of the pharmacies of the town. He soon found out that a racket was in existence between pharmacists and physicians, and putting an end to this exploitation of the sick he naturally incurred the lasting hatred of a craft he had exposed. The financial background of the passions roused against him is of peculiar interest; humanism always was inclined to ally itself with the rich and, for that reason, was easily bribed. Theophrastus was incorruptible, Erasmus was not.

Against this background of suspicion and fears, the teaching itself was polluted by the interference of outsiders. His students were bribed by his colleagues to report his lectures so that they might get hold of some material against him. His programmatic sentence "quorum et ipse auctor" was too deeply resented by the herd of ruminators; and well were they protected by law. We find thirty years later a man in England, a medical doctor, forced to ask official pardon for having criticized the writings of Galenus! No wonder that an enraged colleague of Theophrast quoted two decades later, as proof of the man's madness, the "quorum et ipse auctor".

Very soon the attacks on him took the form of songs and pamphlets. In his examinations, his colleagues intervened with insulting questions. His nickname "Paracelsus", Super-Celsus, was invented now and passed around. In one poem, Galenus himself returned from Hades to scold the innovator. What did the students do? This raises an interesting issue. We are brought up under the tacit understanding that youth is magnanimous, generous and full of sympathy with genius. This is a half-truth only. We may say: sometimes, some young people are this way, The majority never is, at least it was not in the great case before us. Perhaps, to understand this situation, we need a parallel from light. Sun-rays and the light of distant stars travel quite a bit before they reach us. It is hard for us to grasp the fact that the light we see today generated a full century before. Is it not true that the light generated by a human heart undergoes similar laws of irradiation? It is not true that a man sharing the same room with genius and listening to his speech, is able to get at his thought. When a new light shines up among men, in its first year of appearance, it hardly is visible. As far as it is observed at all as "something", we may be sure that it will be misplaced and disqualified and classified under "madness", or "heresy", or ridiculed. The thoughts of man travel as slowly from one man to another as the

light of the stars.

For that reason, it is not to be wondered that the students of a new humanistic center were not prepared to understand the new deity of experience and experimentation and her prophet, Theophrastus von Hohenheim.

Hohenheim, himself, loved to instruct and to impart his knowledge; and in every country, apprentices and fellows gathered around him as assistants so that they might learn some of his secrets. Once he talked about them frankly: "So many disciples are conceived by righteous physicians and yet they turn out failures not following their preceptors. Coordinating teacher and pupil is impossible except both remain in the realm of immediate experience. Though I begot physicians by the hundreds, only two were a success from Hungary, three from Poland, two Saxons, one from Slovenia, one Bohemian, one Dutch, not one Swabian (this last remarks, perhaps, includes his years in Strassburg, Colmar, and Basel.); yet, of each race they had been numerous. Each saddle my teaching after his whim. One abused it for his purse; another for his vanity; again another emendated it. Some though themselves more intelligent than they were. Some were able practitioners however, without the subtle understanding; some were clever, but, being clumsy, they became arch scoundrels." (Werke VI, 55)

On St. John's Eve, the 24th, of June, the students usually had great fires, and threw into these fires all kind of rubbish. Attacked and slandered from all sides, the "Super-Celsus" calmly approached the fire and threw one of the standard textbooks of medicine into the flames.

Fashionable Humanism, vested interests, and the anxiety of the students for a regular career, all three were roused by the personality that came from a world so far outside established society, from god's world itself. His great friend and protector Froben died when Theophrastus visited Zurich, the neighboring place to gain support there from his colleague supervisor.

The death of Froben brought things to an end. Without Froben, he was unable to print his new ideas. Without winning the general public for his ideas, certainly he could not secure the toleration of the local powers. Before retreating, Theophrastus tried, very soberly, to rally with his colleague of Zurich for a publication on drugs, the supervision of which was their common duty. Since humanistic enmity, for centuries, decries him as a drunkard, crazy, a quack, overbearing, impossible to live with, it only is fair that we should investigate one single occurrence where we are able to see him act within society.

His colleague, Klauser, had introduced him to the students during his visit. Theophrastus, in a letter, reminds him of their pleasant gatherings and revives them by some merry remarks. Then, he goes on to describe his lecture on the grading of prescriptions, a topic of first rate importance for both correspondents in their character as city-physicians. And since he notoriously rebukes Galenus, he entrenches himself behind the authority of Galen's greater Greek predecessor, Hippocrates. Shielding his own revival of research by Hippocrates he releases the same forces that every innovation within the last humanistic centuries would set in motion. Adding weight to the Greek part of the classics always was used as a means to develop a new aspect of reality away from the Roman tradition. At the end of his book, he asked for help to print the book on grading.

The letter is a specimen of good manners, good style, and superior sobriety. The manuscript, however, never was printed in Paracelsus' life-time. The lack of urbanity, then, is not the reason of his failure. What, then, was it?

I venture to think that we may peer into the machinery of hostile reactions by studying his way of quoting Hippocrates. Humanism was based on written authorities, on the undoubted existence of "classics". When the Humanists reprinted Hippocrates, they cackled because a new Greek author was added to the list of classics. The classroom needs authorities. In the Chair, we all are compelled to rally behind big names, great books, established reputations. Reluctantly or not, any public teacher has got to quote other books and other authority. This seems to be a kind of sociological law. The law probably is caused by the unreal character of a classroom in which we assemble, three times a week, for mental rumination. Public teaching is impossible without pointing to events that are more direct, more real, more adventurous than the processes in the classroom itself. It seems that the environment in a class is too unreal to endow our words with the halo of complete reality. The deficit is made up by quotations from more direct, more fully real authorities.

Now, Theophrastus was accustomed to outdoor life. He never quoted others when his own experience supplied him with what to say. He wrote the proud line: "Never did I write a word without experience!" When entering public teaching, he suddenly felt the rules of the new game around him, and honestly made an effort to comply with them. He quoted Hippocrates. Unfortunately, he quoted him as a colleague who corroborated his own findings. Everybody could scent that Hippocrates was not quoted because he was a classic, but because he was right. We shall mention later how this invincible law of teaching determined Theophrast's own literary reputation. Others

lack genius, Theophrast might have fed seven medical faculties with his inspiration. All his problem in Basel and in his after-life was authority, and once more authority. It was queer how he finally acquired it.

Physicians, colleagues of the faculty, pharmacists, students gathering against him, a rich patient of Hohenheim, a canon, thought that he well might abuse the lonely figure. He declined to pay him the promised fee after a successful cure. The insolence of the man being obvious, he was sued in court for the fee; when the judge, on the formal reason that the fee was not fixed by Theophrastus but, in the form of a public promise to anybody, by the canon himself, dismissed the case, Theophrastus used an expression of disgust. Now, he was caught. This was contempt of court. His enemies now could proceed without even mentioning professional motives. Exile into the higher Alps was proposed. Hohenheim left the city, his mission as the teacher of a new science now being perverted into a fight about his accidental "contempt of court". He escaped to a friend in Colmar where Gruenwald's altar stands. His resume' of the year was given in lapidary style by himself in a letter: veritas parit odium; Truth engenders hate.

#### 4. After-Life

From his appearance at Basel to his death at Salzburg a sandy desert seems to extend itself. In Basel, his enemies were able to get rid of him under shallow pretexts which enabled them to evade the real issue. In Salzburg he succumbed to an assault against him by the hirelings of his lasting enemies, the humanistic physicians. Morally and physically, then, the profession tried to destroy him, and did destroy him in any wordly sense of the word completely. The years between 1527 and 1541 were one constant fight uphill. Sometimes he was turned away from a town because of his shabby clothes though sometimes, as in Pressburg, he was received like a prince of science. He wandered, between Rhine and Danube, in Switzerland and Austria, in Bavaria and the Tyrol. His reputation as a great physician did not abate; he was able to leave a considerable amount of money to the poor of Salzburg. And his generous attitude toward the poor survived as a tradition for centuries. As late as 1830, the people at Salzburg, during an epidemic of cholera, prayed at his grave for protection.

The desert, then, that surrounded him, was not external starvation so much as the permanent danger of complete oblivion, of seeing the "great monarchy of medicine" that he felt had come down in his times upon earth, and had crowned him first, without any presumption on his side - of seeing this unique revelation cancelled and deleted from the book of history as if it had never existed at all. It

took him years to realize the full intensity of his outlawry. At first he assumed quite naturally that local powers at Basel could not represent the universe of science. He was ready to fight. He put forth his claim in violent language breathing the excitement of a man who feels that he stands for something sacred, entrusted to him for all mankind. He soon found out that 'the powers that be' wherever they might be, identified themselves with their representatives at Basel. When it transpired that the City of Nuremberg was willing to print one of his manuscripts, the medical faculty of the University of Leipzig intervened and successfully prevented the print. In 1537, the Estates of Styria promised to print four tracts which he dedicated to them. They never kept their promise, and the manuscripts still rest in the Styrian archives. The only considerable work published in his lifetime, was his surgeonry in which the medical profession was less directly interested. After forty eight years of toil in life, Theophrast von Hohenheim had to wait another forty eight years after his death till his real medical work was given to the world. By a chain of accidents, this vindication of his work did not contain the surgeonry. This gap in the monumental edition of the faithful Huser, in 1589, is like an ironical remark of fate, whispering: Look here, the only thing his contemporaries were willing to tolerate is less important and valuable than the last sheet preserved by faithful friends in secrecy and appreciated by posterity as starting a new era in our attitude towards life.

His difficulties were increased by his unwillingness to take sides in the religious struggles of his time. He was neither a Lutheran nor a Baptist, the two aggressive groups of the period, nor could he, with his great vision of a living universe, overlook the imitative character of ceremonies and miracles in the traditional sense. In not being able to identify himself with any one of the three parties, he forfeited the claim for support which even an unworthy member of a party gets. He had friends in all groups; and he was bound to disappoint them all in due course when they wanted him to join their religious fight. This would have meant high treason to his new "Monarchy of Medicine." Being the only general and soldier of this new realm, these fourteen years put upon him the burden of making an everlasting impression on a world that did everything to prevent him from leaving any vestige whatever.

No monastery, with its great collection of manuscripts, could be of any use for Theophrast. Public archives and libraries did not exist. Of this dilemma, Hohenheim disposed by cultivating friendship.

Everywhere he made friends, one or two perhaps,

but intimately affected by something inexpressibly great in the man. These people became the trustees of his knowledge and the manuscripts which he dictated. Without a place in which to stay, during constant medical practice and traveling thousands of miles, he managed to produce about ten thousand pages of manuscript in these fourteen years. This alone shows his great power of concentration, and the high degree of discipline; it suffices to put to shame, as also do his pictures, all the slander about his being drunk constantly, one of these silly inventions that have been used against any President of the United States, in the same way as against Paracelsus.

However, this was not all. His task was much more complex. We, in our luxury of libraries and books and scientific progress don't see easily the real obstacles of a great man in the sixteenth century. Leonardo da Vinci who often is called the greatest scientist of his time, left some unreadable notebooks and sketches behind him, a collection of hints, divinations, anticipations. To call such a man the greatest scientist, is the cheap apology of an epoch that is willing to concede everything to a great artist, but knows little about the sociology of knowledge, about the problem of placing knowledge in a place where it can bear fruit, where it can begin to change the daily practice of others, be taught in schools, transform the world with the power of a new gospel. This, and not some ideas scribbled in a notebook, is so difficult to achieve.

His real difficulty, therefore, went much deeper. In times where no Encyclopaedia Britannica gives the illusion to everybody of his having access to the whole universe, he stood for the comparative study of natural phenomena, for travel, for a map of the world based on the collaboration of thousands of scientists all over the world. He stood for a new place of biology and medicine in life and society, by which the meaningful character of illness, as a process of life itself, not as an external and accidental "thing" from outside would become visible: "Man acts continually against the laws of his nature. A time will come when disease will be the result, because the organism requires a period of rest and a renewal of strength to expel the accumulated poisonous elements. If the physician attempts to prevent such an expulsion of poisonous elements, he attempts a crime against nature and may cause the death of his patient (On the Character of Poison)." He knew that mercury was the thing to use against syphilis, he knew of the therapeutic usefulness of zinc, and of laudanum as well, three new and important drugs. He knew how many diseases were of mental origin, and in an ingenious scheme saw man hanging so to speak, in five systems of different range: the mechanical and physical, the neurologic or nervous, the psychic and mental, the spiritual or astral, and finally, of the god head.



That is to say that a man can fall ill and practically falls ill on one of five levels. Sometimes he is wounded mechanically and physically; then he ought to be treated on this level. But any one of the more complex systems in which he is embedded also may make him ill, and give very similar symptoms. Curing him on a wrong level would not restore his health. A physical disease originating in a mental condition, a nervous disease provoked by psychic wear, a mental disorder caused by a 'social', - this has become our term for 'astral':- lesion, depend for healing on first being traced to their source.

The physical level was real and deserved most intimate experimentation; but it did not mean what we call physics, the science of the dead parts of our physique. Body did not mean a carcass; the natural world did not mean a collection of glowing stones. Theophrastus wished to follow the light of nature because nature was to him the living cosmos. He used nature in the sense A. T. Whitehead might use it, in the sense of the Greek Cosmos. Nature in the sense of Cosmos includes all living processes, divine, human, social, physiological, biological, and, finally, mechanical. Since, however, the physicists had not triumphed in his days, Hohemheim had not the faintest reason to give any preference to mechanics in his vision of nature. Mechanic processes were not, as most of us take for granted, the basic processes which explained all the others. They were -- and by the way: They practically are -- only one sort of phenomenon in nature among a great deal of others which seemed to him -- and seem to us again -- much more significant and important for the understanding and interpretation of the creation in which we live than the laws of gravity.

This and many more ideas struggled for recognition. They lifted medicine to a new position in the realm of knowledge, taking over some chapters from theology, some others from philosophy, some even, in its social program, from the law.

To find a form for this new order of our world, this fundamentally new and biological Weltanschauung, was the real problem for Theophrast. He realized that, not one medicine only, but all our natural sciences, of living and dead substance (*ipsa philosophia et astronomia*) are without any solid and efficient foundation.

It was here that the real danger threatened. What he represented in the full vigor of youth and inspiration, by his record, his experience, his personality, his faith, his devotion to the poor and sick, all this had to crystallize now in a form that would survive persecution and death.

Modern scientists, writing about some special problems of one special field within the valley of the dead which is called nature today, are so unfair towards Paracelsus, because they see no cause to relive his anxieties. How could he save the unity, the harmony, the lawful order of life, thought, art, that had happened to him, and that now was smashed to pieces by his defeat? He seems to start a hundred times to tell the whole truth. Each time he begins at another end; each time the whole, entrusted to him, him alone in the whole world, worries him and he tries to let us look, from his specific starting point, into the whole secret. Up to our days, the cosmos of man, spirit, nature of things, has not found a more comprehensive treatment. This seems a big order. However, when we look upon Descartes, Spinoza, Hobbes, Hume, Leibnitz, -- how many real, concrete processes of real human life, like birth, measles, friendship, despair, superstition, love, do they really tackle? Each one of them restricts himself to a very few. The selection of these very few first principles is significant for just this particular thinker. They follow each other, every one of them pointing to some particular principles. Theophrast Paracelsus is different. Around the problem of life, every experience is amassed, and used as a means of approaching the central problem, and such is his reverence that the wealth of facts is preserved despite the drive to the center that animates all. Out of innumerable monographs emerges his general vision. We shall say something about his great concept of the unity of life at the end of our essay. Here we wish to mention one idea which never was appreciated in its fruitfulness and which like so many of the things he knew and practised, has a future. The theologians preached that the church was the body of Christ, with all the faithful as real members of this real body. Philosophers held that man was a microcosmos, reflecting the macrocosmos of the universe. Hohenheim speaks of the individual little man, and the great universal man. We all, he says, contain innumerable Egos because we pre-form, each of us, the innumerable potentialities that in the full life of mankind then are laid out in full size so to speak. Each potentiality comes to pass and is embodied in one individual or tribe or society. Still each individual is this same universality of all these forms, in a nutshell. In this way, Hohenheim reconciled the profound experience of the church, and the cosmic aspirations of philosophy in a truly human and truly biological and sociological conception. Not revelation, creation makes us members of mankind, but so that any member is representing the whole kind, and still has a partial function too. Modern biology, with its cell-theory, says the same on another level. And the cellular theory again, is not very far from the tripartition of elementary processes that Paracelsus ascribes to all living substance, as we later shall see. In this section, we are concerned with the task of his last fourteen

years. It was not that he had to write down "ideas, thoughts, theories". He had to transform into the poor form of manuscript his life, his work, his struggle, his mission so that a hostile and inimical world would be able to grasp what he stood for: A statesman can point to wars, conquests, treaties, laws, even when he is defeated. But how could this man point to the glory that surrounded him when he came to Basel?

So, in the most unpremeditated way, this doctor began to write on the sociology of medicine, on theology, on philosophy. Many of his theological writings still wait for publication. Our sciences may be compared to a tree, each branch having its proper day of origin, and serving a special purpose. Paracelsus, in his experience, seems to relive this tree of the sciences. For all of them are expressions of real departments of our existence. He did not overstep the limits of his calling when he expressed his actions, the principles of his travels, his motives. All this is inexpressible except in ethical, theological, philosophical and sociological reasoning. The humble servant of the art of healing was compelled to give birth to a full system of thought, the first system not recomposed from the headlines of the tables of contents in Summas and textbooks. This system was wrested from him, in the same way as Goethe meant it for his own writings, as "fragments of a great confession". The writings of Hohenheim are the first scientific writings produced as a life's fruit, wrested from him by necessity not by the external needs of a chair, an examination, a promotion, a functional usefulness within a school.

They were written on the highest level of self-defense where the Divine Inspiration had to defend herself against annihilation and because her servant was disabled to operate as her legate, must be translated into his words as an author. We are observing the slow evolution of new literary forms, outwitting the departmentalization of the sciences as it then existed.



1526

by Holbein

ALTERIVS NON SIT OVI SVVS ESSE POT EST



EFIGIES AVREOLI THEOPHRASTI AB HOHEN-  
HEIM SVE ÆTATIS 47  
OMNE DONVM PERFECTVM A DEO  
IMPERFECTVM A DIABOLO

1 541 40

## 5. The Rule of Twofold Beginning

Since the only level recognized by his contemporaries as scientific was lower than that of his new method, Paracelsus was defeated in Basel, and had to live in mental exile for the rest of his life. How often may he have pondered about this verdict of fate. "Time is man's master", he says in his commentary to Hippocrates, "and plays with him as the cat with the mouse."

Still he took up the gauntlet, thrown against him by the world in Basel, and by doing so, the year 1527 became the axis of his life. Losing his office as a professor, he made his life the profession of the new office that he felt himself to hold. "A physician should be married to his art as a man is married to his wife, and he should love her with all his heart and mind for her own sake. They physician who is not married to his art with his soul is a quack, an adulterer, and an imposter." Weighty words for the man who is accused of just these three crimes. It shows what was on his mind.

In the 15 volumes of the admirable Sudhoff- edition, itself a masterpiece of human devotion and wisdom, and finished a few years ago, one feels that each hour of the man's life found a place somehow or other, and was there condensed into spiritual life. That a poet's works are the true children of his inner destiny, or should be, is a commonplace today. The logic of his works and of his life is one. And this truth is not limited to the artist. No dissociation of the living soul and the works of our hands is tenable. The secret of such a connection between life and doctrine was always felt in the case of Paracelsus. Thus, he became Doctor Faustus to some, a lunatic to others, the greatest alchemist, capable of making gold, the patron of Rosicrucians and secret societies. So far went the feeling that a colossal stone had fallen into the smooth pond of scholarship, in his person, that innumerable forgeries were written in his name. Mr. Preserved Smith, Mr. Dampier, and all the honest humanists who slander this great soul, all write, I have no doubt, in good faith. They glance over an unauthorized edition of his works, and they find mysterious and cabbalistic nonsense. Nobody ever despised this nonsense more than Theophrastus, and what is more, all the contemporaries that are played up against him in modern tradition, Erasmus, Bacon etc., are far more infiltrated by the superstition of their age, exactly as we are by the superstitions of our own days.

It takes that indefinable newness and unexpectedness that we call genius to wage war against superstitions in a constructive way. So great was the gulf that separated him from his contemporaries, Luther and Erasmus, that

only two or three men in each generation after his death took the trouble to seek contact with the real Theophrastus of Hohenheim. The year at Basel, then, created a cleavage, a bifurcation, in tradition. One half of Europe insisted on dealing with him after the fashion of Basel, calling him Paracelsus, ascribing to him every folly, later even inventing arbitrarily a certain Valentinianus whom he, Paracelsus, was said to have plagiarized. Thanks to Sudhoff, we know now that this manuscript was forged long after Theophrast's death. Anybody who admires men like Erasmus uncritically will belong to this half. Fortunately, Huizinga, the latest and wisest of the biographers of Erasmus of Rotterdam, does not share their prejudice at all. The other half, of the people who care for Luther, for national politics, for religion, will overlook Theophrastus for his being so powerless in his own days. Luther, after all, made an immediate impression on everybody. Of Paracelsus, one might almost assert that his light was so far away from his incidental contemporaries that they did not see him at all. So, two halves of mankind can't place him in their picture of the world. They are ready to talk about natural science at a time and period when Humanism and religion retreat to the background anyhow. They do not see that a new form of thought must be lived first before it may be externalized into endowed institutions. And that is exactly what Theophrastus did: He lived that same life of immediate, encyclopedic, unprejudiced, experimental research on which modern society bases its existence.

It is unthinkable that this society could exist today without Paracelsus sufferings. Ninety years after his death, van Helmont, basing his studies on the great edition of the collected works, came forward in his defence. The school of Paracelsists, for the next 150 years, fought its way into the medical schools. In 1750, they were in power. It is a stroke of irony, I at least feel, that Theophrastus finally should enter the schools by the means that he had despised in his life-time and that are, however the only entrance ticket for the universities: by literary tradition. Van Helmont had not known him; he knew his books. He was able to quote him, volume and page. There it was in print, of old. And so it was good, and the advocate of immediate experience, who believed that professor and student could meet on this basis only, had to be introduced to the houses of higher learning as a literary man, to be quoted from a book.

A few of his contemporaries sensed the truth; Pierre Ramus, for example, the great iconoclast who smashed Aristotle, would say: "So deeply did he penetrate into the deepest intestines of nature, with so incredible subtlety explored he the energies of metals and plants for the healing of every disease, even the desperate ones which



mankind thought incurable, that with him as the first leader, medicine seems to have come into her own." And Melchior Adam, a humanist, well admitted that here was a man whose acumen seemed certainly, of a divine nature. Neither Adam nor Ramus, of course, were physicians.

If we transfer ourselves, by an effort of the imagination, into the years preceding the printing of his books in 1589, we shall realize that it is nothing short of a miracle that the force that had sustained Paracelsus himself in his titanic struggle through forty-eight years, after another forty-eight years, prevailed once more. We therefore, may thrust our foot between the door and the threshold, thinking that here a glimpse into the functioning of reality is opened before us that transcends the average by its lucidity and importance. It is, for example, a great temptation to compare now the curve of life lived by Theophrastus of Hohenheim, with the rhythm displayed in the life of Erasmus von Rotterdam or of Martin Luther. Erasmus died in 1536, after having consulted Theophrast for his sickly constitution and repaid him with one of his famous Latin letters. Luther died in 1546. Hohenheim died in 1541, he the Luther of Medicine as he was called. However, though it would serve our purpose of clearing the memory of our man from many misunderstandings, and of determining somewhat better the part of a "Classic", a "revolutionary", and a "founder", we shall restrict this chapter to an interpretation of the rhythm in Hohenheim's own life. What a "founder" is-- something apart from classic, pioneer and revolutionary,-- will, perhaps, become sufficiently clear even under this restriction.

Jesus founded the church, and in 325, this church triumphed for the first time.

So, there is at least one historical process where a founder may be observed in his dealings with reality. Now, Jesus was no pioneer. He was fulfilling something. So absolute seemed the fulfillment that he was never considered a precursor. In him the whole thing was achieved already. Nothing could be added nor taken away later. Leonardo da Vinci for the art of engineering, sometimes seems to me a founder. Everything we admire later in innumerable individuals -- technicians, inventors, mechanics, seems to live in Leonardo as in a cell, the seed of a big tree.

What about Theophrastus von Hohenheim, immortal under the nickname Paracelsus?

The life of our friend is divided into three distinct forms of existence: 33 years before Basel, unchallenged, unattacked, growing. One year at Basel, honored,



placed, in charge of recognized social duties. Fourteen years, after this meeting with the established world of science and teaching, a target of slander, persecution, danger and illness.

The year at Basel, evidently is two-faced. When looked at from the beginning of this life, it is the fulfillment, an unbelievable opportunity to bring the right man into the right place. Looking back upon it from his deathbed, he might have dated back his early death, the tragic character of his life, to this same year. Theophrastus expired during this year, the charming, adventurous, generous, humorous and gay creature; Paracelsus began, the suffering witness of a great new truth, the responsible custodian of secrets which he never knew before to be imperiled. From the adolescent of childlike trust, the fighter, author, founder arose.

This is a thing described in the Bible as the acceptable year of the Lord; The highest times of men are whenever heaven and earth, world and inspiration, seem to meet. The formal appointment of a new professor coincided, in the year 1526, with an extreme case of inner readiness for an unexpected and absolutely new attitude toward science. For a short moment, external position and inner life seemed firmly balanced on all fours. He lived what he taught, and he taught what he lived. This messianic state of affairs never lasts. We cannot live what we teach, nor teach what we live, in the radical sense of Jesus or Paracelsus, since it is impossible to teach regularly for a life-time and because of the breadline, under those circumstances; and it is equally impossible to restrict yourself to a certain department of knowledge in your teaching if your real life shall be covered by your teaching. The simple fact of public or endowed schools prohibits the sale of inspiration day after day. A professional teacher or preacher is responsible for an institution, and not to his personal genius.

The acceptable year, therefore, always draws to an end. And when it ends, it will always entail tragedy, heaven ending, hell of despair opening, calvary and mortification around us.

A man who passed through the height of atonement between inner urge and outer requirement, to whom the harmony of ecstasy and duty, social and divine challenge became real, will utterly die to himself at the end of this period. By the very greatness of the event, he is put apart, separated from ordinary, natural men who always know how to distinguish between ideals and realities, and carefully insist on being called idealists by themselves and others and realists under the watching eyes of their parents and wives and children. All these divisions do not exist in the acceptable time. By a sacrament

or a stigmatization - it really is both in a case like Hohenheim's - he is beyond the interests of the natural man. The pursuit of happiness is now meaningless to him. He looks at his own nature not less coldly than he does at any other partner in the game that is entrusted to him. He will use and exploit and outwit and overreach his own nature to make her the carrier of the message that is entrusted to him. He is in the know; he, then, cannot be called a pioneer, chopping wood in virgin territory, settling a country with his family, driven by an instinct of adventure westward, though a parallel undoubtedly exists. But rugged individualism and the pioneering spirit of property, are meaningless to characters who are dismissed from any prospect of personal happiness. When a man has gone through the absolute, when he is expelled from paradise, the power that makes him survive, is an objective. His own life is a tool now. For though he is nearly killed at first, by the catastrophe that always ends the acceptable year of the Lord, he is still there, very much to his own wonderment. And since he experienced the existence of the divine inspiration beyond any doubt just a moment before, suicide is out of the question. The same power that ruled harmony, is now proclaiming martial law; that is all he can see. Apparently, he is left as a witness of the higher life, as a herald of its promises and potentialities. Sealed with this indelible character, he is under one single obligation: What the world rebuked and refused to accept, has to be proved to be the acceptable gift of future life. Acceptable to God, not accepted by man, this dilemma contains a heroic challenge; for the tempter whispers, of course, smiling: neither man nor god is interested in your craziness. Under the spur of this inner temptation and the external disaster, the child of genius is turned into the fighting apostle. The disenchantment is complete. Few people will realize the degree of sobriety after the accepted time of grace led to the revolt of environment against inspiration. Whether the carrier of the inspiration survives himself, as in the case of Theophrastus Paracelsus, or his sister, as in the case of Nietzsche, where genius was protected by a goose, or in the great paradigm, where Peter, a liar, a weakling, a truculent fisherman, carried on the church, in every case, it is a perfectly rational, earthly, simple duty that is put upon the shoulders that survive. A precious gift being spilled, the drops of which are evaporating in a tragedy, it must be saved by all means. A virile discipline is required when loyal men establish a lawful order wherever an act of grace happens. The virility of the late Paracelsus complements the mirth of his youth; the beauty of his pictures as a youngster contrasts sublimely with his portrait, at 45, bald, pale, deep. (See our two portraits)

The tripartition of life, determined by the ac-

ceptable time in the midst of it, is common experience of all true humans. Only, it is strictly forbidden to voice this; for humanism does not admit tragedy in the middle of life. With great effort, it overturns the order of things; for example, we all talk as if the law came first, and grace and mercy afterwards. And it is true, when we take a crime, that this is the order of things: first the law over-awes the criminal, and he is sentenced to die. Only later may a governor grant a pardon. Here, evidently, the act of grace follows the act of the law. Since St. Paul discusses the Jewish Law and the Christian Grace at great length, it may be that this discussion also contributed to our confusion about the biographical sequence of nature, grace, and law. Paul himself is not responsible for this persecution of humanism.

In any life of normal health, grace comes first and the law follows. Any loving couple goes through the acceptable year first and out of this perfect happiness the special law of this marriage is derived and developed. Fluid flesh and blood precedes, and ossification follows. Jesus is free grace and his church is lawful order. Life is a process of crystallization. Free, revolutionary inspiration precedes, evolution, lawful development, is derived from the previous revolution and ecstasy.

Erasmus was a classic; Luther was a reformer. Theophrastus Paracelsus lived as the first citizen of a realm in which most of us feel at home by now. He lived a stranger in his time, without any hope of seeing success during his own life. However, he did not despair of his duty to transform his year of grace into the years of toil and lawful preservation. In this respect his life is far more christian than either that of Luther or of Erasmus. These two men taught and reformed christianity; Theophrastus added to it.

By a chain of marvellous concatenations and circumstances, he was brought up as a new type of man, moving in a new world, using new language, and living with his fellow men in a new fellowship. For an instant, he is placed so that his "newness and unexpectedness" become audible and visible to the world. Of course, no endowed institution will endure the contact with a creature that had never existed before. He is howled down from the chair, and the world does all it can to make sure that he will be down forever. He now faces despair, or compromise, or, thirdly, the slow road of waiving comfort, peace, and rest, and re-building, brick after brick, the palace of truth that before had appeared to him gratuitously. What seemed to come from above, as inspiration, now must be worked out piece, by piece, from the ground. He, despite this change in life's outward conditions, despite this complete change in manner, from eagle-winged

flight to laborious plowing, keeps his faith; as Robert Browning, in the first poem that did justice to Paracelsus, said: "He is sure that God never dooms to waste the strength he deigns impart." This way, grace is transformed into a new descendible law. We repay, by our faithful masonry, ploughing and building up from the ground, our load of gratitude for the inspiration, the abundance of inspiration that fills us in our best hours. Terms like grace, law, atonement, will, calling, perhaps get a new meaning when we re-read them in the light of such a life, full of revelation, full of grace and full of lawful response in the seemingly hopeless exertion of the man's last drop of strength. Why must books on the history of science or civilization be as dull as they are? Is it not because of the complete lack of ingenuity in our historians who never think that the life of Jesus is simply the law of life for all men, and what is more, for all women. Therefore, they are without any scientific basis to work on. But genius has its everlasting, spiritual laws. As soon as we place grace where it belongs, in the center of life, as its inspiration, its directing force, life ceases to be arbitrary or accidental or casual and boring. And then we gain access to the writings of Paracelsus himself. He was aware of the true sequence of chapters in the book of life. In his *Philosophia Sagax*, he explains the strange fact that grace and free will are equally real. Superseding the vain controversies of later centuries between predestination and free will, he, in the small still voice of truth, says that grace and free will follow each other; grace establishes that law for which we sincerely can work with our free will. And the free gift of inspiration as he calls it; the Holy Ghost is no contradiction to our experience of voluntary service later. I only know of one modern writing about the same topic. In the "Meistersinger" - his wisest opera - Richard Wagner expresses this truth. The hero, Walter, is asking Hans Sachs: "How do I begin according to the rule?" Sachs answers: "You, yourself, set up the rule; and from then on, you follow it." We see, inspiration empowers man with sovereignty; still, man can prove that it was inspiration, no mere whim, by no other means than by submitting to this new truth himself.

One important conclusion can be deduced from this insight: any important thing in history is founded twice, once by a stroke of genius, a second time by the labors of duty. The United States were founded by the inspired Declaration of Independence, and a second time by the sober work of the Federalists. The Church was founded more than twice, but at least twice on Mount Tabor and at Pentecost. A college, a university, the Mormon State, a new science, anything worth while, is subjected to the law of a twofold beginning, one as a free gift from supernal inspiration, one as honest fruit of great fatigue and effort. The Bible,

f. i. Ex. 32, Numb. 11, offers cases of twofold beginning. And old Hegel, in his rationalistic way, stated it in these terms: *Aller Anfang muss zweimal angefangen werden.* The law of twofold beginning is the lesson taught by the fate, the experience and the results of Theophrastus Paracelsus. It explains and it connects many fragmentary dates in the history of human society.

Theophrast thus expresses our discovery: (Works XII, 421). "When God withdraws his hand it is nothing short of taking the holy spirit from man and allowing him henceforth to act according to his own reason and his own pleasure. Where inspiration no longer dwells, there free will survives. For where the spirit listeth, all things must proceed according to him. But albeit that the creative spirit has withdrawn, still in such a man free will exists. And he loves this liberty from a free resolution of his will for the good and the choice of the good. And this man will not trespass the commands of divine inspiration from his own free will, now in his maturity. In the absence of genuine inspiration, then, two ways are open. One is the way of the damned. These people have the free will, too; though they have it for wickedness, for killing, stealing or betrayal. Whereas the righteous free will is his who passes the test in temptation, by his own free will, without the concurrence of divine inspiration."

## 6. The Tripartition of the Good Life

The rule of twofold beginning is the rule of realizing, incarnating, embodying. The natural man, by the inspiration, is transformed into an operating force for purposes transcending him and his self. In Theophrast's own terms, the phase of inspiration and of free will in a man's life are similar to the passive and active form in grammar. During the inspiring vision, we are swayed off our feet: "and things proceed according to the inspiration". Whereas later, "man is allowed to act". "Man cannot create day," Theophrastus pithfully remarks, "nor can he create night, and he cannot create wisdom, but it must come to him from above" (*Labyrinthus Medicorum*). This passive reception which integrates us into an event in the history of the spirit, is one aspect and one phase only. For free will, in the midst of all the adversities of our environment, answers the free gift by a rational obligation.

Since the prehension exerted by the inspiration, and the responding prehension exerted by man's matured will both operate on the natural man, the state previous to the passive and the active, the state of childhood, may best be defined as the middle voice in grammar. In this stage, man is already involved in a part of nature, by education,

by environment. However, it is not yet decided what elements he will keep in common with his environment, which he will expel, and which he will add. Since no borderline is drawn between his nature and the nature of his environment in this early stage, "medium" or "middle Voice" is the appropriate term for the first period of life.

Thus, the tripartition of the god life is elucidated. During childhood, or whenever we manage to be child-like in later periods, we are in that happy medium wherein we rely on the inspirations and obligations that animate the responsible members of society around us. We depend on parents, nurses, educators for food and shelter, physically and mentally. We ourselves can only hope for the best since we can do little. Hope is the deity of youth. We haven't yet brought down any personal roots into the life of the community.

Later, love befalls us. It takes possession of us in multiple forms. It commands us to take flight into a woman's land, that is to say into an adventure that was never tried before. Any passion that amounts to more than a physical tickling of the skin, forces us beyond conventions into a new constellation. A woman outside our clan, a task outside our traditions, a mission outside our country claim our dedication. The strength that is needed to face our environment and to break to it the great news that we are to be different from now on, we call inspiration. It is like the power of going uphill without panting. Everything seems so easy. It's a kind of flying, this honeymoon of first love. In fact, it is a real victory over the laws of gravity. Man is the up-hill animal of creation. We suddenly know exactly that the "middle voice", the innocent stage of the medium is at an end, that we are to be different, to become somebody different, for example a strange man's wife, a strange cause's champion; and we don't mind a bit. We don't fear the objections of our family and our friends. We smile at their warnings.

This absolute certainty that directs our steps is possible only because we are sure that the power behind us is bigger than our own weakness. We are precipitated, from above. Man being the animal that changes his environment, the phase of inspiration is that phase in which sufficient strength accrues to the individual so that he feels empowered to change the environment for the group. Inspiration does no more than that. It dislocates and places us. We cease to be a part of the environment, we are made the center of a new environment which, in our inspiration, is envisaged and anticipated by us.

As soon as this translocation is done, the honeymoon is over. We now have fallen into the new ground; we now are the seed that must be dissolved lest it bring no

fruit. As the seed of a new form in society, we have acquired a new character. A woman, for example, just one of a thousand debutantes before she fell in love, now becomes this singular individual mother of these individual and singular children. This is indelible, irrevocable. She may divorce her husband; she never can divorce her children since a part of her own beauty and youth has gone into them. And Theophrast becomes Paracelsus.

In the process of contacting the new environment, of undergoing the painful birththroes of becoming a definite character, we very soon become aware of our own limitations. The infinite power, the radiant certainty leave us. The central choice whom to marry, where to settle, what to do with our lives, these great decisions appear with the force of manifest destiny. The petty daily decisions how much rent to pay, how to treat our wife's first cousin, how to arrange our courses, are open to reasonable doubt. The choice of our environment, we may say paradoxically, if it is to be successful, never must be felt to be our own arbitrary choice. The inner arrangement of this environment, however logical and simple it may seem, always will be more or less arbitrary and our own free choice. This third phase is a slow growth, in daily exchange and wrestling with the energies around us and against us. It is the slow growth of a man who knows that he means to stay, that he is in for good. A man, an institution, that originated in genuine inspiration, never will give up under pressure from outside. For they claim to have a destiny to fulfill, and in defending their mandate, they will demonstrate the nine lives of a cat. Their faith will prove invincible because it is a rooted faith, rooted in the previous experience of something bigger than one's own arbitrary and giddy choice. An institution, or a movement that deems its own faith to be but an answer to the prehension that determined it, is as a tree planted by the rivers of waters that bringeth forth its fruit in its season.

Surveying the sequence, we may grasp why children so long as they grow physically, as selves, can't be rooted into this world of realization. They still wait for the great affections of their lives.

And a professional enthusiast, too, is not a full man. He cultivates the phase of inspiration at the expense of that of incarnation. The everlasting idealist gives you the impression of a man who tries to prevent inspiration from ever coming true.

Finally, the "practical" man tries to live the third third of life, all by itself instead of as the result of the two previous phases. His barbarism consists in taking his self-reliance not as an answer to the hopes

of his youth, and to the love that characterized him, but as the first word by which he himself despite Paracelsus' warning, "can create day and can create night".

The fools of hope only, love only, or faith only, split the trident of our life energy. They pervert the fresh hopes of childhood into the sour milk of eternal moralizing, the great power of enthusiasm into nervous fits of excitement, and the tenacity of a responsive faith into the brutal energy of a "climber".

Man is apt to destroy the interplay between the leading three energies: hope, inspiration and free will. Most people think they have to worship only one of the three, and be ashamed of the two others.

Theophrastus Paracelsus discovered the tripartition of the good life and had the courage to be loyal to all three life-giving processes within him. For that reason he is no contemporary of the Middle Ages or of Modern Times. In fact, we easily are the first generation that may become his contemporary because we, for the first time, are faced with precisely his dilemma.

The preoccupation with Hohenheim is no luxury. It was natural that we founded a Paracelsus - Society some years ago. All previous centuries were unable to approach the real and total man. They all picked out more or less external features. They were forced to admit certain contributions of Paracelsus to their organized work immediately: they never were able to admit the man wholly.

A short survey will show the gradual reception. In his own times, Humanism and Lutheranism dominated the scene. They were, like Socialism and Communism today, an evolutionary and revolutionary attack on the medieval cathedral of civilization. The Socialists of the 16th century, the Humanists, replaced the Christian saints by pagan heroes; the Communists, led by the violent Luther, left the visible church of the bones of saints and of stained glass completely.

To his generation, then, Hohenheim seemed, at best, "The Luther of Medicine". Since Luther marked an exodus only from the stones and bones, and Hohenheim had grown up in the paradise of divine omnipresence in nature, the comparison was nonsense and resented as such by Paracelsus. He was not, by his antecedents, a protesting monk returning to the world after terrible struggles like Luther. He was a denizen of a living universe who claimed citizenship in the world of dead books and who saw his claim rejected. The world of witch-burning was not the world of our man; neither was the world of printed books.

The next generations turned from the stones and



bones of the saints to the stones and bones of the real world. They took up anatomy, physics, astronomy. They ventured to touch directly the world of our senses. The sixteenth century slowly moved on the road to mechanics which were going to dominate all the following centuries. As to their method, nobody did so much for preparing it as Hohenheim, by the boldness of his wholehearted, reverent unprejudiced experiments. His concept of Chaos, that is to say, Gas, is one instance only of his exemplary influence. However, his method of strict observation was applied to dead matter only. The last four centuries will, on the whole, have to be called a period in which physics and mathematics dominated the thought of Western Man. Even God and the Law were proved by geometry. And the physical world, primarily was treated as a world of physics, of thermodynamics, electrons, or waves, or "bodies". All the sciences received orders from physics and mathematics, and are receiving them still today, directly or indirectly.

This arrangement means that we try to base life on death, the explanation of organism on the explanation of mechanism, and the processes in animated bodies on the laws of gravity valid for dead bodies. Modern science looks upon the universe as being a conglomeration of dead matter out of which by some unexplainable process, life may become developed in forms. In using terms like "body", or "energy" which are abstracted from living processes, physics was able to conceal the fact that it is decidedly the science of corpses, and of corpses only.

Now this certainly was not the world observed and disclosed by Paracelsus. Healing being his vocation, the integration of every process into a living universe was his great biological axiom. "Bodies" in the sense of physics, to Hohenheim were shells left over by life, and on their way to being recaptured by life. His method of reckless observation, then, applied to a much vaster universe than that of physics. As he once expressed it: his opponents seemed to see only one fourth of the real universe.

When his method, at least within the limits of the world of dead matter, was victorious, about 1750, it dawned on the world that the universe really was richer than geometry. Now it was not so much Hohenheim's method, but the size of his universe that, though very slowly, kindled the imagination. Organized science moved from physics to chemistry, from chemistry to physiology, from physiology to biology, from biology to phylogeny. But along this road, organized science still preferred to deal with the mechanic side of its subject matter. Death has always had the presumption in its favor during the last four hundred years. In other words: The complex universe, faithfully envisaged by Hohenheim in its totality, was recovered by

science gradually, without accepting his axiom of a living universe.

This stubborn dealing with corpses and stones by natural science offers a striking parallel to the dealing with stones and bones in the medieval church. Both ages knelt in admiration over the relics of the past. Both evaded the issues of intense life in the present. The dogmatism of both ages put up a screen against reality. Today, Man seems to be unknown still.

Therefore a third stage in our relations to the living universe of Hohenheim seems to be reached. The whole range of his anticipations is perceived again. And we understand again what he meant when he treated the whole of the universe as the manifestation of a universal principle of life. A book-title like "A Living Universe" by L. P. Jacks may be rebuked by sceptics as accidental. These sceptics, however, should read the first publication in the series "Bios", Life, published by the leading English, German, Dutch, and American Biologists, in which the author, Mr. Adolf Meyer, adopted my definition of living beings<sup>1</sup> and our corroboration of Hohenheim's statement that the physicists only saw one fourth of the whole world. Professor Meyer explicitly relegates physics from its rank as the basic science to the background of a last and remote abstraction or ultimate generalization, a last frame for the ashes of the universe.

Biology, therefore, finally is facing the issue: Are we living in a living universe?

We are looking back today to the religious, the humanistic, and the naturalistic or mechanistic movement all three, and we are compelled to live on beyond them all. And we find that long before, this man consciously lived the unity of the three elements: instinctive nature, divine inspiration, and reasonable free will which are put up alternatively by natural science, religion, and humanism.

Everywhere, Hohenheim shows his insight in the processes of incarnation. The ground covered by either theology, or natural science, or humanistic philosophy, does not interest him as such, but only as part of the whole process of life. The material of nature, the sublimity of revelation, the logic of pure reason- yes, of course, they are all there. And the only important question, to him, is their interplay. The fact that we shift from one state of aggregation into another, that life moves from naive hopes through supernal love into experienced faith and- in our children- back to hope again,

<sup>1</sup> My theory was developed in Die Kräfte der Gemeinschaft (=Soziologie I, 1925). It is accepted by Adolf Meyer in "Ideen und Ideale der biologischen Erkenntnis" = Bios, bd. 1, Leipzig 1934.

that instinct, revelation, and reason are fundamental chapters of any course of life, is more important than the atomistic treatment of any one of them. Elsewhere, I was able to show the tremendous results for our conception of ethics and politics to be arrived at on the basis of this tripartition.<sup>1</sup> Here, we may show how Paracelsus' own biographical tripartition helps to elucidate an important point in his biology; possibly, this point will come to the foreground in modern research.

We found that Theophrast von Hohenheim ingeniously experienced the interplay of natural talents and instincts, inspired calling, and cold rational work. Now, he never tired to explain that life and any living substance was only possible as long as it was permeated by three elementary processes, mercury, salt and sulphur. It has long been understood that these names are confusing for us because we think of these three names as terms for "substances" while to Paracelsus they were elementary processes governing life lest it be incapable of corporification or embodiment at all. The conditions under which life can become manifest are the subject matter of his science, and of our study here. He says: 'The three elementary processes are three forms or aspects of the one universal Will-Substance out of which everything was created. As long as these three are full of life they are in health. But when they become separated, disease will be the result. Where such separation begins there is the origin of disease and the beginning of death. To explain the qualities of the three it would be necessary to explain the qualities of the First Matter. But as the First Matter of the Universe was the "Let there be", the Living Word, who would dare to attempt to explain it?'

Indeed we need no verbal explanation for the tripartition of energy reflected in Paracelsus' biography itself. Here, the facts of the man's own life furnish, not explanation, but illustration of his words. His life sponsors his doctrine. Such was the man's courage and wisdom and faith that he held one and the same truth for all creation and for himself. His biology and his biography are one.

By this translation of physical, intellectual, and spiritual processes into each other, Theophrast von Hohenheim really becomes the "Super-Celsus", the super-physician of our age. We are ill because the trident of instinct, revelation, and reason is broken in pieces. The divisions made by the churches and the sciences are untenable. In themselves, neither instinct, nor revelation, nor reason suffice, as regulating principles. Each has its time. To restore the process which leads life through all three, for its incarnation and integration, is the longing of our age.

<sup>1</sup> Rosenstock- The Multiformity of Man 1936.

In the identity of biology and biography, modern society faces the issue of its future. And in mustering all the masks of death, all the propaganda of physics, for nature, of creeds, for inspiration, of philosophies, for reason, we have some cause to despair. Our contemporaries have many a bone to pick with us. But where is life? Suddenly, we find that a man of 1527 A. D. went right at our problem. This experience has a surprising effect. It smashes the iron prejudice that, after all, a man four centuries old never may be our contemporary. Paracelsus is our contemporary much more than most of the men who must prove this quality by their birth certificate. And for that very reason so many of his modern critics simply are behind Hohenheim's time. They are obsolete compared with him.

This, then, is the last conclusion of our study. The tripartition of life has an effect on its duration. For whenever it is achieved in a man, in whomsoever these three life-giving processes had their full sway, life is sublimated into a form that remains of vital importance beyond the lapse of time. The carrier of such tripartite life is our contemporary forever.

#### 7. Scientific Bad Humor

The bibliography of Theophrastus is in itself the greatest adventure in books. Its peculiar character was revealed by the master of all who know in the field of history of medicine, Karl Sudhoff, first in his two volumes: Paracelsus Bibliographie, 1894 ff., later in his monumental edition, in fifteen volumes, of the writings of our hero, with the exception of most of the theological manuscripts. His introductions to each volume are gold-mines of information.

Miss Stoddart, in the year of her death, published a charming book in English. This publication of 1911 is out of print now. It is the only fair representation in English of the real Paracelsus. For example, she is the only writer that mentions how Lord Lister was anticipated by Paracelsus: "Keep a wound clean and open, and it will heal."

Browning's poem will always remain a great document though he read in Paracelsus a nineteenth century Byronism quite abhorrent to this humble servant of the poor and ill. Kolbenheyer's novel is groping after something important. Gundolf remains a purely academic performance; and probably was not intended to be more.

Two Austrian scientists, Franz Struntz and Franz Hartmann contributed considerably to the understanding of

the physician and the scientist. A great piece of literature is another physician's study, Victor von Weizsacker, Hippocrates and Paracelsus.

A short abstract of Fritz Medicus, The scientific significance of Paracelsus, was translated in the Bulletin of the History of Medicine IV, 1936, 353 - 366.

A "Paracelsus - Society" was founded five years ago, in Munich; In the general histories of Science, the only serious effort was made by Em. Radl, in his History of Biology, to expiate the ludicrous performances that dishonor the scientific tradition of our times.

Since it is an important part of reality, this centennial bad humor against the 'Faust' - type must be illustrated by some examples that, at the same time, will help to explain how the scientific process is nothing merely mental or abstract but the vital process of man and mankind itself, concerning the whole of man's personality and character, vitality and faith.

As the standard bearer of humanism against Paracelsus we may mention Andreas Libavius, in his Anthology on Alchemia of 1597. Here, all the great achievements of Hohenheim are turned against him as either diabolical or lunatic as follows:

1. Paracelsus did not respect the departmental spirit: "He united chemistry and medicine and," Libavius exclaimed; "hereby reversed all the sciences."

2. The great statement of the Basel program is recriminated--after 70 years!--again and again. Paracelsus had made three simple points:

- a. Experience shall guide me.
- b. I am myself the author of the texts on which I am going to lecture. (quorum ipse sum auctor)
- c. I am lecturing in German.

About a. Libavius exclaims: "May he remain by himself. Authority means more than experience." Accordingly, his own book is made up from a list of some fifty authors of all times and places.

As for b., he tries to be very witty: "Non quidem repudiavi si quas formulas apud Paracelsum inveni quarum fors ipse auctor non est." I have not repudiated formulas that I found in Paracelsus the author of which he perhaps isn't.

About c., Libavius moans: "If they would not, in their lunacy, prostitute (one of the pet phrases of

the set mind) sacred medicine by German versions, medicine would stand in better authority." According to this typical eclecticist, "Paracelsus is a delirium, deserves no authority, his writings are impious against God, pestilential, filled with horrible lies of world and God, and Paracelsus is guilty of blasphemy and no vote can absolve him. The filth of Paracelsists..... but already too much has been said about this Cloaca." This is pure poison.

Nevertheless, it is important to note, that the reader has before him, in our quotations, the whole substantial material which Libavius was capable to produce against Theophrast.

Later writers were equally venomous. Everything that the human mind may invent, was invented against Paracelsus. Any group in society seems to need one permanent scapegoat who has no rights whatever.

"He seems to have written his books in a state of intoxication". I. G. Zimmermann. "As a boy, he was maimed, and hence, was a castrate. He was epileptic. He was insane." K. G. Neumann.

The man's worst enemies, it is true, were his henchmen who merely sought refuge behind his powerful name. Scores of forged manuscripts were put forth, advertising the same nonsense in alchemy, astrology, sorcery, mysticism that Paracelsus fought tooth and nail during his life. Undefined by the profession as he was, unprinted too, he fell the victim of the well known technique to smother a man under false laurels. Since this process was told by Sudhoff, it may suffice to expose the most recent example. In 1933, the Masonic Supply Company of New York published a book on "Philippus Theophrastus known by the name of Paracelsus". As the title shows, the author knows his stuff well. However, his mystic public expected miracles. And so on page 108 this beautiful derailment happened:

The reader will remember that, in his Basel days, Theophrast was annoyed by Pasquins one of which was a letter sent up from Hades by Galenus complaining of the revolutionary disturber of his peace. The intermezzo was known to us because Paracelsus made fun of it in the preface of his Paragranum: "O the soul of poor Galen! If he had remained faithful to experience, (Theophrast's guiding star) his remnants would not now be buried in the abyss of hell whence he wrote me a letter. Such is the fate of all quacks." Put on the track by this allusion, the indefatigable Sudhoff discovered the Pasquin, a Latin poem in clumsy rhythm, and printed it many decades ago.

The joke of Theophrast is taken up by the modern Theosophers as a revelation: And we read: "It appears from this sentence (in the Paragranum) that phenomena of modern Spiritualism (entering en rapport with a certain mind, writing or speaking in the spirit of a deceased person) are not a new revelation, but were known and explained three (4?) hundred years ago."

The enemies of Hohenheim in the 16th century were great forgers too. For example, they invented a complete author, Valentinianus, who was said to have been plagiarized by Paracelsus for everything that was of any value in the latter's writings. Though this forgery was proved long ago, modern books on the history of science still go on quoting this antiparacelsean invention as a genuine source.

Today, it is not so simple to omit Hohenheim in a textbook. On the other hand, he fits so badly into the list of humanistic and mechanistic Saints canonized in the 18th and 19th century, he contradicts too many glories especially that of Bacon of Verulam. French and English political history, for reasons that I discussed elsewhere at greater length, are unwilling to recognize the chronology of the German Reformation, and date the Renaissance correspondingly too late. Paracelsus does not fit in the scheme of the enlightenment. Vesalius and Lionardo are enthroned instead.

The modern historian of science, mostly unconsciously, is laboring under these political and religious prejudices.

Certain points are repeated in our handbooks again and again though they were refuted by Sudhoff, Radl, Darmstaedter, Struntz, Hartmann, Miss Stoddart, Richard Koch, myself, long ago.

First, of course, that he called himself Paracelsus. Second that he wrote a bombastic style whereas he created the first scientific German prose, in a pithy and simple manner, an abomination, it is true, for the Latinists.

He did not burn the Arabian medical books of Avicenna in his classroom.

He originally was a good fellow, helpful and polite. After the catastrophe in Basel, he, for years, was in a bitter mood, and tried to explain his own position, as distinct from the Galenian, in prophetic and violent language., which, however, has to be measured by the language of a Luther, an Aretin, a Hutten and which is the simple truth in every material assertion. He is

attacked today because he warned people against imprudent operations. Here a modern issue, between conservative and bold surgery is simply carried over into the past. Why should Paracelsus have delayed the progress of science because he stressed - in the year 1536 - the healing powers of man's own nature?

Some of his many discoveries in chemistry are: determination of the amount of iron in water in gallic acid. He was the first to claim zinc as a particular metal, determined alumn, used mercury, zinc, laudanum and lead, was the first to produce psamech paracelsi (tartar), arsenic acid. Sulphate Potash was first prescribed by him. He advised the vapor-bath for distillation. Ether was used by him as a narcotic before others, and he described its effects. He preceded the Italian Girolamo Fracastoro in the scientific treatment of the Morbus Gallicus. When Hohenheim had finished his work, full of medical prescriptions that prevailed for many centuries, especially in the use of mercury, its publication was prohibited, (Sudhoff, Werke VII, 23) instead Fracastoro published his poem that invented the euphemistic name Syphilis and won a reputation.

Hohenheim knew, in sharpest contrast to all his contemporaries, the truth to which physiology returned at the end of the nineteenth century: that "in the human being, there is present an invisible pharmacy and an invisible physician who produces, prescribes, dispenses and administers suitable remedies as occasion demands. Had not God created them, then notwithstanding all the efforts of our physicians, not a single creature of the earth would remain alive". Everybody knows that this is a great truth, so much so that Bernard Jaffé in his Outposts of Science, 1935, when speaking of a modern explorer of the glands, of Abel, sums up Abel's position in the one sentence: "Abel felt that the words of Paracelsus were true." (p. 162). Paracelsus perceived (to continue our list of his achievements) that air was a mixture and that gases -- what he termed 'Chaos' -- were something far more general than air.

He rebuked astrology and said that the stars had no influence on life on earth. He tried to express the process of life in biochemical terms - exactly as our biologists today. His tripartition of the archeus into three material processes, all balancing each other, is neither refuted nor surpassed in its epistemological depth and its divination of the laws and categories of human understanding.

He conceived of the calcoli as one great process of dross throughout the whole system.



He investigated the use of magnetism for cures.

He wrote that Biblical medicine was very poor because Moses had other things far more at heart.

He was the humblest of the humble when learning from the common man was concerned, and his charity toward the sick and poor, his valiant fight against graft in hospitals and pharmacies is on record. Many other merits are ignored even by his scientific admirers because they themselves are specialists in one field; for example his distinction between hereditary and un-hereditary talents goes unheeded to this day (*de artium et facultatum inventionem*, Works XIV, 253)

Now we shall observe how this pure and devoted and illuminated life is pinpricked by the moderns.

Benjamin Ginzburg, *The Adventure of Science*, 1930, mentions Paracelsus only once; for what purpose? to say someone else refuted his theory of magnetism.

A. Wolf, *A History of Science, Technology and Philosophy in the 16th and 17th century*, London 1935, takes no notice of Sudhoff's standard edition 1919-1933, nor of Huser's, but quotes the spurious of 1658. He gives, on page 445, a list of the famous physicians that, naturally, includes Hohenheim. Then, however, he goes on saying that Hohenheim's life was mentioned before and that therefore the lives of some other doctors are told by him now. Unfortunately, he is mistaken, and the life of Paracelsus is not told anywhere else in the book. The humanistic wit Fracastoro, probably because he wrote in Latin verse, gets full treatment. The much younger Ambroise Pare' (1510-90) is singled out by Wolf to hit Paracelsus, in these terms: "A son of the people and no scholar, Pare' was ever ready to learn, even from old house wives, and in this way came to adopt such remedies for instance -- as raw onions. The modesty of this great doctor and surgeon forms a pleasing contrast with the bombastic attitude of Paracelsus."

So, Paracelsus, a man of the people plus a scholar, is humiliated by a man who not only followed in his footsteps only, but made a brilliant career where the pioneer was persecuted. The Plato of biology must be measured by the Calvin Coolidge of medicine; for Pare' was simply a doctor trying to cure his cases. Hohenheim tried to express a whole new order of the world, in the new light of nature.

W. C. Dampier-Wetham, *Cambridge Readings in the Literature of Science* 1924, p. 74, prints from a most dis-creditable, theosophic source and translation, instead from Sudhoff, a doubtful text of Paracelsus, and adds: "His

writings well illustrate the characteristic confused treatment of scientific problems by the later medieval mind, before the Renaissance cleared the air." Here, everything is turned topsy-turvy. The man who "cleared the air", literally and metaphorically, was Paracelsus. Paracelsus attacked the Renaissance and Humanistic medicine on grounds we are just now reclaiming for our science of the living. For the Renaissance was given to a stolid Galenianism, in reverence to the classical texts.

As we saw, A. Wolf omits Paracelsus' biography. Still, he has to mention him occasionally by inference. How does he treat him there?

344: "In the meantime Lower had also adopted the Paracelsean idea of the composite character of air." Nowhere has he stated before, under the name of Paracelsus, that this idea was conceived by him. Most illuminating is Wolf's treatment of the first great Paracelsist, van Helmont. After having mentioned Paracelsus as a mere name on p. 325, he gives Helmont's life on page 326: "It was in this way (of medical service to the poor) that he came under the influence of the medical chemistry of Paracelsus whom he greatly surpassed. Van Helmont's greatest service to chemistry consisted in having been the first to show scientifically the material character of gases and their variety, the term "gas" was actually introduced by him (he derived it from the Greek chaos, an expression which Paracelsus had applied to air)." One stands gasping. So wonderfully is truth and slander mixed.

1. Paracelsus did not call the air by the new name chaos; but used chaos because he understood the composite character of air, and needed a more comprehensive term, i.e. the later "gas".

2. As the only instance in which Helmont "greatly surpassed" his master, and in which he showed himself to be of great service to chemistry, we are told of a discovery which Helmont learned from Paracelsus, and therefore, was able, in the comfort of his station, to develop. It is, by the way, the only thing always credited to Helmont, as against the score of important innovations made by Paracelsus.

3. Van Helmont not only came under the influence of Paracelsean chemistry, but the man's whole personality, and always freely acknowledged this discipleship, a fact though not denied yet carefully omitted by the phrasing of Wolf.

4. The clause: "Whom he greatly surpassed" is set before the reader without any further reference to the own merits of the belittled at any other place of a work

which promises a history of Science and Philosophy of the 16th and 17th century.

The hatred of these rationalists is indomitable. The architecture of another paragraph is a masterpiece in this respect: "Paracelsus, it is true, denounced the association of astrology with medicine and proclaimed that the stars control nothing in us. But he only substituted for it his own equally delusive fancy when he added that the archeus not the stars, control's man's destiny." I hardly believed my eyes in reading this.


According to Wolf, the "Mneme" of Semon, the "Gene", of Morgan, the law of Mendel, the principle of selection of Darwin are "equally delusive fancies" as astrology. Any working hypothesis for biology inside the organism itself is placed on the same level with astrology.

Preserved Smith, in his Age of the Reformation, surpasses even Wolf. In his bibliography, he quotes seven works on Leonardo, five on Copernicus, not one on Paracelsus. He ignores Sudhoff. No wonder that he reports from mere hearsay in his text: "The greatest name in the first half of the century was that of Theophrastus Paracelsus, as arrant a quack as ever lived, but one who did something to break up the stronghold of tradition. He worked out his system a priori from a fantastic postulate of the parallelism between man and the universe, the microcosm and the macrocosm. He held that the Bible gave valuable prescriptions, as in the treatment of wounds by oil and wine."

The Microcosm-Macrocosm parallel is not Theophrast's brand at all. He corrected it as we have shown in the text. And he did this, after forty years of restless toil and ever renewed experience, at the end of his life. He stated clearly that all Hebrew medicine was unreliable because Moses was interested in theology, not in physics (Liber Azoth, chapter on human bread), and because Israel did not take real interest in this world. And was, in fact, the first to teach Asepsis.

But what about the biographer of Erasmus, Mr. Preserved Smith, who knows so well that all contemporaries of Hohenheim believed in the inspired letter of Holy Writ? Hohenheim was one of the very first to criticise the Hebrew tradition. Why then, sting a man who is the last credulous of all, with a reproach that applies to every orthodox Christian down to 1859?

Except for a slovenly remark a hundred pages later, the quotation given here, is all the information about Paracelsus, in a volume of 850 pages on the Age of the Reformation.



The only really remarkable thing is that these detractors all are compelled to call their despised victim "the greatest name" or something similar. They are nothing but the prolonged arms and thoughts of Paracelsus' humanistic contemporaries among the physicians. Mr. Preserved Smith is not even in his biography of Erasmus mentioning the fact, that Erasmus himself consulted Hohenheim.

Scholarship is not an achievement of "the empty intellect" (Faraday) but of living, fighting, loving and hating persons. The scientists are divided into the two groups of those who admit and those who repress this fact. Real lives try to live the source - life of the heart; to put their hearts into something important! They risk to be destroyed through the persecutions of the other group that boasts of being pure 'mind'. For, the mere mind, by ignoring or fearing passion, is unable to integrate mental and passionate processes into a whole, and hence becomes unable to master the passions. Of course, the passions are not annihilated by ignoring them; only it is true that they are perverted by being denied. When the constructive passions are declared not to exist or to be bad taste by the pride of reason, they will turn into hatred, and lead to outbreaks of hatred within the realm of science itself. The Rationalist's bad humor is a reality, and an important reality in the process of science. Consequently, a world-heart such as Theoprastus Paracelsus who challenged all the world to share his whole and primary life raised against him all the powers of derivative and divided life. Their defense-mechanism is at work against this great soul for four hundred years. And so we may learn what is meant by the powers of hell. They are raised when the powers that be are not conscious any longer of the fact that they are derivatives from the primary powers of the heart.

### THIRD PART

#### III. THE COMMON DENOMINATOR FOR CLASSIC AND FOUNDER

##### 1. External Diversity

Obviously, classics and founders of science fulfill a different function in the growth of a science. Their relations to society seem to be almost opposite. Faraday met with praise and appreciation; Paracelsus was persecuted and nearly destroyed. The science offered by Faraday was eagerly expected and greatly admired; the science envisualized by Paracelsus was feared and declared impossible. The increase in Knowledge through the work of both men cannot be measured by any objective yardstick. But the data given by us about Paracelsus show that the change in knowledge made by him in a short life would have meant a greater revolution in science than even Faraday's discoveries, had they be listened to, received and digested by his age. As it was, no such possible progress was made.

This obvious contrast in the situation of natural science within society in 1526 and in 1820 is clearly a determining factor in the making of a "classic" or a "founder". For its clear definition, it may be helpful to admit at the start that personally a classic may meet with all sorts of difficulties and hardships, and a founder with an abundance of social advantages; and still, they will depend on the objective phase of social evolution. Therefore, we see, between our two heroes, the more tortuous and difficult career on Faraday's side. He was poor and unknown and uneducated and Davy's valet. Similarly, the great "classical" contemporaries of Theophrast von Hohenheim, Michelangelo and Erasmus, had a harder youth than Paracelsus. The latter was the son of an academic physician of good standing and social reputation.

This admission does not diminish the importance of our statement that a classic's achievements meet with universal appraisal. For this only means that one cannot become a classic without an atmosphere and a public which expects and welcomes the advancement of this special field. Richard Wagner was hated during his life, but music had her heyday in his time. He did not live in Plato's republic where music was forbidden and execrated. Wagner lived after Bach, Mozart and Beethoven. He had to fight for "his" kind of music, not for "music". With regard to the classic Faraday, we find that physics, for two centuries had made a gradually deepening impression on the European mind. Therefore, with Faraday, physics themselves, finally, gained social and cultural recognition, even from the common man, as a universal blessing and an asset to

humanity. Faraday's aim and field were welcome.

The blunders of the historians of natural science concerning Paracelsus are easily explained when we consider their negligence about the timing of science. They treat anyone scientist as an individual, and try to define his character as an atom in the universe. Then, it is true, the fervor, the anxiety, the sacrifice, the dangers of a genius like Paracelsus become wholly superfluous. In an alphabetical index or in the Dictionary of Biography, every individual seems safe; his individual contributions are listed; all scientists, poets, etc., seem to work more or less on the same level. The problem of Paracelsus was not at all "how to make his contribution". It was, rather, to enable scientists to make contributions into a new reservoir, a new system, a field hitherto not defined at all.

The founder may be liked personally and belong to society. Paracelsus was the equal of his colleagues from the outset. Only, his plans seemed absurd, his aims ridiculous; his vision seemed madness; his new scientific "Monarchy" of experience in biology sounded as blasphemous to humanism as a science of the living soul sounds humbug to modern scientists. Not the man but his intentions were undesirable. Any founder is a failure in the eyes of most of his contemporaries as compared to his immediately successful competitors. May be that he lives to see some public recognition at the end of his days. This depends on the accidents of his physical vigor; mostly congratulations which are tendered to an octogenarian are purely accidental when related to this man's struggle at 35. During the periods of his greatest effort, this approval is withheld, because the eyes of men never can see without love or hope or promise preorganizing them. Romulus founding Rome was not a success in the eyes of his contemporaries. Yet, these same contemporaries, probably including his brother Remus, thought of a senator of the neighboring towns of Tarquinii or Alba Longa as completely successful. And even the founding of a new place by Romulus was routine work when we compare it to the enterprise of Paracelsus who enchained the stream of new sciences, in their own right, and in a ceaseless procession out of the womb of time, in an environment spellbound by classical books. His grain of seed was far more inconspicuous and unrelated to anything previously practiced.

And yet, though every external element differs in the destiny of classics and founders, these differences between hissing and applause, invisibility and lustre, fade away as soon as we analyze the real merits of classic and founder. Both, classic and founder prove the same laws for the mind in action. In temper, habits,

speech, fate, Faraday and Paracelsus certainly have nothing in common. All the more astounding is the identity of their heart and soul of which we have to speak now.

## 2. Internal Identity

The first law proved by their lives, is the fact that natural science presupposes one common education that comprehends the people and the scientists as well. Scientists must find themselves integrated into society before they can set out for their special functions; otherwise society will not stand up for science.

And when this common faith does not exist, the scientist himself has to step back patiently and create the soil of a new public faith for his plantation of a new science. In the days of a classic, this soil of a common faith exists, and spares the scientist the dividing of his energies. The impotence of modern scientists to understand Paracelsus originates from their ignorance of this law. They did not see that a founder has to do both; create a new soil and plant a new tree, witness a new faith - for the general public - and at the same time sow the seeds of a new knowledge. In this twofold role, his creation of the new faith is not understood by his alleged scientific colleagues: they deplore his walking with the sinners, the laymen, the uneducated classes. His scientific efforts are absolutely inaccessible to the common man with whom he shares his new faith.

Reason can't build a body of science or a republic of scholars, before the hearts of men are trained for the corresponding equilibrium between future, past and present. In order to place the house of science between the future and the past, Paracelsus had to raise inaudible expectations of a future unbelieved by theologians and humanists. The theologians talked about the end of the world or the Anti-christ. The Humanists hoped for a second Antiquity. The faith of Paracelsus was the emancipated faith of an adult, who, on the basis of the previous Christian revelation, now experienced the day of revelation in nature as a further chapter in the inspiration of mankind.

The very existence of science, and all the more its steady progress and perpetual regeneration, presuppose an efficient social education. For education connects men of different interests and aims in a common faith as to the direction of society. The classic, Michael Faraday, and his European public in the 19th century, were sufficiently steeped in a common faith, Faraday drawing infinite resources from the Christian training of his heart, and his public having that faith in science which had been

created by Paracelsus, the Paracelsists, and the later physicists. And because of this mutual permeation of his own and his public's faith, Faraday thrived and grew like a tree.

Theophrastus von Hohenheim was made into Paracelsus, the vigorous genius of the picture by Holbein on page 40) was turned into the man of suffering shown by our second portrait in 1540, not more than fourteen years later, less because his contemporaries were not scientifically minded but because they were foul-hearted. And he met with foul play for another four centuries because few people admit the relation between faith and science, between future and presence.

Natural science cannot thrive in the void. It owes its opportunities to the faith of an integrated society. The tragedy of Paracelsus was not in vain if it destroyed the misunderstanding in our own minds that education can be based on science. This is the most popular assumption of our age. Nevertheless, it is not true. It is, of course, a truism that the mind may be and should be well trained by scientific methods. Only, we have to be in agreement on the meaning of "well" trained, of truth, of solidity, long before we are able to use the specific methods of biology or physics for achieving our aims with our children in this direction. Why do we love truth, the training of the mind, independent thinking? Perhaps a society may prefer patriotic lying, hazy enthusiasm to our campaigns for clear thinking. A predilection for mendacity is frankly avowed by the newest social creeds. When they enthrone a profitable mendacity against a science for its own sake, they must be met not by better science but by a deeper faith. Science is based on faith, on a very specific faith, perhaps, and the different sciences all anticipate different aspects of mankind's destiny. However, all occidental science is more than curiosity; it is carrying out a sacred obligation, it is fulfilling the prophecies of old. And though we may need a new branch of the sciences today, the now already old natural sciences and these new ones, both, must be based on the common faith of mankind in its destiny. Natural science has to go back to its founders in order to restore its own accounts of its activities to their original meaning. In my quality as a scholar, I naturally am tempted to go ahead recklessly with my reasoning power and to laugh off any suggestion that scientific progress presupposes a solidarity of heart and soul between the know-nothings on the one side and the know-much on the other. But then I am reminded of the vicissitudes in the march of science; where, as in Darwinism today, a central idea like evolution may be breaking down after a triumph of fifty years. And it becomes clear that no society can be based on any content which is shifting so rapidly as



scientific theories. Any scientist tries to carry over his opinions over into the field of social reality as recklessly as possible. But that is just our temptation; we have to resist this temptation or we are digging ourselves the grave of science.

Science, as a body of knowledge and as a strategical campaign of the human mind, is a social achievement and as such, science is based on social education. The people must be integrated and come to feel again and again that they all are indetical in heart and soul lest they withdraw the Magna Charter of scientific doubt bestowed on Reason by the great-heartedness of society. The heart of the scientist must remain identifiable with the heart of mankind. As long as this fact is respected, the scientific mind may set out for his adventure. The loss of this identity kills the life of science and of society.

This solidarity of the scientist with the very heart of humanity was lived by both Paracelsus and Faraday.

In the case of the radical rebel against textbook humanism, this solidarity with mankind's destiny had to take precedence before scientific success. Paracelsus clearly knew that he defended a new faith from which new sciences would spring like locusts. He had lived this faith in the marvellous decades of his unique youth, those years of pure experience in three different worlds. And so he insisted on the proper hierarchy between heart and mind. Otherwise, he might have been absolutely succesful with his colleagues; he might have made them listen to his discoveries simply by linking his new discoveries, as they did, to old Latin texts in one or the other tricky way of interpretation. There were certain techniques which allowed a doctor to innovate by compromise. Only by remaining within the world of humanistic shadows, Paracelsus would have sacrificed his truth, his vision, the very sap of his existence, to social success. In a dilemma such as the dilemma of Paracelsus, between world-heart and world-mind, the social failure of the man becomes the test for the success of his new foundation. The failure of the founder is the condition of his work's success. The failure of the founder and the success of the classic are one and the same act, performed at different stages of evolution. They are different avatars of the soul of science. Our two heroes are outstanding because both reveal the whole man, heart and brain, soul and mind. Both link the profession which they create or represent to the universal tree of humanity. Both embody the right hierarchy of values. Surprising as it may seem, the classic gave evidence of the same law borne out by the founder that the body of scientific doubt must be rooted in a living and undebated social faith.

The classic is the fruit of  
this faith and embodies his  
science.

The founder embodies this  
faith and is the seed of  
his science.

The combination is different; however, it is a combination of the same elements. When we apply the rule to our two cases, we may express it more concretely in these terms: Faraday is Faraday because he embodies his science; his faith though of first rate importance as a condition is not his principle of individuation. Paracelsus is Paracelsus because he embodies our modern faith. His scientific genius in medicine, biology, sociology, chemistry, education, though an important condition is not his principle of individuation. Richard Koch, and Victor von Weizsaecker, turned to Paracelsus when they wished to gain clarity about their own faith as modern physicians. Abel turned to him as a biologist. Goethe and Browning, instinctively, turned to him when they tried to express their own human faith. The "Faust" is, after all, the sublimation of the popular legend of Paracelsus. Finally, Oswald Spengler, in his Downfall of the West, called the whole millennium 'Faustean'; in doing so, he exalted unknowingly Paracelsus into the embodiment of Western Man in general.

And now, we are in a position to understand why both, the classic and the founder are not explained, in their role among us, by the yardstick of external success or failure. While it is true that one meets success and the other meets failure, their common denominator consists in their readiness to accept the one or the other as mere by-products of life. Martyrdom and success, both, are coveted by certain types of man. Faraday and Paracelsus are too vital for being 'typical'. They are persons in the making. A person is beyond the typical. Martyrdom has no merit per se, and success has no merit per se, for a living person. The founder may get very near the stake where witches are burnt, the classic very near the throne of coronation - both are little concerned with these precipitations of their process of living into external moulds. Fortunately, we have striking biographical material from both men from which it can be proved that a victimized founder must be carefully kept apart from a martyr-volunteer and a classic carefully distinguished from the merely successful man. During their whole life, these two made a real effort to evade any misunderstanding in this respect. A fanaticist would proudly say: 'I am a martyr'. Paracelsus, instead, wrote a beautiful chapter against voluntary martyrdom, in his booklet on invisible illnesses (edited by R. Koch and myself in 1923). In this chapter, he makes fun of the ranters who triumphantly run to the stake of martyrdom as though it was a bonfire. We ought to remember his being hounded like an outcast when he wrote the lines; then, they gain momentum. And Faraday

did not say: 'I shall be successful'. He declined decorations, two Presidencies, a knighthood, and a sure fortune of 750,000 Dollars, all offered to him. "I must remain old Michael Faraday to the end", he would say. Both men were tempted as we see, to skid off the narrow ridge of freedom into the valley of their pseudo-type; the boastful failure or the boastful success. They were more than martyr and more than conqueror. Any man is tempted in his career to establish himself in his external garb firmly. The founder undergoes the real temptation of posing as a victim. And to pose as a fake-conqueror is the temptation of the classic. In order to keep alive, a man has to discriminate against the external marks of his mission; only so may he uphold its inherent truth. Paracelsus, it is true, became a martyr of his living faith at least in the same deep sense as his contemporary Thomas Morus became a martyr of the Church. However, though this turned out to be his historic experience, he always remained superior to this role valiantly. When we read his great - and neglected- *Philosophia*, one of the most personal words of Shakespeare keeps running through our mind:

"He's truly valiant who can wisely suffer  
The worst that man can breathe; and make his wrongs  
His outsides, - to wear them like his raiment, carelessly;  
And never prefer his injuries to his heart,  
To bring it into danger."

Hohenheim became Paracelsus, the martyr, not because he attached any importance to this role but because the transformation of the world of souls and minds is not timed by the man who is instrumental in this transformation. The timing is not man's business, not to his last hour is he authorized to know whether he is called forth to be a failure or a success. For that reason, Faraday made his successes "his outsides, and wore them like a raiment, carelessly." It was not his business to be successful. It was time for his science to become successful through him.

The actions of any real person, instead of a type, cannot depend on environmental consequences. When this person is a scientist, a mind in action, this detachment towards his own activities is especially needed. This is the contribution that has to be made by the power of the man's heart. The mind in action fails when it is not guided by the passive capacity of the soul. This balance between the mind's sky- aspiring activity and the soul's patience with the conditions of earthly bodies is the rare quality which lifts man to cultural efficiency. The pseudo-types serve their own desires and their self-chosen ends. It is often overlooked that as many people may fall in love with their being victims of life as with

success. By taking it for granted that success is the only desire of man, we deprive ourselves of the means to study the laws of the good life.

Mankind never bestows the titles of classic or founder on a typical character. Types such as conqueror-victim, martyr and made man, failure-success, are on a level of pure nature, and for that reason void of that quality by which persons are interesting. The titles in the realm of historical creativity only go to people who to the very last keep the balance which we call freedom, the middle voice between infinite effort and infinite patience. The respiratory process between the two allows man to remain "in becoming", i. e. free, instead of making himself into the product of his own pre-conceived, and for that reason merely typical will.

The common denominator of founder and classic is important, because it betrays the secret of their fecundity. They are fecund, the types are merely productive. The type is in his books, his inventions, his acts. The living historical person creates an army of disciples and followers in his image. The fecundity of Faraday and Paracelsus is far more important than their "output". Now this fecundity is practically non-existent in the mere type. The students of a typical scientist- a man with a big mind and an anaemic heart, are nearly always of lower ranks than he himself. It is well known that it is rare to find a rationalist producing students better than himself. The real person is an inversion of the type. The type acts objectively against and within the world, playing the world's game; inwardly, he is full of subjective desires, which he carefully conceals from the eyes of the world. The courage of classic and founder runs in the opposite direction: They frankly avow their heart's desire and are subjective within the world and society. Inside themselves, they are objective, because here, they detach themselves from their volition and take this not more seriously than any other objective element.

The historical person is passionately subjective in his relation to the world, and patiently objective to his heart's desires and his brain's reasons. Both transcend the type because they make use of man's freedom to be two in one: creator and creature, active and patient, planning and planned. When they act highly subjectively according to their calling, they, at the same time, submit to being timed objectively by mankind's destiny. By overcoming the common fear of the merely typical member of society, they invert the roles of courage and fear. Most men are courageous inwardly and indulge in all kinds of aspirations and desires privately; outwardly, we conform to all the requirements of society. A living soul, courageous against the world, fearful in

her inner dealings with herself, leaves an impression not only on libraries but on other living beings as well. And apparently, this is the origin of their fecundity. Self-willed men, by admitting into their being the other portion of "being willed", cease to be types and become original personalities, classics or founders. Their contributions in matters of fact is one half of the historical role only: They themselves are contributed, creators of a new type of man of whom they are the first-born.