

T
335

SOME PHILOSOPHICAL ASPECTS OF MEDICAL
THEORY OF HEALTH AND DISEASE

BY
MATILDA SAYEGH

SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS
OF THE DEGREE MASTER OF ARTS
IN THE PHILOSOPHY DEPARTMENT OF THE
AMERICAN UNIVERSITY OF BEIRUT
BEIRUT, LEBANON,

1960

PHILOSOPHY AND MEDICAL THEORY

SAYEGH

TABLE OF CONTENTS

	<u>Page</u>
PREFACE	iv
ABSTRACT	v
CHAPTER	
I. ONTOLOGY	1
ONTOLOGICAL CONCEPTION OF DISEASE	
Paracelsus	5
Van Helmont	16
Glisson, Stahl, Leibniz, Jahn, Virchow	29
II. HOLISM	39
THE THREE PERIODS OF VITALISM	51
THE HOLISTIC CONCEPTION OF DISEASE	58
CONCLUSION	87
APPENDIX A - BIOGRAPHICAL NOTES ON PARACELSUS	97
APPENDIX B - BIOGRAPHICAL NOTES ON VAN HELMONT'	104
APPENDIX C - BIOGRAPHICAL NOTES ON SMUTS	110
BIBLIOGRAPHY	122

ACKNOWLEDGEMENTS

I here wish to express my deep gratitude and appreciation to Professor Jesse V. Mauzey, Associate Professor of Philosophy, American University of Beirut, Beirut, Lebanon, under whose guidance and help this thesis was written. I found many of his valuable suggestions and insights extremely useful.

Special thanks are due to Dr. Walter Pagel, Pathologist, previously at the Central Middlesex Hospital, London, England, for sending a reprint of one of his essays and for suggesting relevant bibliography, and to Mr. Francis Kent, Librarian, American University of Beirut, Beirut, Lebanon, who carried on correspondence with Dr. Walter Pagel.

PREFACE

The present study assumes that there are significant inter-relations between philosophy and other scholarly disciplines. Some of these inter-connections, such as philosophy and physics, philosophy and mathematics, philosophy and biology, etc., have been fairly fully explored. In the case of the mutual relations between philosophical, and medical theories, exploration is not entirely lacking; yet, in the writer's opinion, the available material is either (a) extremely general, or (b) fragmentary, and appearing in a context of specialized journals.

Since the writer's interests are both philosophical and medical, it seemed to her that the tracing of parallelisms between at least two philosophical and medical theories would be of fruitful interest to both fields. This study is restricted almost entirely to what have been designated as the "ontological," and the "holistic" theories.

The ontological theory was most prominent during the sixteenth century, although its influences continue into the present. The holistic theory is relatively recent, belonging chiefly in the twentieth century. The original source materials from which the ontological theory of disease was derived are not available in this University, and dependence has been on translations, historical treatises, and commentaries. The recency of the holistic theory, on the other hand, has enabled the writer to depend more largely on the basic materials of holism, and upon contemporary references to it in current journals. In any case, the major interest has been to state the nature of the theories themselves as they occur in philosophical medicine, and to indicate at least some of their similarities and differences.

ABSTRACT

The first chapter of this research deals with the ontological conception of disease. It starts by defining ontology as the science of being as possible, a metaphysics without existence. In medicine the ontological appears as a corporal entity, a foreign agent with the power of concrete reality, even though its origin may be in imagination. The ontological concept of disease is based on the concept of the Archeus, the dynamical governor of form and function inherent in the matter. This view was supported by Paracelsus, a sixteenth century physician, whose aim was to explain pathological phenomena in terms of chemistry rather than in terms of the doctrine of humors. Elaboration about this point is discussed in terms Paracelsus' doctrine of "correspondences" where a series of objects in the macrocosm correspond to others in the microcosm and are related by sympathy in a hierarchical manner. Each series is crowned by a particular planet governing preordained tunes. In such a condition disease is a disturbance of function caused by a seed from without.

This view was of great influence on Van Helmont who defines Archei as spiritual forces presiding over chemical events which are the basis of all organic processes. A discussion about Leibniz' monads in relation to Van Helmonts' Archeus follows. Similarities between the two are drawn.

The influence of this conception on Glisson, Stahl and Virchow with emphasis on self-movement, life force, as a fundamental internal principle for linking the spiritual with the material is also discussed.

With Jahn who believes that each organic fiber represents a "relative totality" such that when disease occurs it starts in one organ and is therefore local the ontological conception of disease culminates in the view of Virchow who emphasized the importance of the individual cell as the ultimate unit of life, and of disease as a parasitic organization.

The second chapter deals with the holistic conception of disease. It starts with holism as a philosophy expounded by General Jan Christian Smuts. It describes the world as a whole including units which aim at integration into greater units until they finally reach a whole culminating in the concept of personality. In terms of medicine this conception considers the totality of an individual as prior to all its parts guiding it towards it as an aim. It is an organic unity where the whole constitution of the organic being is considered and involved before any local manifestations appear. The coordinator of these parts is the nervous system and thus disease is an irritation of the nervous system by some stimulus whether organic, pathological or functional. Being a relatively new theory, the holistic conception of disease is discussed in terms of its supporters who have dealt with it mainly in the twentieth century.

In the conclusion parallelisms and oppositions between the two theories are drawn, followed by three appendices including biographical notes about Paracelsus, Van Helmont and Smuts.

CHAPTER ONE

ONTOLOGY

Ontology as a branch of metaphysics was considered by Christian Wolff, an accomplished professor of philosophy at the university of Koenigsberg, to be the general science of all things, physical and otherwise. The term was used to mean the true essence of all existence, and the inner structure or core of being. (1) At a time when Christian philosophers were debating one of the basic views of Christianity viz: whether or not being presupposes existence, some of them disagreed that existence is something actually distinct from its essence. Among these was Suarez whose influence upon Wolff was very great. (2)

In the prolegomena to his Elementa Philosophiae sive Ontosophiae (1647) J. Clauberg says: "Since the science which is about God calls itself Theosophy or Theology, it would seem fitting to call Ontosophy or Ontology that science which does not deal with this and that being, as distinct from the others owing to its special name or properties, but with being in general." According to Gilson this statement may be considered as the birth of ontology as a science viewed after the pattern of Theology, yet basically different from it, since being as being in such a case is considered to be completely indifferent to all its conceivable determinations. Clauberg continues: "There is a certain science which

(1) Walther Riese, The Conception of Disease, p.78.

(2) Etienne Gilson, Being and Some Philosophers, p.109.

envisages being inasmuch as it is being, that is inasmuch as it is understood to have a certain common nature or degree of being, a degree which is to be found in both corporeal and incorporeal beings, in God and in creatures, in each and every singular being according to its own mode." (3)

The term "Ontology" occurs in Leibniz at least once, according to Gilson, and it came into its own with Christian Wolff's Ontologia. Wolff published his complete course of lectures including a Prime Philosophy or Ontology, treated after a scientific method and containing the principles of all human knowledge. In the preface of the Ontology he writes: "Prime philosophy (namely metaphysics) was first laden by the Scholastics with enviable praise, but ever after the success of Cartesian philosophy, it fell into disrepute and has become a laughing stock to all." In other words, there may have been metaphysicians but not metaphysics, which ceased to be a science in itself. Wolff's aim was to retain the terminology, not the philosophy, of the scholastics and build upon it more exact definitions and statements. (4) Being, Wolff believed, can be attained only through the notion of possibility, i.e. that which is possible is a being. This notion of possibility is a metaphysical one and is accepted by all when used in the form of common language. It is the root of existence. The components of being should be primary and compatible i.e. free from contradictions. The primary elements should not be determined by some foreign element nor by any of the other components of the same being. They are the essentials of being necessary

(3) Ibid., p.112.

(4) Ibid., p.114.

and sufficient to define essence without which being cannot be. They possess properties inseparable from the object i.e. attributes, and their modes are accidents. (5) Sufficient reason for the actual existence of a finite being is found in another being external to the one in question. Thus existence is foreign to its own essence, hence to being. This explains why, according to Gilson, in Wolff's philosophy existence is excluded from Ontology. There are sciences which deal with the problems of existence but none of them is Ontology. Ontology is a metaphysics without natural theology because it is a metaphysics without existence. (6) Thus we see that the doctrine of Wolff is considered ontological because it is deduced from an ontology defined as the science of being as possible. "A proof is ontological whenever it looks at existentially neutral essence for the existential complement of its own possibility." (7)

Kant was greatly influenced by the teachings and doctrine of Wolff at Koenigsberg, where they had taken deep roots. He was well grounded in Wolff's ontology, with "entity" as a focus for which the external world, the soul and God were objects to which the ontological categories had to be applied in different sciences. (8) Gilson tells us that when Kant speaks of Hume as arousing him from his dogmatic slumber he means that Hume believed in distinct existences which destroyed

(5) Ibid., p. 115

(6) Ibid., p. 119

(7) Ibid., p. 121

(8) Ibid., p. 120

Wolff's universe of concatenated essences (ontology), in which Kant had been sound asleep. (9)

A model of ontology is found in the Monadology where Leibniz reduces the various phenomena and processes of nature to monads, thus changing the perceptible material in the physical world to purely intellectual and conceptual constituents. (10) Why Leibniz and Wolff failed to find a sufficient reason for the existence of the universe is, according to Gilson, because they looked for it in abstract essences rather than in knowing the relation of God's existence to his own essence. In order to solve the problem, Gilson continues, we need to know the relation of God's existence to his own essence before we look for the relation of God to the exterior world. (11)

(9) Ibid., p. 122

(10) Walther Riese, The Conception of Disease, p. 78

(11) Etienne Gilson, Being and Some Philosophers, p. 123

ONTOLOGICAL CONCEPTION OF DISEASE: PARACELSUS

In terms of medicine the ontological conception of disease appears as a corporeal entity, a foreign agent with the power of concrete reality even though its origin is in the imagination. In this respect the ontological and the etiological conceptions of disease are closely connected. In primitive medicine etiology entails supernatural causes whereas in modern scientific medicine the concept becomes gradually ontological when it releases itself from natural causes. (12) More about this point will follow in due time.

The history of the ontological conception of disease was carefully studied by Dr. Walter Pagel, retired professor of Pathology, beginning with Van Helmont down to Virchow.

The ontological basis of Van Helmont's doctrine of disease is found in the concept of the "Archeus" which Pagel defines as "the dynamical governors of form and function inherent to and together with the particles of matter thus organized by them." Thus disease is an entity outside man, "an alien-ferment" which aims at imposing its own schedule of life on the archeus of a person by acting on his imagination in view of the fact that all actions in nature are due to the imagination of the form. (13)

The roots of Van Helmont's idea of the Archeus are found in the writings of his predecessor, Paracelsus (1493-1541), a physician and chemist who saw great similarity between bodily phenomena and illnesses on the one hand and chemical reactions observed in his laboratory on

(12) Walther Riese, The Conception of Disease, p. 78.

(13) Ibid., p. 79.

the other. The aim of Paracelsus was to explain the mechanism of diseases in terms of chemistry rather than in terms of the traditional theory of the humors prevalent at that time. (14) The theory of the humors consists of the idea that corresponding to the four elements which constitute the ultimate reality of the universe which, according to Empedocles, are fire, air, water and earth, and the four qualities which are hot, dry cold and moist, there are in the human body four different humors and these are the blood, phlegm, yellow bile and black bile. Health and disease are the proper adjustment or the imbalance of these different components. (15) In the macro-microcosm theory of Paracelsus where he emphasizes "correspondences" i.e. series of objects corresponding to each other and related by sympathy in a hierarchical manner, each of which is crowned by a particular planet which sends out spirits to other spheres and is in control of preordained tunes, man is found between a world of matter which attends to his physical needs and a world of action and power which serves his mind and spirit. (16) Thus in representing both parts of the world, the material and the spiritual which is also the astral possessing its Idea or "paradigm" in the heavenly intelligences living in the stars, man is a microcosm corresponding to the macrocosm, a fifth substance or as Paracelsus calls him a "Quint essence". (17) In the human body as well as in the physical

(14) Henry Sigerist, Civilization and Disease, p. 155.

(15) Fielding Garrison, An Introduction to the History of Medicine, p. 89.

(16) Walter Pagel, Paracelsus, p. 37.

(17) Charles Greene Cumston, An Introduction to the History of Medicine, p. 246.

world there exists, Paracelsus believed, three basic elements i.e. sulphur, mercury and salt and with these exist three basic principles which are the combustible, volatile and the incombustible. In addition he assumed the existence of a peculiar force, a vital principle, which helps transform the inanimate to the animate. Paracelsus calls this the "Archeus". (18)

Unlike the "Vulcanus", which Paracelsus considers to be the active principle and all-embracing life of nature, the Archeus is an individually acting principle of life, the individual life of a single organic form. The universe, according to Paracelsus, is created in its "prime" but not "ultimate" matter. It is a process whose efficient cause is the Vulcanus. The "Vulcanus Terrae" is a power inherent in elements such as water, fire, heaven and earth which draws its nourishment and preservation of natural resources from a general reservoir of raw material possessing potentiality but not individual life which Paracelsus calls "Iliaster". The Vulcanus is in need not only of the Iliaster but also of a certain virtue which separates the general from the specific and this virtue is the Archeus. Both these concepts, the Archeus and the Vulcanus, are complementary aspects of nature as a living unity and in fact it is difficult to treat them as two different entities since it is said of the Archeus that "all things are constituted to have their own Archeus by which they are brought to their highest pitch." In guiding prime matter on its way to ultimate matter the

(18) Henry Sigerist, The Great Doctors, p. 119.

Archeus bestows on it specificity and individuality. It is an internal Vulcanus acting inside the object, performing chemical actions such as separating, preparing and distributing in certain proportions just as a chemist would do in his laboratory. (19) The four elements in nature are endowed with Archei, each of which is divided into various parts corresponding to an organ in the human body. The curative action of drugs depends upon this correspondence e.g. whatever is obtained from the heart of earth such as gold, strengthens the heart of man. This interaction between physical elements and the human body is one of Archei and parts of Archei. In separating the harmful from the useful drug the physician himself is considered an Archeus. (20)

We mentioned above that the Archeus is the individualizing principle in the various elements of the physical world depending upon the particular environment in which the Archeus happens to be. For example, through a long process stones are produced in water by the specific Archeus of water, and metals are generated in the mountains by the specific Archeus called the Archeus mineralis. Likewise the Archeus of the earth increases putrefaction and, with the help of the sky, promotes the growth of the planted seed in the earth in order to provide nourishment for organic beings. In short the Archeus controls the object it acts upon and without it nature cannot transmute anything. (21) Just as the Archeus acts on the elements in the physical world it also plays an important role in organic beings. In man the Archeus is situated

(19) Walter Pagel, Paracelsus, p. 105-107.

(20) Ibid, p. 109.

(21) Ibid, p. 107.

in the stomach where it is meant to separate nutritive material from waste products. Some biochemical problems arise from the idea that a definitely directed transformation of food should take place if the organism is to develop. All one needs to do is to eat and drink and then it is the function of the Archeus to take care of the rest i.e. to blend the food in an artful manner, decompose it, and to distribute it to different organs assigning to each its function and keeping things under control within the bounds of measure, proportion, weight etc. (22) the "Archeitas Stomachi" decides the quality of the urine. Healthy urine must be separated, digested and expelled in the stomach and with the aid of this separation health is guaranteed. There is also the "Anatomia Archei" which is the "Anatomy of Life, as it lies in Man in each individual limb." It takes over "after the body of the first man has been formed and life infused." Each organ has a sphere of control on other organs similar to a sort of constellation with the chief organ at the center, e.g. the heart possesses in itself a constellation of its own.(23)

Paracelsus' doctrine of elements implies three points, viz: archetypes of qualities, concrete objects, and spiritual forces which guide the concrete objects to the archetypes of qualities. Of these three the spiritual forces are considered to be the true elements since they are capable of change from a solidified state to one of finest corporeality. Thus prime matter is neither corporeal nor spiritual but the

(22) Fritz Medicus, ed., "The Scientific Significance of Paracelsus," Bulletin of the History of Medicine IV (May, 1936) pp. 353-366 (Translated by Fritz Marti)

(23) Walter Pagel, Paracelsus, p. 108.

beginning or "Arche" of all being in which body and spirit unite. (24)

In man, action flows from imagination which is closely connected with the spirit, on the conscious and the subconscious levels, enfolding personality in its entirety. Here the Archeus which is the active principle of life is connected with the soul and mind, being a part of the universal soul and an emanation of the divine mind. Flowing from these which distribute activity all over the universe it is shared by all objects in the physical world and also by all individuals, thus linking man with the universe. (25) This living oneness with nature is strongly felt by Paracelsus. He believes that nature's undivided life is in everything it produces. It is a whole understood not by senses or reason but by intuition, by a trance reenforced by strong will and imagination. It manifests itself in all its creatures individually, having its roots in spirit, spirituality being unity-embracing multiplicity. (26) In terms of his theory of correspondence between the microcosm and the macrocosm Paracelsus believes that knowledge is acquired directly by sympathetic attraction between the subject and object rather than through an external way. It is acquired not only through the brain but through man as a whole i.e. his astral body, astrum being not only a celestial body but the virtue or essence of any object. (27) Astrum becomes a virtue subject to the will of the individual whose power may be greater than the

(24) Ibid., p. 84.

(25) Ibid., p. 111.

(26) Fritz Medicus, ed., "The Scientific Significance of Paracelsus," Bulletin of the History of Medicine, IV (May, 1936) pp. 353-366. (Translated by Fritz Marti)

(27) Walter Pagel, Paracelsus, p. 50-52.

stars when hierarchies dissolve giving way to the individual. Any change which the astrum may bring about affects members of a group in particular and the whole universe in general by disturbing the pre-ordained order of things. (28)

As a religious naturalist Paracelsus regards the universe as the creation of God and the laws of nature as the manifestations of divine freedom by means of which God coordinates creation. Both matter and mind are emanations of God's will and are connected in all stages in various degrees until they finally become identical. Thus the universe consists of corporeal units possessing souls graduated according to the amount of divine force bestowed upon them at the time of creation. This divine power exists in the entirety of the creature as well as in its individual parts. It is the ^esed which helps the creature to develop and which directs its function towards a specific aim. In the same manner each living being has a center or an inherent spirit in it which helps it in development and fulfillment of its purposes, namely, the Archeus. In this respect Paracelsus is said to have regarded the world monadically. (29)

Paracelsus applies the microcosmic theory to the field of medicine. The course of events in astronomy plays an important role since life is parallel to the movements of the stars, and thus the bodily organs, individually and collectively, rule the body, as the stars, individually

(28) Ibid., p. 38.

(29) Walter Pagel, "Religious Motives in the Medical Biology of the XVIIth Century," Bulletin of the History of Medicine, III (February, 1935) pp. 97-129.

and collectively, rule the universe. From this view arose the study of localism i.e. of morbid anatomical changes of the bodily organs with which view is associated the Ontological conception of disease, a view where disease is considered as an entity in itself characterized by certain causes and changes. Although disease is a disturbance of the functions of the various organs in the human body yet it is not something constitutional. (30) A foreign body, a seed, is a necessary condition to bring disease about. These seeds which were sown by God at the Fall of man affect the organs to which they are related by a predestined sympathy. (31) With the Fall of man is closely related the concept of separation or individuation which signifies breaking away from the original divine unity. This view of separation has been the main feature of the universe, manifested by beings struggling for existence in isolation, and by processes splitting to individuation and breaking away from the original harmonious makeup. An example of this is found in diseases where each disease represents an "Ens", an individual being, e.g. the foreign agent causing the disease. (32) This agent could be of different types such as a poison which Paracelsus calls "Ens Venene", a cosmic agency "Ens Astrorum", abnormal imagination "Ens Spirituale", divine intervention "Ens Deale". (33) Thus disease is an individual interfering with the harmonious work of an organism creating

(30) Walter Pagel, Paracelsus, p. 137.

(31) Ibid., p. 140.

(32) Ibid., p. 113.

(33) Fielding Garrison, An Introduction to the History of Medicine, p. 206.

disintegration, and with its metabolism causing abnormal changes in its organs, and as a result becomes manifested as a pathological change leading a parasitical life and conditioning the patient to a new setup.(34)

Diseases as beings are made in the form of "Semina" attacking man from the outside. For Paracelsus the universe is full of all sorts of invisible beings trying to attach themselves to man and participate in his life. He calls these beings "souls", "sparks", "demons", "homunculi". They are vegetative and sensitive in nature, travelling from one body to another in a cyclical manner from plants to animals, to man to air, to earth, to plants again and the cycle goes on and on. In connection with the doctrine of sin this process is meant to help either the host or the parasite to repent and to give him the chance to become righteous again. Evils and demons pervade the atmosphere and surround each individual causing all sorts of discomforts and bad effects of overcrowding such as shaky knees and tearing of clothes. These demons which are supported by the devils and are created either by God on a Friday or by Adam after his Fall may also be the spirits of the dead which seize man, stick to him and possess him, thus creating disease. (35)

Each disease, according to Paracelsus, is endowed with a body and this is how it spreads among men. There is connection between a specific disease and the place where this specific disease happens to take place, "Just as there is not gold everywhere". This is called the

(34) Walter Pagel, Paracelsus, pp. 113-115.

(35) Ibid., pp. 216-218.

"anatomy" of diseases which is responsible for giving each individual his particular disease and to this "Anatomy of the Disease" the "Anatomy of the Remedy" must be used if one were to get control of the pathological state otherwise it would spread and become poisonous and dangerous. Thus the "disease body" marks the outcome of its action on the various organs of the body i.e. the anatomical changes, and the distribution of these changes reveal the type and nature of the agent causing them. (36)

Paracelsus believed that since disease is a specific entity its therapy must also be specific. The external agent or substance which unites with its equivalent substance inside the body gives rise to a disease complex with its own specific characteristics as a parasitic invader thus requiring specific measures to cure it. Treatment should therefore be etiological rather than symptomatic i.e., the doctor must aim at eradicating the cause of disease which is producing various signs and symptoms and then all these which are secondary, will automatically disappear. Each organ, says Paracelsus, has an appropriate herb and both organ and herb are bound by a specific planet. (37) During disease the Mumia, an invisible vehicle, in which the Archeus is contained, should be magnetically extracted from the body and inoculated into a plant bearing the signature of the disease so that it may attract the specific influence from the specific star, since disease is caused

(36) Ibid., p. 138.

(37) Ibid., pp. 142-145.

by astral influences acting upon the body of man. (38) It has been mentioned earlier that in applying the microcosm theory to the field of medicine Paracelsus believed that astronomy plays a very important role since the course of events in the firmament is comparable and analogous to the functional schedule of the organs. These indicate the functioning of the various Archei and consequently the real course of physiological mechanisms, habits and emotions. (39)

(38) Fielding Garrison, An Introduction to the History of Medicine, p. 205.

(39) Walter Pagel, Paracelsus, pp. 111-113.

ONTOLOGICAL CONCEPTION OF DISEASE: VAN HELMONT

Influenced by Paracelsus, Van Helmont believes that all organic and physiological processes are based on chemical events presided over by spiritual forces which he calls the "Archei." In a state of health all chemical processes are under the control of the Archeus, in disease foreign elements create various chemical changes beyond the control of the Archeus, and in death the Archeus is completely lost and the chemical changes are left without any restraining power. This would account for the fact that the healthy living body does not putrefy, that the diseased body partially putrefies, and that the dead body totally putrefies. The Archeus itself is under the control of a "sensitive soul" which Van Helmont calls "light." (40) Van Helmont was influenced by the theory of the microcosm which is related to gnosticism where the world appears to be a derivative of the highest spiritual principle, in the form of light gradually materializing the spirit. (41) In man the sensitive soul which is mortal coexists with the intelligent soul which is immortal. In fact the sensitive soul is the shell of the intelligent soul and the latter operates through it, i.e. at the command of the intelligent soul or the "mens immortalis" the sensitive soul makes use of the Archeus regardless of whether the sensitive soul wishes to do so or not. Before the Fall of Adam the Archeus was subordinate to the immortal mind and was controlled by it but at the Fall man received the sensitive soul and with it death, the immortal mind retiring within the sensitive soul and becoming its core. The seat

(40) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV (October, 1932) pp.23-29.

(41) Walter Pagel, Paracelsus, p. 208.

of the sensitive soul, according to Van Helmont, is in the stomach, since an injury to that area destroys consciousness. However, it is there not in a local manner but from there the influence of the soul is diffused throughout the whole body. (42)

Van Helmont does not mention what the nature of the Archeus is but he seems to have regarded it to be an aether-like substance. He believes it to be of two types which correspond to Paracelsus' concepts of the Vulcanus and the Archeus respectively. The Archeus Influxus controls the body in its entirety according to a certain plan of the Creator whereas the Archeus Insitus is a local Archeus of the various individual bodily organs but subordinate to the chief Archeus Influxus. (43) In a state of disease, whether the cause is incapacity or a foreign harmful agent, the Archeus deviates from its normal course of action and though the direction of action is changed yet it always acts according to a certain fixed plan, e.g. inflammation is a reaction of the local Archeus to trauma, and fever is an effort by the chief Archeus to overcome an irritant. (44) Van Helmont here seems to be elaborating on Paracelsus' view of the Archeus, i.e. that it is divided into various parts acting on corresponding parts of an object, a view consistent with his theory of correspondence. However, in addition to the central Archeus Van Helmont sees other archei inherent in the organs and their parts which he

(42) R.O. Moon., "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV (October, 1932) pp. 23-29.

(43) R.O. Moon, The Relation of Medicine to Philosophy, p.166.

(44) Ibid., p. 177.

call archei insiti. Later on Leibniz elaborated still further saying that the universe consists of innumerable objects which are infinitely divided and each division possessing its own Archeus, the Monad, which unites with other archei in its own way. (45)

The Archeus is analogous to Aristotle's concept of "Entelecheia", an active agent in generation not linked up with the free action of a living Creator, according to Pagel. In explaining vital functions Van Helmont stresses the "seeds" with organized matter in a process of generation rather than a special life force. "Generation", he says, "means nothing but the flow of the seed towards perfection, the maturation of properties, the emergence of hidden qualities, the consummation of a schedule down to its end." The "Vita Media" or the middle life of things, which persists and prevents objects from perishing completely. If cows have eaten onions before being milked, their milk will taste of onions, which illustrates the gradual change in an individual being. The being does not perish entirely but disintegrates into a fluid form. This dates back to the original sin which disabled the human archeus from absorbing and assimilating food and also properties of middle life during which time mutations entered human life causing afflictions and harmful changes inflicted by "alien ferments" i.e. external to the human body. These ferments unite with the archeus and create in it either appetite or aversion, enchant it with all sorts of imagination, and force it to digress from its own regular schedule. As a result the archeus fails to perform its duty of assimilation, since the ferment does not blend harmoniously with it, and so

(45) Walter Pagel, Paracelsus, p. 108.

it leaves certain anatomical changes manifested by the organs in case of disease. (46)

Specific differences between objects and their specific actions if found in Van Helmont's idea of "Magic" in nature, in which impressions are tied up with the representation in the individual of all things in nature. All actions and properties of beings are caused by the acting entity imagining its own form. This is simple, "corporeal and ignoble" and present in elements of inorganic matter and occult qualities such as those found in laxatives. Imagination of forms of composed bodies with specific virtues such as the magnetism of a magnet yield higher faculties. Still higher is the virtue which produces a certain entity and transmits it to its proper object (sympathy) (47) e.g. when the archeus, by confusion, is stirred up it forms an image of the disease or of its own change, and this imagination of an "image of death" in the archeus prepares the right medium in which the poison can live with the help of sympathetic attraction. (48) The highest of all virtues is not tied up with bodily powers but is due to the excitation of the internal soul by intense imagination, contemplation or by the Holy Spirit. (49) Similarly, according to Pagel, there is neither birth nor death to the monad "but only development of the seed and its envelopment and regression to smallest germs." (Does this foreshadow the Law of conservation of

(46) Walter Pagel, The Religious and Philosophical Aspects of Van Helmont's Science and Medicine, p. 26.

(47) Ibid., p. 31.

(48) Walter Pagel, Paracelsus, p. 186.

(49) Walter Pagel, The Religious and Philosophical Aspects of Van Helmont's Science and Medicine, p. 32.

matter and energy). The gradual change of the monads which represent all things in the physical world, and which is reflected in each individual monad by "small perceptions" is accounted for by the degree of clearness of these perceptions. Perceptions vary in degree ranging from bare and unconscious monads found in inorganic matter up to highly conscious monads found in mental faculties until the most conscious monad, i.e. God. (50) In short in the systems of both Van Helmont and Leibniz we find that the Archeus and small perceptions respectively are links between coarse matter and the highest qualities of a conscious representation of the world. (51) Thus the higher we go in the scale of impressions and monads the more ontological the view becomes.

Another similarity between Van Helmont's view of the Archeus and Leibniz' view of the monad is that the Archeus, like the windowless monad, acts by its own spontaneity possessing an innate schedule and an aim towards which it works. Nothing can alter the schedule of the Archeus in spite of the fact that it might be disturbed by illusions and appetities which the alien ferment might create. Similarly the monad is windowless and nothing could enter into it from the outside. It acts out of itself and any change which might take place occurs from an internal principle. In continuing to draw similarities between Van Helmont and Leibniz, Pagel says that the former regards the "Form" of Life as a spark or light given to man by divine creation and any shortcoming in man

(50) Ibid., p. 32.

(51) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June, 1945) pp. 1-44.

is due to the original sin. Leibniz speaks of divine lightning, "Fulgurations continuelles de la divinite", as the generator of monads. This essence given by God to the individual is limited by the receptivity, the empirical existence of the creature. (52)

In his scientific endeavor Van Helmont was greatly motivated by religion and mysticism. Science, he believed, should be advanced for the welfare of life which God has created. He is concerned about each object in nature as following a certain plan of form and function given to it by God and therefore about the divine resources and hidden forces in objects, plants and beings in general. He believed in positive entities inherent in matter and created by God and his problem was to find out how the non-corporeal interacts with the corporeal. This search for the divine spark in created things which only divine illumination can help us attain by blending all our mental faculties into one intellect such that the divine grace spreads over our soul, is a religious and mystic approach possessed only by the God fearing. (53) With this religious and mystic approach Van Helmont combines a scientific and empirical one. In addition to being concerned with positive entities, divine resources etc. he was anxious to find out what the active principle in beings responsible for their specific form and function is. This plan of form and function which each object in the physical world follows is contained in the

(52) Walter Pagel, The Religious and Philosophical Aspects of Van Helmont's Science and Medicine, p.34.

(53) Ibid., p. 12.

material "vector of specificity," a substance of the finest corporeality which Van Helmont calls "gas." Gas, or the material vector of specificity, is a gift of the Creator whereby crude matter is changed to organized matter. According to Pagel, the original notion of "gas" may be religious and mystical or else philosophical and metaphysical, but it is nonscientific and this is the reason why historians of science neglected it. (54) Paracelsus emphasized the term "chaos", a volatile state and Pagel believes that Van Helmont may have derived the term "gas" from it. Man, in Paracelsus' theory of the micro-macrocosm, represents all parts of the world and all elements in it forming a "Quint essence." The question which here arises is how can specific differences be accounted for, and Pagel tells us that Van Helmont built up the concept of the Archeus, as the material vector of specificity, in which spirit and body of individual unite. It is subject to experimentation in the form of "gas". In this way Van Helmont prevents a cosmic "all life" from overshadowing "organic life". (55) He believes that physiological processes are chemical, due to the agency of a special ferment i.e. gas. Each gas is an instrument for its special Archeus which Van Helmont calls "Blas" and this in turn is presided over by the "anima sensitiva motivaque" i.e. sensitive soul which is located at the pit of stomach. (56) Van Helmont was the first to recognize the physiologic^a importance of

(54) Walter Pagel, "Julius Pagel and the Significance of Medical History for Medicine", Bulletin of the History of Medicine, XXV (May-June, 1951) pp. 207-226.

(55) Walter Pagel, Paracelsus, pp. 95 (footnote) 104-106.

(56) Fielding Garrison, An Introduction to the History of Medicine, p. 251.

ferments and gases e.g. carbonic acid or the "wild gas" or "gaz sylvestre", bile, gastric juices and acids, and to explain that the explosive power of gunpowder is due to the production of gas. (57) Gas is a form of water and not air, Van Helmont affirms. He makes the idea of a ferment liberating free gas by its action the basis of his system of physiology i.e. spirits of the body, natural, vital and animal, are basically related to and connected with the spirits of wine by fermentation. All changes in the body are due to ferments and this he regards as consistent with his view of the influence of the Blas or Archeus in that these spiritual agents act indirectly on matter with help of the ferments. Unlike Paracelsus who stressed the presence of three elements Van Helmont stresses the presence of only two elements and these are air and water, gas being a form of the latter. These two elements are distinct and irreducible to each other. Plants and animals are constituted of water plus other properties whereas gas is found in many bodies as solidified and condensed spirit which is set free with help of a ferment. (58) The gas of water is water vaporized but not all vapors are gases since there is the sylvestre gas (carbonic acid) which comes out of woods and during the fermentation of wine. (59) By "Blas" Van Helmont means the same as Archeus, an immaterial agency responsible for the guidance of material phenomena and changes. Blases are impetuous

(57) R.O.Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV, (October, 1932) pp. 23-29.

(58) Sir Michael Foster, Lectures on the History of Physiology, p. 134.

(59) Charles Gumston, An Introduction to the History of Medicine, pp. 279-281.

movements in living bodies, and emanations from stars, bodies, thunder, earthquakes, e.g. the Blas meteorum governs the heavens, the Blas Motivum governs all movements, the Blas A~~l~~terativum governs all metabolism, and the Blas Humanum governs all actions of the human body. (60) According to Cumston, the Blas Humanum becomes the nervous element the animal spirit in Descartes, the nervous current of the eighteenth century physiologists, and the animal magnetism of Mesmer. (61) Thus the ferment in Van Helmont's system is the efficient cause which governs all the acts of living beings and it is itself a formally created being possessing neither substance nor accident but something particular like fire, sound or light.

In his system Van Helmont emphasizes magnetic forces represented by "Actio Regiminis" which controls vital processes and functions according to an innate schedule by means of central regulation. Interaction between body and soul is possible not through the humors as was traditionally believed but through sympathy or concensus. (62) Here sympathy is the counterpart of the preestablished harmony of Leibniz and his view that there is "concensus" and not "commercium" among individual things each fulfilling its own schedule of life. (63) After studying Van Helmont carefully Pagel believes that interaction in the system of Van Helmont was necessary in order to do justice to organic

(60) Sir Michael Foster, Lectures on the History of Medicine, p. 130.

(61) Charles Greene Cumston, An Introduction to the History of Medicine, p. 280.

(62) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June, 1945) pp. 1-44.

(63) Walter Pagel, Paracelsus, p. 38.

matter with its inherent dynamic impulses, rather than leaving matter lifeless. Besides, Van Helmont's religious beliefs do not permit of monism where matter alone would be responsible for life, and so he solves the problem by his view of well defined biological entities in the individual i.e. a unit consisting of material aspect organized in the form of Archeus, gas, and also of a spiritual aspect of a plan of form and function. (64) The concept "gas" helps represent the interpenetration of matter and dynamic agents manifested in various stages ranging between coarse matter and the finest corporeality, i.e. the odor of ferment. Body and soul in this system are, according to Pagel, two aspects of the same reality rather than two independent entities with one inferior to the other matter owing its form to the same entity responsible for its function, i.e. the Archeus. By acting as metabolic centers the Archei Insiti, the dynamic principles inherent in tissues, achieve close union between the Archeus (gas) and life (ferment). (65) Just as Van Helmont avoids Monism so he disapproves of Dualism because it creates a gap between body and soul and so Van Helmont, says Pagel, may be considered as a vitalistic pluralist, considering the ultimate reality of the universe as consisting of innumerable seeds which are neither body nor soul but both, in whose specific form, function and development are very much like the monads of Leibniz. (66) The

(64)Walter Pagel, The Religious and Philosophical Aspects of Van Helmont's Science and Medicine, p. 22.

(65) Ibid., p. 23.

(66) Ibid., p. 8.

importance of this concept is that in it lies the core of modern psychiatry i.e. psychosomatic medicine, whose problems have not yet been solved by anatomy, physiology or experimental psychology. (67) We mentioned previously that when a ferment attaches itself to an organ it tries to deviate the Archeus from its own normal schedule of function by stirring it up and confusing it. The Archeus forms an image of the disease preparing a medium for the poison to settle by sympathetic attraction. This view leads one to think of psychic elements found in bodies and bodies in psychic elements, a view which, according to Pagel, eliminates dualism. This view is also present in Campanella's theory of the Sensum Rerum which Van Helmont elaborates to become the precursor of the philosophy of Glisson and Leibniz. (68) In a monistic conception where matter is a product of mind in that the noncorporeal ~~Creates~~ its material and gives it form, the emphasis of the spiritual as the active force leads to the ontological view of disease.

Disease, according to this view, is a local aggression of pathogenic agents, seeds in need of a medium, and the local affection of the organs which receive the seeds and sustain them. The emphasis is on the cause which in primitive medicine is viewed as possessing concrete reality even though it springs from imagination, and in rational medicine when it breaks its ties with the natural causes. (69) If the seed is

(67) Iago Galdston, "Book Reviews," Bulletin of the History of Medicine, XVII (January, 1945) pp. 108-110.

(68) Walter Pagel, Paracelsus, p. 181.

(69) Walther Riese, The Conception of Disease, p. 79.

external then disease would be a parasitic organization since it lives at the expense of the bodily organs. Here the etiological conception of disease, the basis of scientific biology and medicine where life and nature are interpreted in terms of chemistry and living monads with closely interlocked physical and psychical elements, is related to the ontological conception of disease. (70) The criterion of the ontological conception of disease is the passage from the conceptual nature of a thing i.e. essence, to its perceptible reality. In terms of ontology natural phenomena possess no perceptible qualities but only "being" and what we see in the physical world are species of being, pure concepts with none of them limiting the other but coexisting side by side. (71) Likewise diseases which were thought to have their roots in magic or religion (e.g. evil spirits) now have their causes traced to empirical roots i.e. instead of an evil spirit causing the disease we have an external cause in the form of an animal or a worm. (72)

In so far as therapeutic treatment is concerned Van Helmont agrees with Paracelsus. He used wine, laudanum and various preparations of mercury and antimony which the Galenists denounced. For gout and pleurisy which he thought were due to excess in acid he used alkaline substances. He believed that each country produces its special

(70) Walter Pagel, Paracelsus, p. 332.

(71) Walther Riese, The Conception of Disease, p. 80.

(72) Henry Sigerist, Man and Medicine, p. 106.

medicines suitable for its own diseases and therefore it is unnecessary to import any drugs. He opposed venesection strongly on basis that it diminishes the mass of vital spirits in the blood and encouraged the belief in pacifying the Archeus as the most important and most effective remedy. (73)

(73) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV (October, 1932) pp. 23-29.

The ontological conception of disease had a tremendous influence on the writings and research of the "Naturphilosophen", i.e. naturalists, which followed Van Helmont. Disease, they believed, is a parasitic organization which reduces the individual to lower forms of life i.e. it is not only a nutrition disturbance but also a foreign entity entering the body from the outside. This entity represents primitive forms of life or lower monads and is endowed with dreams of the higher integration of life. It lacks individuality and attempts at getting into the lives of real individuals and be part of them thus realizing its dreams. In short, disease is the result of the entrance of primitive monads into the human body, a higher monadic aggregate, and the disintegration or reversion of this human body to lower forms of life, with emphasis on various anatomical changes as well as disturbance of the process of metabolism. (74)

In his Tractatus de natura substantiae energetica, seu de vita naturae, ejusque tribus primis facultatibus, Francis Glisson (1597-1677) writes that all beings and bodies capable of self movement do so because of an internal principle, an immanent life force which is the basic principle of subsistence, perception, appetite and motion. It acts from within the subject in conjunction with a second energy which is the faculty of movement and communication with the interior. In addition to these there is a principle of consciousness which accounts for the accidental qualities. Unlike the Cartesians who believed that only

(74) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June, 1945) pp. 1-44.

matter and movement existed and all causes are reduced to external conditions of action, Glisson believes that only an internal principle explains the activity of bodies. He disagrees with the Cartesians that every thing moves from outside because this only creates the desires and occasion for movements. On the other hand he agrees with them in his belief in vital spirits and that the irritable fibers develop action influenced by the innervation they get from the brain. All parts of the body, Glisson believes, have a sort of animal or vital irritability, but just as the mechanism of any machine explains only the operation and not the function of a machine, so does the soul alone explain life. Glisson's views are based on the observation of irritability and tone of organic fibers which led him to assume an inherent and invisible force, similar to the Archeus, with which every single material object in nature is endowed. (75)

All through medical history there has existed, in different forms, the conception of an integrating principle which gives reality to the body manifesting itself in certain bodily phenomena and processes, in emotions and in thoughts. This principle appeared as the Physis of Hippocrates, the Anima of the classics, and the Elan Vital of Bergson. (76) It also appeared as the Archeus of Paracelsus and Van Helmont and life-force according to Glisson. George Ernest Stahl(1660-1734), professor of medicine at Halle and physician to the king of Prussia, believed that all chemical events which take place in the

(75) Charles Greene Cumston, An Introduction to the History of Medicine, pp. 289-291.

(76) Millais Culpin, "The History of Psychology in Medicine," Proceedings of the Royal Society of Medicine, XXIX (1936) pp. 1569-1577.

organic body differ from those which take place in the laboratory in that in the body chemical events are directly controlled by the sensitive soul, Anima Sensitiva, which pervades all organs and presides over all processes. The human body, according to Stahl, is not a machine. Its phenomena are subject not to physical or chemical laws but to the laws of the sensitive soul which made itself felt in the simplest of body changes. (77) In so far as the phenomena of the organic body are similar to the chemical and physical events in the inorganic body we may explain organic phenomena in those terms, adds Stahl, remembering that chemical and physical phenomena in the living body may be modified by the sensitive soul which shapes them to its own ends by motion. (78) In this respect motion is the link between the spiritual and the corporeal. Stahl's views may be regarded as a development of those of Van Helmont's. However, Stahl's views on the sensitive soul differ from those of Van Helmont. Stahl considers the sensitive soul to act directly on the chemical processes without the need of an Archeus. It is not as Van Helmont believed it to be: a mortal thing associated with an immortal mind, but itself the immortal principle, spiritual in nature, coming from afar and returning to its original place after the death of the body. There is a great gap between the organic and the inorganic beings. They differ in that living things are guided by a sensitive soul while the others are not. Living things maintain an identity of

(77) Sir Michael Foster, Lectures on the History of Physiology, pp. 165-168.

(78) Ibid., p. 171.

their own in spite of the various changes which might take place whereas the others do not. Moreover, the living body is meant for special ends and purposes i.e. a true and continued minister of the soul whereas the converse is not the case. Unlike Van Helmont, who believed that the Archei and ferments are necessary agents between matter and the sensitive soul, Stahl believed that motion should be the agent, and all organic phenomena and processes such as preservation of the material structure of the body, building and reparation of bodily tissues, sensation and appetite, are all modes of motion.(79)

Van Helmont's view on the ontological conception of disease had great influence not only on the thoughts of the "Naturphilosophen" but also on the thoughts of Leibniz (1646-1716) Leibniz conceived the world and the individual objects in the physical world as an aggregate of innumerable small units each of which is endowed with its own life force. He believed the monad to be simple and imperishable, and possessing a center of force it has a functional direction of its own. In quality monads differ from each other. The monads embrace a material principle which help^s them to live together. The material aspect may either be primary matter with passive power of resistance or secondary matter, the organized "Massa Corpora" of the object. (80) According to Leibniz the body of the monad is the image of substance, and its

(79) Ibid., pp. 172-174.

(80) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June 1945) pp. 1-45.

movement is the image of action. His idea is that matter can only be conceived as a phenomena, and likewise its movements. Matter and its movements are extensions of an indivisible cause, like a mathematical point, and it is to this metaphysical point, a basic substance composed of possible matter and force, that concrete elements of nature must be referred. This he calls the monad. In this conception the monad is the human being and the soul is a point. The relationship between body and soul is the effect of a preestablished harmony and so intellectual ideas are not derived from sentient ideas i.e. they are not the effect of an impression but they develop in the soul when the senses are impressed with help of a preestablished harmony. (81) Dead bodies are an aggregate of monads immanent in the particles of secondary matter. The object seems to us as a unit qua phenomena and not qua reality, just as a pond is considered as a unit even though it might be full of fish. The living body, on the other hand, is real since in addition it contains a central monad which, like the soul, integrates the parts of an organ and coordinates its functions. Death is a new arrangement of the monads and so they do not perish but only their combination perishes. It is disintegration of monads and involution to lower forms. (82)

(81) Charles G. Cumston, An Introduction to the History of Medicine, p. 284.

(82) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June 1945) pp. 1-44.

In trying to establish a historical link between Van Helmont and Leibniz, Cumston tells us that Leibniz was in touch with François Mercurius Van Helmont, son of Jean Baptiste, for several years. During his life time Jean Baptiste Van Helmont was little known because he had published few books only, and it was not until his son, François, published for him his complete works under the title Ortus Medicinæ in 1667, i.e. three years after Jean Baptiste's death, that his fame and influence appeared. This may account for the influence of Van Helmont's views on Leibniz (83)

In his letter dated March 1st, 1960, to Mr. Francis Kent, University Librarian, American University of Beirut, Dr. Walter Pagel, Pathologist, writes: "The personal relations between Leibniz and Fr. Merc. Van Helmont (V.H. the younger) have always been well known from L.'s letters and it is said by L. himself that it was F.M.V.H. who suggested the term Monad (I personally do not see why this should not have been derived basically from Giordano Bruno). However, what does seem to me of greater importance for your student is the close parallel between Jean Baptiste Van Helmont (sen.) and Leibniz in certain respects and also the most probable close acquaintance of Leibniz with the work of Francis Glisson (he may well have met him personally when L. was in London - Jan. 1673) (84)

(83) Charles Greene Cumston, The History of Medicine
pp. 278-284.

(84) Correspondence with Dr. Walter Pagel, London through
Mr. Francis Kent, Librarian, American University of
Beirut.

All three, Van Helmont, Glisson, and Leibniz, believed that it is force, "Dynameis", immanent in organized matter which constituted the core of their systems. None of them neglected the importance of matter. Whereas Van Helmont viewed unorganized matter as inert water the others believed that no unorganized matter existed. (85) Their emphasis on the spiritual aspect, however, was just as great if not greater.

Through Jahn the ontological conception of disease culminates in the cellular pathology of Virchow. Ferdinand Jahn (1804-1859) is considered to be the link between Van Helmont, Glisson and Leibniz on one hand and Virchow on the other. As a naturalist Jahn believed that man is a part of nature and that disease is an expression of the struggle of the individual for existence. The body of an individual consists of various organs each fiber of which has its own life representing a "relative totality". When disease occurs it starts in one of the organs not involving all the body at once and therefore it is a local process. As such disease creates a "double life" in the body, a "break of life in itself" since some of the functions remain normal while others take a pathological direction. (86) In assuming that each fiber in the body has its own schedule of life and function representing a "relative totality" on one hand, and in considering the cells as the

(85) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June, 1945), pp. 1-44.

(86) Ibid.

ultimate units of life, the vital centers of metabolism on the other, Jahn helps the ontological conception of disease culminate in Virchow's cellular concept of pathology.

In addition to the two views emphasized by Jahn, i.e. the cell as the ultimate unit of life, and the localization of disease Virchow identifies physiological and pathological processes. In his treatment of the basic principles of humoral and neuro-pathology Virchow aimed at an expression of the general law which is behind the blood and the nerves, which is responsible for the differentiation of tissues. At the same time his aim was directed to that primary movement which he believed to be immanent in all living beings and is their essence. He called this movement the vital movement, the "spiritus rector", "anima structrix et vegetativa" or Archeus. (87) This vital force is a combination of physical and chemical forces, connected with certain combinations of substances found only in the living cell. In this manner Virchow derived the vital force from other ordinary forces subject to physical laws. Life is an expression of organic phenomena each of which proceeds in accordance with the laws of nature. Virchow, forty years later, said that life processes differ from physical and chemical ones only by their compositions and the internal manifoldness of mechanisms and effects, thus contradicting himself. (88) I doubt whether it is correct to accuse Virchow of self contradiction, since within a period

(87) Walther Riese, "An Outline of the History of the Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April 1949) pp. 111-137.

(88) Alfred Plaut, "Rudolf Virchow and Today's Physicians and Scientists," Bulletin of the History of Medicine, XXVII (May-June, 1953) pp. 236-252.

of forty years his hypothesis that the vital force is a combination of physical and chemical forces connected with substances found only in the living cell may have empirically proved to be negative.

The confusion that was created in thinking that the disease and its cause are one was done away with by Virchow who believed that the cause of a disease can be driven out of the body since it is a parasite but not so the disease itself. (89) With this view it is clear that Virchow held disease to be a parasitic organization with emphasis on anatomical changes originating in the principles of the Naturalistic School, and also on the ontological view of disease where disease is an "Ens" with a life schedule of its own, known by its anatomical changes and functional disorders of metabolism, rather than a disturbance of balance and harmony. The morbid cell, according to Virchow, is the "Ens Morbi" the focus of infection affecting other organs and creating all sorts of signs and symptoms. Living at the expense of other organs of the body the cell is said to constitute a parasitic organization. To this view of parasitism as an ontological conception the disease itself rather than its cause represents the parasite. Pathogenic microorganisms or parasites, Virchow believed, caused a condition in which essence and cause got mixed up, with essence seen in a changed part of the body. In this respect he reconciles the modern scientific view with the ancient one, i.e. disease as an organic entity leading a parasitic existence, since each part of the body acts as a parasite living at

(89) Ibid., p. 237.

the expense of the rest of it. (90)

"Disease is a reversion to lower levels of life" ways Virchow basing this view on his cellular theory. This appears also in Jahn as the result of his view of man's position in the physical world, i.e. man is a part of nature and his body consists of various organs each fiber of which has its own life representing a "relative totality". Nature has made the human body as the highest stage of development, and in it lower forms are integrated. A process of disease is due to the outweighing of one direction of life and the exaggeration of a normal process. Thus if man is a combination of all lower forms of life, and if disease is an excess of any set of vital phenomena, then disease is the reversion to lower forms of life. i.e. disease is repetition of what is normal at lower stages of life. (91)

(90) Walter Pagel, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine, XVIII (June, 1945) pp. 1-44)

(91) Ibid., pp. 33-36.

CHAPTER TWO

HOLISM

Holism is the "doctrine that the dynamics of a living whole permits of no differentiation of discrete elements". The basic principle here is that reality is an integrated and well coordinated whole and that the whole is more than just the sum of its various parts. (92) In his book Holism and Evolution Smuts presents it as the ultimate activity of the universe. This activity is responsible for synthesizing, organizing and regulating units and groupings beginning with the atom on the material level, through the cell in organisms, through Mind in animals to Personality in human beings. The synthetic unity in these structures pervades all that exists in the universe and is ever increasing in character. It is these characteristics which lead to the concept of Holism as the basic activity coordinating all wholes, and to the belief that the universe is a holistic one. (93)

Elaborating on this view Smuts says that we might be able to develop concepts of matter, life and mind by moulding them more closely to fact and experience, by freeing them from elements of separation and by forming the cooperative elements in a more inclusive conception of Reality. (94)

Modern evolution is not, as was previously believed, a purely

(92) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February 1952) pp. 71-82.

(93) J.C. Smuts, Holism and Evolution, p. 317.

(94) Ibid., p. 4.

mechanical one but a creative, dynamic and progressive one. It believes that life is descended from matter, and mind from both matter and life, but that in the process of descent there also exists growth and an effect greater than its cause. Thus in order to find the concept of reality we need to return to the fluidity of nature which in turn requires the concept of "field" in which other concepts and things act and interact providing for activities and the comprehension of their relations.(95)

Matter, life and mind appear as a progressive series of the same process which underlies and explains their characters giving evolution a continuity which modern scientific ideas do not. The concept Space-Time is in harmony with this progressive and creative process in nature. In a world of relative motion when measurements and clocks are variable and the universe curved with events following its curves i.e. having a definite organized structural character, Space-Time continuum becomes a part of physical reality, the field of the material world.(96)

Both physics and chemistry traced matter to the atom and molecules in different combinations. Physics, however, went further to units of electricity i.e. electrones and protons. States of matter whether gas, liquid or solid depend upon the forces in atoms due to their inner structure. The most remarkable of these states is the colloid state of matter in which particles of one matter are dispersed throughout another. The importance of this state lies in the fact that the protoplasm of

(95) Ibid., pp. 9-18.

(96) Ibid., p. 21.

cells is organized in this manner. The minute particles are spread and exposed at a maximum surface area which helps interaction of surface forces, physical and chemical, and certain reactions in the colloid state are very similar to certain biological ones. This would lead one to conclude that separation between matter and life disappears, that organic descent and radio activity render fluid the old fixed entities and forms, that matter is creative of the forms and patterns, that the Periodic table of chemistry resembles the systems of botany and zoology in their activity, plasticity and development, and that in colloid state in protoplasm matter manufactures substances such as hemoglobin and chlorophyll in order to bridge the gap between itself and life. A mutation may have taken place in this gap. (97)

The cell is the second main constituent of the world. It constitutes plants and animals, has nuclei, cell fusions which give rise to higher organisms. It displays its characteristics in various body activities such as breathing digestion, reproduction, development, death. It possesses certain metabolic character forming enzymes which by osmosis keep the body alive. Thus it displays a physical as well as a chemical mechanism. In reproduction cell division and cell fusion resemble electrical situations and seem to connect the electrical structure of the atom with a possible electrical origin of the cell. The plant cell arose from need of food i.e. air and earth, the animal cell from need of organic food. This required mobility and so the cell

(97) Ibid., p. 35-36.

developed a motor system with a nervous system to work it and later a brain to direct action. (98)

Unlike the atom the cell is much more complex in structure and in function. Among its components there is cooperation for a purpose, equilibrium and regulation, all well displayed in self restoration in the case of injury which implies that there is something, more than just the parts, in action, a central regulator to which the parts respond, an inner factor in Evolution. (99) The subordination of the parts to the whole is best seen in reproduction where the type is maintained at all costs without loss of the individual identity.

How life and mind were derived from matter has been quite an important issue to settle. Two views of development have prevailed. The first is that reality is given at the start in form and substance either actually or implicitly with a following history as the unfolding of its content. This, of course, means that creation is in the past and predetermines future thus abolishing all possibility of creativity. The second view is that a minimum of the given is put at the start and the process of Evolution is made creative of reality. Here evolution is one of new forms, new groupings and new materials in a process of development. This view implies release of the present and future from the past making freedom an immanent characteristic of the universe. (100)

(98) Ibid., p. 59.

(99) Ibid., p. 61.

(100) Ibid., p. 85.

Both matter and life consist of units whose organized grouping produces natural wholes i.e. physical bodies or organisms. Since this wholeness is found everywhere it must point to some fundamental principle in the universe. Holism (from *ολος* = whole) is the term which Smuts uses for this principle which creates wholes in the universe. Since its character is specific and general he uses it for a starting point in his system. Wholes, Smuts believes, point to something real and that Holism is a real operative factor, a vera causa. Behind evolution there is a definite thing with specific action productive of a concrete character of evolution. It is a unity of parts which is found in inorganic substances and also in human beings. In plants and animals the basic unity of parts is observed as intense such that it is more than the sum of its parts. It relates them in structure and integrates their functions such that this integration directs their function towards a whole. Thus the whole and the parts influence each other mutually. (101)

Synthesis in holism is a progressive one. First we have the physical mixtures where the parts preserve their identity and separate characters and functions. Then we have the chemical compounds where structure becomes more synthetic and the functions of the parts are influenced by the new synthesis. Next we have the organism where synthesis becomes more intense giving the various organs a greater unity,

(101) Ibid., p. 86.

central control and coordination of the parts. As we go higher we have minds where the central control acquires consciousness, freedom, and to a large degree creative ability. Finally Personality^{is} the most highly synthesised and evolved of all structures of the universe. During this progressive scale where the final structures are far more self creating than the beginning ones the concept of wholeness deepens. Because inorganic, organic and psychical parts are in a process of creative synthesis holism is dynamic and evolutionary as we have previously mentioned, and evolution has an increasing upward spiritual holistic character. Thus the evolutionary process is understood in terms of wholeness which implies that nature is not purely mechanical but that its mechanism has its place in a framework of holism. (102)

Holism is unity of parts and not a "tertium quid" over and above them. It is the new reactions resulting from this unity in which parts change towards the type resulting in change of their functions also. Here the whole appears as a central power of coordination of parts and all activities of parts seem directed to a central end where there is a unified action as a whole instead of individual mechanical activities of various parts. Mechanically the function of parts is the sum of activities of components whereas organically separate action disappears in a process of synthesis. (103) Although holism acts through parts

(102) Ibid., p. 87.

(103) Ibid., p. 118.

yet it does so only in their new synthesis. This has a great effect on the concept of causality. When an external cause or stimulus acts on a whole the effect is transformed in the process. The whole absorbs and assimilates the stimulus and the effect is that of the whole. Thus in its application to organisms the physical category of "cause" changes. Again synthesis has a great influence on creativeness. In fact Smuts believes that it is the source of creativeness. Nature and Evolution are creative in proportion to the wholes creating new syntheses. Out of old material the whole creates creativeness in evolution and novelty in organic nature which raise us from mechanical ideas to categories. On the spiritual level creativeness issues in great values. We said above that external causation is assimilated and changed by metabolism of the whole into this same whole. In ^{this} ~~plus~~ manner otherness becomes selfness and external pressure becomes personal free action. With progress of wholes freedom in wholes increases until in man it takes conscious control of itself and creates free ethical world of the spirit. (104)

Holism is seen not only in progress and changes but also in the stability of great types. Though the new is assimilated into the whole yet these variations are exceedingly small in contrast to heredity. Unity in organic evolution explains the essential stability as well as the integration of the whole process. (105)

(104) Ibid. p. 119.

(105) Ibid. p. 120.

Holism and mechanism are found everywhere in the universe but in different measures. During evolution mechanism which is a cruder form of holism decreases and holism increases until it culminates in Mind and in Personality. (106) It seems to me that this view is analogous to Aristotle's concept of becoming during which matter and form are diffuse at the start but with time there is less and less materiality and more and more formality until finally in a hierarchy of forms we get pure form. The question which here arises is how, in compound structures, the material and immaterial interact but Smuts says that these are not separate interacting substances. Holism explains the creative directive and controlling activity which embraces both organic and psychic whole. Life and Mind are inherent in the concept of wholes and human beings as wholes i.e. they are two aspects of a whole. (107) Holism determines the course of progress directing structures into greater syntheses of character and meaning, into greater wholeness, and so in evolution the universe is directed from the mechanical to the holistic type which is its immanent ideal. (108)

In the field of evolution where some evolutionists believe that organic descent is the effect of variation, of an inner creative factor, whereas others believe that it is the effect of natural selection, of

(106) Ibid., p. 145.

(107) Ibid., p. 146.

(108) Ibid., p. 147.

external factors acting on variations, cytology traced certain unit characters in breeding and in the laboratory where mechanical combinations replaced creative variations making evolution difficult to understand as progressive and creative. Later developments in evolution overemphasized the inner creative factor as the motive force and the secret is in the cell as the inner seat of Holism. (109)

Whether modifications in an individual are selected or not is a complex and difficult question to answer. So it forces us to leave individual selection and observe the advance of an organism as a whole. The variation is the center of advance of a holistic nature and it issues from the organism and is in harmony with its type and function. The organism selects the suitable variation and supports it and so it is a holistic selection which acts at birth and during development, and only during its maturity natural selection takes over and variation begins to "fend" for itself. So we see that Holism creates certain variations and at the same time represses others. It pushes to the front certain features and checks others thus aiming at the achievement of a balanced whole. This is especially true during the formation of a personality as a moral whole. (110)

The third great structure of Holism is the mind. It is related to other earlier holistic structures in that it is a continuation of

(109) Ibid., p. 182.

(111) Ibid., p. 224.

regulation in organisms appearing in reasoning which integrates all experiences. It is also a development of an individual aspect of Holism advancing and culminating in personality in a new order of wholes in the universe. (111) Disturbance in organic life created a feeling of discomfort which had survival value and later became active in attention and consciousness. Interest followed and then mind with power of conation and experience which helps control its own condition of life and secures freedom. The individual and universal sides of mind develop making it a part of the universal order. By influencing and enriching each other mutually both aspects of mind, the individual and the universal creat a new world of spiritual freedom, which ultimately leads to creativity and purposiveness. Smuts warns us against pure individualism since an individual becomes self-conscious only with help of society by using the common language of his fellow men. (112)

The holistic movement culminates in Personality as the supreme whole. It is ideal when mind and body nourish each other and mind penetrating body acts through it. As we said previously they are not separate entities and so Smuts prefers to use "introaction" rather than interaction. This whole is a creative and transformative activity which accounts for what takes place in personality and its elements. Personality is more inclusive a term than psychology since the latter is concerned with the study of the objects of the experiences of an

(111) Ibid., p. 224.

(112) Ibid., p. 225.

individual. The mental aspect is only part of the personality which requires a discipline to itself as a real factor in the universe, Smuts suggests the term "personology" as a name for this new discipline. It should start by biographies of human beings and personalities as living wholes in development i.e. synthetically. This supplies us with materials for formulating laws of personal evolution making biography a science. He thinks that this gives us a sound theory of personality and personology which would serve as a good basis of a new Ethic, metaphysic and a truer spiritual outlook. (113)

Personality is an organ of self realization. Together with feeling, intelligence and will it constitutes a balanced structure of various activities in progressive harmony. The greater the holistic character and control in it the greater is the strength of mind and character, the better the coordination of impulses, the less the conflicts within the soul and the greater the spiritual integrity and peace of mind. As a spiritual metaboliser it is self healing and its nature as a whole makes it free to eliminate any disturbing and inharmonious elements in the personality. Wholeness is harmony between the higher and lower elements in human nature with all the features subordinate to the progressive whole which ultimately yields peace and joy i.e. summum bonum of Holism. (114)

(113) Ibid., p. 261-262.

(114) Ibid. p. 290.

To sum up everything in this universe, from the electron to personality wants to be whole, says Smuts, and structures and compounds are only steps in the holistic movement. This of course means that eternity is contained in time, matter is the vehicle of spirit, reality inherent in the natural phenomenon. (115)

THE THREE PERIODS OF VITALISM

The metaphysical views of the nature of disease moved in correspondence with two basic views regarding the ultimate reality of the universe. These were the mechanistic ideology which views all changes in a living being as the result of physically measurable quantities, and the vitalistic ideology which assumes the existence of a lasting and unmeasurable energy of life, a vital force. (116)

In "The Tradition of Ancient Biology and Medicine in the Vitalistic Periods of Modern Biology and Medicine," Adolf Meyer tells us that in modern times there have been three periods of vitalism all of which are revivals of Aristotle and Hippocrates. The first period represented by Thomas Sydenham (1624-1689) and by George Ernst Stahl (1660-1734) is a reaction against the mechanistic natural science or Iatromechanics. Sydenham reacted to Georgio Baglivi (1668-1707) who regarded the human organism as a sort of a tool-chest. For example the teeth were like scissors, the stomach like a bottle, the glands and intestines like sieves, the blood vessels like a system of tubes, the lungs like bellows, etc. He (Sydenham) preached return to Hippocrates. Stahl also, as we have seen previously, gave the soul the chief place in an organism. God is the prime mover and the organism exists by virtue of the soul and when the soul fails to function properly it causes illness. (117)

(116) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 71-82.

(117) Adolf Meyer, "The Tradition of Ancient Biology and Medicine in the Vitalistic Period of Modern Biology and Medicine," Bulletin of the History of Medicine, V (November 1937) pp. 800-822.

The second period of vitalism takes place during the eighteenth century and is connected with the struggle over evolution and epigenesis (embryo is entirely new.) Evolutionists believed in a mechanistic unfolding of what existed before and that the difference between the seed and growth is a matter of size. Epigenecists, on the other hand, believed not only in increase in size but also in a progressive climbing from one step to another in evolution with intensification and differentiation of the organism with a vital force guiding this evolution. This view of vitalism led to research and proved to be empirical as well as metaphysical (118) Albrecht von Haller (1708-1777) experimented on this and discovered that external actions in nerves and muscles of amputated members produced muscular contraction differing according to the strength of the stimulus. After excitation the nerves were in an unstable state of equilibrium and this he considered as a normal property of life. Bodily organs needed external stimuli, he believed, and he considered air and food as being the normal stimuli for the bodily organs. The kind of activity seemed to be conditioned by the specific energy of the organ influenced by the vital force. Thus diseases according to this view were judged to be so depending upon the increase or decrease in excitability. (119) Others added sensibility e.g. Johann Friedrich Blumenbach (1752-1840) realized that each type of living creatures grew according to a specific design and that a

(118) Ibid., p. 812.

(119) Hermann von Helmholtz, "Of Thought in Medicine," Bulletin of the History of Medicine, VI (February 1938) pp. 117-144.

"nisus formations," a formative impulse, was at work in them. Its main work is embryogenesis, an active, common organic force in nature and is of equal importance in principle with the known physical laws of attraction and gravity. This view reached its height in Johannes Muller's (1801-1858) "specific energies." Each sense cell, he believed, reacts to any sort of stimulus it meets, only with its own proper "specific energy." This is not restricted to sense cells only but is a common property of all organic structures. (120) The third period of vitalism is represented by Hans Driesch, the modern vitalist. Vitalism today is the result of embryological problems. The modern mechanist does not oppose the view that embryogenesis is of epigenetic nature but in addition to this view he stresses the fact that forces and energies by which embryogenesis occurs are of purely chemical and physical nature. This is expressed in Wilhelm Roux view where each cell coming into being in the embryogenesis has its own predetermined task which it follows blindly and mechanically without worrying about the whole. This mechanical determinism is found in the sex cells which Roux calls determinants and which are known today as genes. In short the genome as a whole is nothing but the passive result of the activities of the genes and embryogenesis likewise, as a whole is the passive activities, determined by the genes, of the organizers which follow each other in a series of order,

(120) Adolf Meyer, "The Tradition of Ancient Biology and Medicine in the Vitalistic Period of Modern Biology and Medicine," Bulletin of the History of Medicine, V (November 1937) pp. 800-822.

a determined sequence. This view is similar to evolution except that the germ cell is not a miniature of the grown creature but that it possesses deterministic, causal transformation into another biological coordination, into a system. Hans Driesch opposed this view on the basis that neither embryogenesis nor regeneration appearances can be understood as the mere results of activities of blindly and mechanically operating organizers. The whole, he believes, is not the passive result of the organizers but their active generator, their "vera causa." By arguing so, Driesch revived Aristotelian biology and Hippocratic medicine, a revival which paved the way to a powerful movement, a new ideal of scientific knowledge i.e. Holism, which will revive what mechanism destroyed and vitalism repaired in science. (121) The question which here arises is that if the soul is the vital principle then in which part of the body does it exist? If the answer is that it exists in every part of the body then it becomes difficult to localize the vital principle. Rudolf Virchow (1821-1902) overlooked unity and viewed the organism as an aggregate of infinitely minute centers, a sum of vital units, a sort of social institution. This prepared the way for a local view of disease. Unity is not found in anatomical structures but in the consciousness of our own self. If, according to Riese, Virchow had interpreted organized matter as analogous to our consciousness then he would have saved unity. Thus the omnipresence of the soul in the whole body does not contradict unity neither in action nor in principle.

(121) Ibid., pp. 817-819.

Disease is no unity and the picture on symptoms which stimulate such a unity is only imaginative. Disease is a multiple foci, according to Virchow, and the cure rests in eliminating these foci. (122) For over a century and a half after Giovanni Battista Morgagni (1682-1771) published De sedibus et causis morborum per anatomen indagatis libri quinque the main feature of empirical research was the anatomical idea i.e. what part of the body carries the disease. With advancement in learning the pathologist changed the site of disease into smaller units of structure. For Morgagni it was an organ, for Xavier Bichat (177-1802) it was a tissue and for Virchow a cell. (123)

Virchow's cellular pathology was meant to be, according to Riese, not only a theory of disease but also a theory of life. Life is action not carried on by any center subject to anatomical demonstration, and the nervous system as the real center of life is here subject to the difficulty that while it, the nervous system, is supposed to bring about unity it is itself broken down into innumerable separate centers as one finds in the rest of the body. (124) Virchow's achievements influenced modern thinking to a great extent. When we think of an organ we think of its cells and when we examine a smear under a microscope we are

(122) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April 1949) pp. 111-137.

(123) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February 1952) pp. 71-82.

(124) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April, 1949) pp. 111-137.

actually studying cells. Moreover these days we stress life of cells and interaction among them more than Virchow did. Among other advances in the field of medicine since the days of Virchow there are two which are considered as contradicting the cellular theory. The first one is that which regards immunizing substances as acting through acellular fluids upon the body, that is to say it stresses the humoral rather than the cellular. But, Plaut believes, these substances are produced by cells and act upon cells. "The cells remain, in serology also, the acting and the suffering units." The second advance is that hormones and internal secretions are similarly mentioned but the power of a few cells can best be shown by small organs such as the parathyroid gland. (125) Virchow's aim was the study of not only the existing pathological conditions or anatomy but also the happenings of these conditions, the physiological mechanisms. Pathological anatomy and pathological physiology are brought nearer to each other with aid of chemical methods which manifest chemical substances in and between cells. The purely morphological concept of an organ and the concept of localization develop physiological aspects. For example, if we can make visible all the cells that produce acetylcholin then one can demonstrate an "organ" physiologically as well as anatomically. To Virchow the vital force was a specific combination of physical and chemical forces with certain combinations of substances found only in the living cell. Reflecting anything

(125) Alfred Plaut, "Rudolf Virchow and Today's Physicians and Scientists," Bulletin of the History of Medicine, XXVII (May-June, 1953) pp. 236-252.

transcendental, Virchow believed that life is an expression of a sum of phenomena each one of which proceeds according to specific physical and chemical laws. (126) In modern times we extend the cellular theory and modify it while building on it but we do not do away with it. Although endocrinology and Gestalt psychology bring us to a holistic attitude yet this progress is based upon what Virchow and his predecessors achieved. It is a return to a "meridian in a spiral" (127)

(126) Ibid., pp. 244-247.

(127) Ibid., p. 240.

THE HOLISTIC CONCEPTION OF DISEASE

At the beginning of the twentieth century nuclear physics and Planck's quantum theory replaced the rigid laws of science, mechanism and determinism. This revolution in physics suggested the idea of wholeness in the field of biology and in physically integrated systems. Mechanism was disregarded and reintegration of cells, tissues, organs into an individuum, a living organism, was emphasized. (128) Holism, which has already been discussed in the second chapter, became the dominant view. This view assumes that man is a single, indivisible biological unit rather than a socialistic state of autonomous cells, as Virchow had claimed. In such a view man as a living being must be considered together with his environment. This theory is opposed to the vitalistic and mechanistic theory of the previous century and in terms of pathology, it means, according to Claudius Mayer, a change in outlook on research and a turn from dead organs kept in formalin, to the living body as object of experimentation. (129) Arising out of the cognitive necessities of biology and psychology, holism will conquer physics which, as Planck says, cannot go further without thinking in totalities and will achieve significant results in mathematics just as calculus has done so. (130) Disease is of the whole organism and

(128) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 71-82.

(129) Ibid., p. 72.

(130) Adolf Meyer, "The Tradition of Ancient Biology and Medicine in the Vitalistic Periods of Modern Biology and Medicine," Bulletin of the History of Medicine, V (November, 1937) pp. 800-822.

even though it possesses local manifestations in various organs it is not itself local. This view opposes that of Virchow i.e. "Disease is never general, it is always local of tissues and organs." In order to obtain a clear idea about a disease clinicians advise that not only the involved organ but the patient as a whole be studied and examined. For example in the case of Bright's disease where the kidneys are damaged not only the local area or formalin kept specimens but the patient as a whole should be thoroughly examined. Biochemists tell us that blood chemistry and the metabolism of the whole body is changed before local signs and symptoms make themselves manifest. Vegetative nervous system disturbances and psychical changes take place prior to and independent of local lesions resulting in disturbed balance of blood chemistry and humors. In ~~its~~ failure to adapt to changes in the environment the organism becomes ill and disease is, therefore, the continuous struggle for adaptation to a changed environment. In such a case the first manifestation would be psycho-neuro-endocrine i.e. constitutional, metabolic or "humoral." (131) This doctrine of constitutional medicine centers on the constitution of the patient, on the balance in the bodily systems. It implies that disease is general and is an expression of the fight of the body against external agents. (132) The essential

(131) A.P. Cawadias, "Neohippocratism," Proceedings of the Royal Society of Medicine, XXXI (1937-1938), pp. 27-39.

(132) Ibid., p. 28.

element of disease is the shock to the individual caused by the disturbance of a well coordinated functioning of his systems. (133) In this respect the patient and not the disease becomes the aim and treatment becomes an individual and biological one. As a biological unit the organism is a whole. All his systems are interdependent and have no real existence save as components of a whole. In order to understand the organism we study ~~its~~ parts separately but this separation is, according to Cawadias, artificial. It gives us only a fragmentary type of understanding. It should be viewed as a whole in order to be comprehensible. George Mivart says: "As the living creature is a highly complex unity, both a unity of body and also a unity of force, a synthesis of activity.... we need a physiology specially directed to the physiology of the living body considered as one whole." Similarly Sherrington addressing the British Association in 1922 said: "The living creature is fundamentally a unity. In trying to make the how of animal existence intelligible to our imperfect knowledge we have for purposes of study to separate its whole into part aspects or part mechanisms but that separation is artificial. It is as a whole or single entity that the animal or for that matter the plant is finally and essentially to be envisaged." More about Sherrington's views concerning integration will follow in due time. Supporting the principle

(133) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 71-82.

of the unity of the organism J.S. Haldane taught that biology must deal with the organism as a whole rather than as organs or cells. The biologist deals with life and this is incomprehensible unless he knows that "each detail of organic structure, composition and activity is a manifestation or expression of the life of the organism regarded as a separate and persistent whole. (134) Elaborating on this view Haldane says that in anatomy and physiology we can distinguish the maintenance of an articulated normal. This idea brings unity to all corners of physiology. Each phenomenon of life whether in structure, activity or environment is a function of its relation to all the rest of phenomena. Life is a whole determining its parts which exist only as constituents of a whole. In research the whole is assumed and we proceed to discover its living details which contribute to the knowledge of the whole. Any attempt to dissect the organism or separate it from its environment either in thought or in action it vanishes from our mental vision and becomes meaningless in our interpretation of facts. The structure of the organic cell is a molecular flux dependent from one moment to another upon its environment such that any change in its chemical constitution would change the behavior of the organism. e.g. deprivation of oxygen for one minute may kill a nerve cell. (135) The structure of living cells depends on the blood which in turn depends on the structure of the tissues. It is in a state of dynamic and unstable balance

(134) A.P. Cawadias, "Neohippocratism," Proceedings of Royal Society of Medicine, XXXI, 1937-38, pp. 27-39.

(135) J.S. Haldane, The Harvey Lectures, pp. 34-37.

which if disturbed, the whole system falls apart. In a living organism balance is active, elastic and stable. When unbalance dominates the organism adapts to the disturbance and the normal is maintained in specific essential points, e.g. tissues restore themselves, microorganisms are eliminated from the body and immunity for against other attacks in the future is produced. Death may be regarded as temporary scrapping of structural machinery, and reproduction its revival. Health is what is normal for a living being in terms of biology. "The condition in which the organism is maintaining in integrity all the interconnected normals which, as I have already tried to indicate, manifest themselves in both bodily structures and bodily activity." Medicine is interested in the physiological normal, says Haldane, and a patient is a perversion of the normal and nature's attempt is to restore the normal with help of medicine. Mechanistic physiology gives us little information about restoration of the normal and its maintenance as such under the varying conditions of the environment. To get a satisfactory answer to this Haldane suggests a new physiology, a new pathology and a new pharmacology.(136) He believed firmly that biology and physical science will some day meet and when this takes place and one of the sciences is swallowed up, that science will not be biology. (137) Like other biologists of his time Haldane was influenced by Hegel's view of the whole as prior to its parts.

(136) Ibid., pp. 36-40.

(137) Adolf Meyer, "The Tradition of Ancient Biology in the Vitalistic Periods of Modern Biology and Medicine," Bulletin of the History of Medicine, V (November, 1937) pp. 800-822.

The whole determines the parts but not vice versa. C.R. Collingwood believed that "the parts are the way in which the whole organizes itself. The cells are subordinate to the organism which produces them and makes them large or small, of a slow or rapid rate of division, causes them to divide now in this direction now in that." Cawadias tells us that there are some experiments which demonstrate the integration of a body-mind organism, a chemical integration due to balance of endocrines and the cortex, which help the body to function as a whole. This view may be considered as a return to the conception of alkmaion 2500 years ago where the body-mind was considered to be a balance of forces subordinate to the brain. (138)

The unity of the organism was also realized by Stahl. He believed that the mind plays a significant part in causing mental and physical diseases and that emotions play a similarly important part and therefore they should not be overlooked. (139) In addition to being a vitalist Stahl is also a neuropathologist. Neuropathologists were doctors who gave the nervous system an all-determining role in health and disease. When anatomy was the center of interest the nervous system had its part in the new conception of disease. In such a view the concept of motion, among various other factors underlying health and disease, is a fundamental one. We have already mentioned in the first chapter its importance

(138) A.P. Cawadias, "Neohippocratism," Proceedings of the Royal Society of Medicine, XXXI, 1937-38. pp. 27-39.

(139) Millais Culpin, "The History of Psychology in Medicine," Proceeding, of the Royal Society of Medicine, XXIX (1936) pp. 1569-1577.

as a link between the spiritual and the material. "All life processes were expressed in terms of movement." This doctrine of life and of movement was the outcome of a rational attempt to give life processes their most elementary and objective expression. Although they might differ in type, direction or effects all movements are instrumental conditions of life. Prevention of decay, building and reparation of bodily tissues, elimination of waste products are all types of movements. Thus motion is the primary factor in all life processes and sensation is to be expressed in terms of this view i.e. sensation is the effect of two movements, one being transmitted from the object to the sense organ, the other produced in the sense organ by the soul.(140)

Following Stahl, Haller believed that motion resides in the muscle fiber itself. In order to induce contraction the fiber needs a stimulus, a nervous power whose sources are in the brain. (141) Haller made the decisive step from a universal system of motion to a regional irritability. In such a case the central nervous system can be considered as the cause of a specific type of motion proper to forms of life possessing a central nervous system. In disease the central nervous system loses its specific function and then motion falls back to a less special type. This passage from motion as from a behavior represented universally to motion as a function related selectively to the central nervous system is a

(140) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine. XXIII (March-April, 1949) pp. 111-118.

(141) Ibid., p. 122.

significant change made by organized nature. The result is expressed in greater differentiation with which a being grows to be more dependent and motion becomes more specialized. In high centers there is adjustment of very special movements, representing movements of the whole organism, to the most special of impressions from the environment. (142)

Working along similar lines in neuropathology William Cullen (1710-1790) believed that all processes of a living organism in health and disease are explained by "the state and affections of the primary moving powers." Disregarding the doctrine of humors, which distorted other systems, Cullen stressed that our study must be focussed on the motions of the animal system, a state upon which progress of disease generally depend. "Life," he said, "so far as it is corporeal, to consist in the excitement of the nervous system, and especially of the brain, which unites the different parts, and forms them into a whole." He distinguished various degrees of mobility of the nervous fluid in the brain, those of "excitement," "spasm", "debility", "collapse" and others. In a hierarchy of organs under normal and pathological conditions, Cullen gives the central nervous system the chief position. In such a view, Riese tells us that pathology becomes synonymous with neuropathology. (143)

Stahl's vitalism was also accepted by Cabanis (1757-1808), a French physician who maintained that "under certain conditions,

(142) Ibid., pp. 128-132.

(143) Ibid., p. 115.

inanimate matter was capable of becoming organized, alive and sensitive." Sensibility is the only and common principle of vital faculties. The processes of sensibility can be studied but not its causes since these are not subject to research. Explanations of nervous operations must be looked for not in physical laws but in the human body. Cabanis spoke of the interdependence of vital and physical processes in physiology. He distinguished several degrees of existence claiming that the laws of the lower class are operative in the higher ones and so physics and chemistry are not eliminated from animal physiology. However laws of animal life are not completely reduced to physics and chemistry as the Iatrochemists had claimed. (144)

Feeling and movement constitute life, says Destutt de Tracy (1754-1836), French philosopher and author of "Elements d'ideologie." The vital force is the cause of movement and so long as a body has life it absorbs into its substance specific bodies suitable to its constitution. When the body dies it desintegrates and its elements join new combinations in environment following new laws of affinity. This vital force is the outcome of certain chemical combinations and attractions which create a particular order of facts and soon return to more general laws of unorganized matter. So long as it lasts we live i.e. "we move and feel". Animal life has an autonomy expressed by the vital force which represents the integration of molecular movements on a new and higher level. Since the principle of this integration is

(144) Owsei Temkin, "The Philosophical Background of Magendies' Physiology," Bulletin of the History of Medicine, XX, (1946), pp. 20-22.

not subject to measurement we cannot consider man as a machine as Descartes had claimed. (145)

The concept of "integration" in modern physiology is according to Walther Riese, closely related to the concept of the soul. Integration is active on an unconscious physiological level and here it differs from the interpretation of the soul by the eighteenth century writers as self-consciousness. The element of unifying is common to both concepts, integration and soul. Integration is achieved by means of a simple collection of isolated organs and transformed an animal or individual. It presupposes plan and action. Modern physiology considers the nervous system as the chief agent for integration and as such no single organ is in itself able to achieve unity of the whole. (146) In his Integrative Action of the Nervous System (1906) Sherrington stressed the chief position of the nervous system in all life processes. This view was understood to be a physiological one based on empirical evidence. It is capable of transmitting states of excitement created within the nerve cells. In a human being where higher reactions constitute the behavior of an organism as a social unit, it is the nervous system which integrates it, synthesizes its parts and gives it solidarity. "It works through living lines of stationary cells along which it dispatches waves of physico-chemical disturbance, and

(145) Ibid., pp. 23-25.

(146) Walther Riese, "The 150th Anniversary of S.T. Soemmerring's Organ of the Soul," Bulletin of the History of Medicine, XX (July, 1946) pp. 310-322.

these act as releasing forces in distant organs where they finally impinge." (147) In terms of mechanism the nervous system cannot, according to Golla, be expressed only by physics and chemistry but also by macroscopic mechanism which helps in understanding the nervous activity. In such a case the nervous system is said to consist of several mechanisms each having a specific anatomical structure and responding in a specific manner to specific environmental changes. By studying these isolated mechanisms and by their physiological integration the nervous system has been built up in a successful manner. Sherrington tells us that an isolated reflex is an abstraction and that each individual reflex is influenced by the activity of the rest of the nervous system. Goldstein says that the activity of the nervous system is one of a whole and by virtue of its ability to direct activities of the organism it can compensate for any obstruction in one mechanism by the rest. The central nervous system affects all the chemical and physical set up in the body as well as its specific activities and reflexes. On the other hand variations in the ionic balance in blood and tissues due to hormones or other elements greatly affect the degree of excitability and mode of reaction of the nervous system. (148)

A nervous system is not only a sum of mechanisms ready to

(147) Charles S. Sherrington, The Integrative Action of the Nervous system, pp. 2-4.

(148) F.L. Golla, "The Nervous System and the Organic Whole," Proceedings of the Royal Society of Medicine, XXIX (1936), pp. 109-119.

respond to stimuli and environmental changes but, according to Riese, a present event enfolding a history i.e. temporal extension. No account of the nervous system which does not envisage its relation to mental events can be other than an abstraction. Mental events and nervous events go hand in hand. Nervous action viewed as a whole leads us to predicate some conditions related to the purpose which we are conscious of. For example when someone is aware of why he is performing a certain activity the whole series of physical nervous activity has the same attributes which are correlatives of the awareness of purpose in the mind. The organization of the nervous system is a dynamic one. When in a process of simplification of behavior the nervous system works with, fewer units, rearranging its activities and mechanisms but at the same time maintaining its teleological orientation. Rearrangement of a nervous activity presupposes an involvement of the nervous function throughout the whole system. When the teleological view is included in the holistic one activities become more meaningful and especially so when we realize that the whole social organization transcends the individual. Golla gives the example of the meaning less behavior of an individual ant becoming meaningful when viewed as a unit in the activity of the whole complicated nervous system of the ant hill.(149)

As an organic whole the universe shows a dynamic process of

(149) Ibid., pp. 114-116.

change and, Golla continues, if the past history of the whole can teach us something about the significance of specific types of nervous activity then from such indications we can gather of the immediate teleological direction to guess the meaning of specific nervous functions. Man can say "No" to any emotion which might impede his teleological activity and this is indicative of the nervous development in him. History gives us some evidence in support of the fact that it is also indicative of progress e.g. in primitive times man ingested food in a savage manner and had a greater lust for destruction than he does at present. The relation of the nervous system to the organic whole helps to prevent any conclusion based only either on psychological or mechanical grounds. By including mental activities in the whole, mechanism acquires a teleological view which increases the meaningfulness of the process. (150) Reacting as a whole to its environment the organism is an infinitely more complex a system than the highly specialized responding units involved in a reflex preparation. Both the organism and his environment are in a state of constant change which leads us to believe that in such a case the reproduction of an identical response is impossible but that every reflex act leaves its traces on the whole of the central nervous system as well as on the immediate mechanism. (151)

(150) Ibid., pp. 117-119.

(151) Ibid., pp. 112-114.

The nervous system is, according to Flourens (1794-1867), French physiologist, the principle of life and the form of the animal as a whole is derived from the form of its nervous system. In his De l'Unité de Composition (1865) Flourens writes that all systems in the body are found there in order to serve the central nervous system and "l'entretenir." (152)

The realization of the unity of the organism by cooperation of all its parts in all its reactions is the basis for integration. Linking integrative factors with the determinism of vital processes cannot be realized unless integration is viewed on the model of law (of mind) as proper to all parts of an organized whole. The universal presence of the whole in all its constituents, whose nature is unknown and cannot be localized, does not allow separation of the organizing factor from the organized effects. In this respect "the organism is built on the model of absolute equality of all its parts." In addition all parts are interdependent and mutually generative. (153) If in experimentation we first isolate specific parts then this would affect a chronological whole, according to Riese. In a machine which is a whole not undergoing evolution isolation of one of its parts produces no change in the part or the whole. But in a living being where evolution is permanent, as long as the integrity is saved all the

(152) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April, 1949), pp. 111-137 (F.N. No.31)

(153) _____, "The Structure of the Clinical History," Bulletin of the History of Medicine, XVI (December, 1944), pp. 437-450.

parts participate. This co-operation is guaranteed by virtue of the relation of each part to all others as well as to the whole and so isolation creates changes in one and all parts. In a present situation of action neither past nor future can be abolished, structures and processes being the final results of an evolution and being formed in anticipation of the future. In disease the organism remains an integrated whole. However it may pass from one type of integration to another depending upon its goal. As long as there is life, a whole is realized. In case of disease the effort of an organism to solve a specific task in such a way which conserves the organism and insures his welfare, in the present and future conditions, is revealed. (153)

Genesis, development and regulation are total behaviors which necessarily involve all parts of an organism. This cooperation aims towards a final action in which the parts no more appear as components but as a unified whole e.g. movements need neither glands, nor nerves, nor muscles separately but all of them simultaneously. (154)

Virchow's Cellular-Pathologie (1858) changed the outlook of people on the human body. The body, according to Virchow, is "a cell state in which every cell is a citizen" and disease is "merely a conflict of citizens in this state, brought about by the action of

(153) Walther Riese, "Claude Bernard in the Light of Modern Science," Bulletin of the History of Medicine, XIV (October, 1943) pp. 281-292.

(154) _____, "The Structure of the Clinical History," Bulletin of the History of Medicine, XVI (December, 1944), pp. 437-450.

external forces." Virchow opposed the view that the nervous system is the center of life and that it controls the nutrition of peripheral parts. (155) The sick cell is an "ens morbi." The cell is the seat and vehicle of disease, just as it was the seat and carrier of individual life. (156) In short Virchow's idea of disease was an anatomical one which stressed the concept of localization of disease in structural parts of the body.

In reaction to the anatomical idea of disease there has been varieties of a holistic approach in pathology which spread mostly in Germany. There are a few differences in the details but essentially they agree in opposing the anatomical idea of disease. (157) The materialistic point of view of research in pathology seemed to be unsatisfactory and the modern trend attempts to reintegrate the individuum. Various metaphysical theories of disease help to bring about such reintegration by synthesis of various details. (158)

Claude Bernard (1813-1878) French physiologist, was the first to enunciate the doctrine of holism, in an analytic method. He rejected vitalism and Virchow's views on neuropathology. (159) The nervous system, he believed, does not only control the humors but

(155) Fielding Garrison, History of Medicine, pp.570-573.

(156) Walther Riese, The Conception of Disease, p.62.

(157) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January - February, 1952), pp. 71-82.

(158) Ibid., p. 81.

(159) Walther Riese, "Claude Bernard in the Light of Modern Science," Bulletin of the History of Medicine, XIV (October, 1943), pp. 281-292.

also all physiological, pathological and therapeutical phenomena. It is the mediator in an organism and all processes in health and disease are related to it. Without the nervous system and the nerves there would have been no sympathy, reaction or fever. As the organ of mental and moral, as well as physical, functions the central nervous system determines health and disease. (160) Vital phenomena are acceptable, says Bernard, only in so far as their physico chemical determinism can be tested and known by the physiologist. He admits a vital influence but as soon as it creates matter the latter can be treated separately aside from the organizing factor. Criticizing Bernard's interpretation of the organizing factor ~~as~~ of the idea of unity, Riese says that this unity realizes itself in all vital manifestations. It is a rational formula of life. "This implies that the factor responsible for this unity cannot be omitted in analysis from the factors co-operating in a given effect. Bernard opposes vitalism and mechanism and in doing so, according to Riese, he is rejecting two aspects of the same causal thought indispensable to reason which leads us to the idea of the unity of an organism in which are found the unity of an organizing principle and organized product, which, if separated from the organizing principle, the organized product becomes a machine having its director outside itself. (161)

(160) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April, 1949) pp. 111-137 (F.N. p.118)

(161) _____. "Claude Bernard in the Light of Modern Science," Bulletin of the History of Medicine, XIV (October, 1943) pp. 281-292.

Nicolaus Philip Tendeloo, pathologist of Celebes, emphasized in his Pathology of Constellation (1920), the concurrence of several environmental factors. (162)

With rise of bacteriology the emphasis on the cell shifted to the bacillus. As the new sciences of serology and endocrinology progressed the humoral pathology was revived and with World War I the doctrine of the Constitution came to the fore and was later helped out by the growth of Mendelian genetics and endocrinology. (163) Consideration of the soldier as a whole and of vast clinics of men en masse helped revive the general pathology of Hippocrates. The constitution was regarded as the summation of inherited traits fundamental in resistance, susceptibility and predisposition to disease. In 1914 Martius published his famous book on Constitution and Selection. (164) He stressed the role of heredity and environment in Pathology of Constitution, on this ground Kraus worked out a biology and Pathology of the Person, in 1919. (165) He also wrote on fatigue as a measure of constitution.

Another metaphysical approach to holism is humoralism. There

(162) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 71-82.

(163) Fielding Garrison, History of Medicine, p. 678.

(164) Ibid.

(165) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 71-82.

existed a sort of a renaissance of humoral pathology which was favored by the gradual disregard of the anatomical conception of disease and by advancement in physiology and chemistry. Charles Richet (1850-), professor of physiology in the Paris Faculty, promoted the view that all organic cells including the human cells are aquatic. Health and disease in such a conception are properties of the whole body with one as the balance and the other the imbalance between forces of the organism and the physical world. In 1922 Auguste Lumière (1862-) patho-biologist, suggested a different aspect of humoralism where disease is an irritation of nerve endings due to precipitated colloids; the colloidal balance could be broken by a great variety of external and internal influences. (166)

Among other trends in modern pathology, Claudius Mayer, tells us of functional pathology where disorders, according to Bergmann, may begin in a disturbance of equilibrium of the autonomic nervous system and may end in organic lesions such as, for example, gastric ulcers. This was an important step to psychosomatic medicine and it resulted in a reform of surgery in that it warned surgeons that causes might be functional. The anatomical substratum in such a case would be of lesser importance since pathological structures may be the outcome of mental tension. Attempts at curing gastric ulcers may be considered, according to Mayer, a victory for the holistic approach

(166) Ibid.

in pathology. (167) The nervous system is not a passive organ whose main function is only to react to internal and external environment but, as the electrophysiological works reveal, a state of autogenous activity. "Pathological evidence is equally cogent." Organic behavior in its various forms may be viewed as expression of a release of autogenous activity determined by the balance of the nervous system as a whole. (168)

There has also been at the same time a tendency to support the principle of anatomical localization by giving greater importance to certain general structural elements of the body and by working with hypotheses which might reconcile between various conceptions of disease. Karl Ludwig Aschoff (1877-1942) professor of pathology at the University of Freiburg, is a representative of this view. His description and synthesis of the reticulo-endothelial system indicate abandonment of the small cell. (169) In showing the purposive nature of inflammation Aschoff classifies disease reactions as "functional (recreative reaction), deficiency (regenerative reaction), destructive (reparatory reaction), infective (defensive reaction, i.e., inflammation). (170)

(167) Ibid., p. 77.

(168) F.L. Golla, "The Nervous System and the Organic Whole," Proceedings of the Royal Society of Medicine, XXIX (1936) pp. 109-119.

(169) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 71-82.

(170) Fielding Garrison, History of Medicine, p. 699.

Disease consists of two components, a "reaction" to the pathogenic agent of environment, that is "nosos", and a residual constitutional change of the body as a whole, a "tendency to react" and this affection he calls "Pathos". Life is not fully explicable by the laws of cause and effect because the organism, by its being a whole, possesses certain forces not subject to measurement. Causal analysis and measurement help in the strictly material bodily relations of an organism and these are limited to just a few theoretical branches of medicine. In so far as the practical aspect of medicine is considered all the parts of the human being are to be essentially taken into consideration, including the field of psychology. Disease is the result of a shock to the existence of an individual, caused by a disturbance of a well coordinated functioning of a living being and as such the field of psychology must be considered in handling an ill person. Aschoff tells us that "The pathologist as a human being must be fully conscious of the fact that he will not be able to unveil the fundamental secrets of Creation by any one way of approach". (171) Sigfried Graff, a pupil of Aschoff and a pathologist in Hamburg, used the term "hetology" to denote holistic pathology. He opposed the anatomical view of disease on the basis that it was destructive to the clinical picture of disease since the physician tends to identify the disease with the

(171) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952) pp. 76-81.

pathological part of the body instead of with the whole body. (172)

Disease as a nervous process is best illustrated by Ricker's "Relationspathologie" (1905 built upon the circular relation of three elements in the body. These are the neural (vaso motors), the humoral (blood vessels, blood and tissue fluid), and the cellular (tissues). The neural element coordinates the entire organism by an infinite thread of terminal network which unites cell to cell. Irritation of the vaso motors affects the width of the vessels and consequently in the flow of blood supply and the quality of the tissue fluid. These changes affect the relation between the fluid element and the cells and consequently metabolism, structure and function are ~~affected~~. The cellular changes may again act upon the neural elements and if these are overstimulated the result would be disease. Moderation of the strength of the stimulus restores the organism to health again. (173) Ricker attacked the cellular theory of Virchow and denied the separate existence or separate function of cells. Although basically both Flourens and Ricker have a holistic approach to pathology, whereas Flourens believes that all other systems in the body are there to serve the central nervous system and "l'entretenir". Ricker on the other hand believes that in all bodily processes the cells do nothing but everything is done to

(172) Ibid., p. 76 (F.N.)

(173) Ibid., p. 78.

them by the nervous system. (174) Ricker's doctrine makes physiology and pathology simultaneous and disease in such a case becomes a matter of degree of excitation of the nervous system. His view is best illustrated by his concept of cerebral hemorrhage. He believes that there is more than the rupture of a vessel to be taken into consideration. Hemorrhage is due to the stimulation of the nerves of the blood vessels. When the stimulation is strong it paralyzes the constrictors and dilates the capillaries. After a short period of acceleration the blood stream decreases and finally it stops because of the constriction and blockage of the adjacent arterial segment. During this time the erythrocytes (red blood cells) pass through the wall of the vessels using openings which might not have preexisted but have been formed only in case of need. (175) Nervous stimulation is the determining factor of all diseases. Criticizing Ricker, Riese says that this view neglects causality as shown in an organism. Since the organism is built on the basis of interdependence of its parts it does not have a fixed causality. It does not help to fix the chronological sequence of events in nature by which the irreversible dependence of a series of events is established. The interdependence of parts and whole does not permit of an irreversible arrangement of parts

(174) Alfred Plaut, "Rudolf Virchow and Today's Physicians and Scientists," Bulletin of the History of Medicine, XXVII (May-June, 1953) pp. 236-252.

(175) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April, 1949) pp. 111-137 (F.N. No. 24)

according to rank of time. Ricker, says Riese, neglected the historical nature of disease and his reduction of disease to only one physiological phenomena i.e. nervous irritation, is inadequate to meet the requirements of the evolutionary element in disease. The history of disease teaches us that bodily organs are in a state of continuous change and in such a history no organ can claim the exclusive right of opining the sequence of events. (176)

In expounding Ricker's theory of relation pathology, A.D. Speransky (1887-), a Russian scientist and director of the physiopathological department of the Leningrad Institute of Experimental Medicine, holds similar views of the role of the nervous system and of irritation in the creation and course of inflammation phenomena.(177) His relation pathology is based on the neural and cellular elements only. Diseases are the outcome of direct irritation of the central nervous system and the diencephalon (middle brain). By irritating the brain through various experiments such as spotwise freezing of the brain cortex, pumping cerebrospinal fluid in a way to massage the brain and the spinal cord, inserting glass beads in brain tissue, Speransky was able to produce various disease at the peripheral parts of the body e.g. gums and paradentosis. (178) Mental and emotional strain may lead

(176) Ibid., p. 120.

(177) Ibid., p. 119 (F.N. No. 24)

(178) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, (January-February, 1952), pp. 71-82.

to functional or organic disorders which might turn out to be serious. Causes of infection are influenced by nervous factors. In his experimental and clinical studies Speransky emphasizes the importance of the role played by neurogenic factors in the experimental production of pneumonia. (179)

Another follower of Ricker, Wolfgang Veil, proved the importance of the diencephalon in being responsible in exophthalmic goiter, diabetes, obesity and arterial hypertension.

In England Wyburn-Mason published Trophic nerves in which he says that "any influence acting on a tissue does so first by acting upon the unmyelinated fibers of the tissues before it affects other constituents. Inflammation merely means nervous activity..." He shows, according to Mayer, radicalism of thought in the sense of the relational pathology.

In his Dynamische Reaktions Pathologie (1946) Kurt von Neergaard, professor of physical medicine, Zurich, identifies dynamism with function and history emphasizing the element of time as an essential factor in disease.

There are other holistic pathologists in modern times whose works are of great significance, in exploiting achievements of microphysics for biology. These are Pascual Jordan, quantum biologist of Rostock, Adolf Meyer Abich, philosopher in Hamburg and Karl Kotschau, professor

(179) David Macht, "Psychosomatic Allusions in the Book of Proverbs," Bulletin of the History of Medicine, XVIII (October, 1945), pp. 301-328.

of biological medicine in Jena. Their research on steps or "echelons" of reality, on Bohr's biophysical uncertainty relations or complementarity, on mental procedure of "holistic simplification," is a very great effort of using advancements in physics for the field of biology. (180) By holistic simplification is meant that explanations ought to begin from the higher steps, "echelons", of reality to the lower ones by reducing the dimensionality of the more to the less complex ones. (181)

"The state of health", says Jackson, "is a dynamic state of specialized vital manifestations which has to be maintained most actively and constantly with the instrumental help of structures resisting regression toward the more general. The assumption is made that the healthy lives a most precarious life under the permanent threat of overwhelming stimulations and constantly endangered to act and react by overflowing impulses; he has to resist both, stimulations and impulses, and this is the task proper of the central nervous system as an organ." With such a view disease would be a state of regression from the particular to the general. Trauma leads the individual back to the immediate and direct sources of life which he shares with the healthy. It produces new forms of life as long as positive signs and symptoms appear for the first time in life history but these forms are the potential tool of the healthy to which one returns in emergencies. (182)

(180) Claudius Mayer, "Metaphysical Trends in Modern Pathology," Bulletin of the History of Medicine, XXVI (January-February, 1952), pp. 71-82.

(181) Ibid., p. 79 (F.N.)

(182) Walther Riese, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, XXIII (March-April, 1949), pp. 111-137.

Pathological changes allow some glimpses of the earlier stages of nervous activity. The removal of recent functional arrangement, of disease reveal traces of early activities. We cannot know, according to Golla, to what extent we are entitled to regard new methods of reactions to stimuli in cases suffering from nervous lesions as due to the relaxation of inhibition. Though this assumption applies to all sort of pathological signs and symptoms, only little evidence supports it. We can only say: "the nervous system adopts a new form of reaction and that this may often be recognized as an older and simpler form". (183)

In a holistic conception of the universe history is considered as an orderly sequence of events and not chaos. Facts are related to each other in such a way that they form an intelligible whole. Tracing a clinical history both patient and doctor alike follow the same method. The next step is to restrain the patient from indulging in his attempt, followed by selection of relevant facts from many others. The criterion of choice of these relevant facts is the subjective experiences of the patient and the objective ones of the doctor. The whole of the doctor's experiences is present to his mind and from the very start the case is interpreted in terms of this whole. In interpreting natural phenomena the doctor follows several methods of dogmatism,

(183) F.L. Golla, "The Nervous System and the Organic Whole," Proceedings of the Royal Society of Medicine, XXIX (1936) pp. 109-119.

scepticism, criticism, analogies and others. The method of analogies leads to no absolute certainty as to the cause of an event since in organic life there is no identity but analogy, and this is the only method we dispose of in order to establish causality in life and history. "Disease may be characterized by the appearance of symptoms not existing before, symptoms being new formations in the whole of vital manifestations a given individual may reveal." Subjective facts are the fundamentals of medical action and no objective statement, no diagnosis or cure, according to Riese, can be followed unless we seriously consider these subjective facts. (184) "One must judge of children as of others, which will die and which recover, from the whole of symptoms." The modern physician can predict the outcome of a disease by treating the diseased individual "en bloc" or "globally" relying on the clinical picture as a whole rather than on diagnosis. The circumstances as a whole, the total picture of human life and not only parts, are the sources of prognosis in a disease. In having a cause one directs his attention to the symptoms which imply the coordinated function of the whole and express the desire of an injured organism to live and adapt to a new situation. In these symptoms is implied their integrated and purposeful nature and they emerge as the expression of recovery which in turn reflects the activity of the organism as a

(184) Walther Riese, "The Structure of the Clinical History," Bulletin of the History of Medicine, XVI (December, 1944), pp. 437-450.

whole under pathological conditions. Though this whole may anatomically be reduced yet it is physiologically equal with the healthy organism. Like symptoms recovery is non-specific. Since it tends to eliminate harmful factors it implies a directed behavior and as such it must be conceived as a total and integrated behavior. Through this total character all states of recovery gain a fundamental identity through which they lose their specific nature. (185)

(185) Walther Riese, "Philosophical Presuppositions of Present Day Medicine," Bulletin of the History of Medicine, XXX (March-April, 1956) pp. 163-175.

CONCLUSION

In this survey of the ontological and holistic theories of diseases we find that it is not possible to divorce the history from the philosophy of medicine. The differences among the various historical schools of medicine lies, however, not so much in truthfulness as in the milieu, in the limitations and in the perspective of the representative of a particular school of medical thought. There are empiricists, dogmatists, iatrochemists, iatromechanists, humoralists, vitalists, mystics, and many others in addition to the rival schools of Cos and Cnidus. The lines of demarcation among these various schools and the doctors who represent them is basically one of metaphysical attitude. (186)

The Cnidian school emphasized disease rather than the patient. It was concerned with exact diagnosis, classification of disease and therapy. Its main shortcoming according to Hippocrates, lay in the excess of detail where symptoms got confused with individualized diseases. Remedy was limited to milk, purges and whey. Cnidian medicine, which Garrison calls the medicine of library classifiers, of the pathological specimen of Broussais' "served on the plate", belongs to modern times of "ultra-refined diagnosis and highly specialized therapy". At Cnidus physicians studied part or organ, the disease and the type if not the names. The Coan school, on the other hand, emphasized the study of

(186) Charles Greene Cumston, An Introduction to the History of Medicine, p. 24.

general symptoms and generalized remedy. The patient's reaction in his totality to disease constituted the core of the study. Disease was considered not as an entity but as a fluctuating condition of the patient's body and a fight between the "materies morbi" and the ability of the body to heal itself. Signs and symptoms were mere episodes in the patient's history and treatment aimed at helping the patient through his physis to react in his individual way against illness which was viewed as an imbalance of the four humors. Imbalance of the four humors was considered to be due to external forces. In the reaction of the body to these external forces the humors were brought to a state of concoction in the form of fever, inflammation or pus, inflammation here being understood as a special type of excitation or agitation. When the concocted humors and morbid agents were eliminated from the body either by crisis or lysis, that is to say either by a rapid or slow process of secretion and excretion recovery would prevail again. The patient's condition was regarded as "only an accident" in the total history of the disease whose symptoms could spread among many people over several generations. Hippocrates, like other Coans, studied the whole individual in a state of health and disease. In these two schools, i.e. The Cnidian and the Coan, lie the core of the two theories which this research deals with, the ontological and the holistic theories respectively. (187)

Medicine flows from the philosophy of the people and that is why the study of the history of disease is necessary if one were to know how various theories evolved. History tells us that the innate feeling

(187) Fielding Garrison, An Introduction to the History of Medicine, fourth edition, p. 99.

which forces man to remove any cause of pain in his body made him look for cure, asking for help from his familiar deities with the help of prayers, sacrifices, and vows. In the Middle Ages cure was looked for from the stars, spirits and so on. Spirits were responsible for the passage of invisible atoms from one body to another. Analogously, relationship between the terrestrial and celestial world was drawn and theological chemistry was emphasized. As time went by, men asked experts what plant was most helpful in any particular disease and this led to interest in the kind of disease. Metaphysics in medicine applied in the search of the essence of disease rather than its causal factors and nature and so metaphysical theories of disease are considered as such because they are based on the intellectual faculties of their inventors rather than on the observed facts in nature. In recent times the study of man in a state of health forms the core of research in disease. Metaphysical medicine consists not only of forces, Archeus, or vital principles but it also attributes to phenomena an importance that they do not exclusively possess. In separating cure from other medical knowledge there exists representatives of remnants of early medicine. The metaphysical attitude constitutes the present-day opinion of medicine where people search for the origin and ends of things, looking for archetypes. Although specific elements have been gradually added entities and forces are still prevalent, perpetuating the notion of an all governing force. In short, the field of medicine evolved through four different epochs, the instinctive, the religious, the

metaphysical and the scientific. (188)

Both the ontological and the holistic theories of disease have several points in common and are also opposed in a few. Paracelsus tells us that nature's undivided life is in everything it produces. Life is parallel to the movements of the stars and any change by the stars affects the particular members and the whole universe by disturbing the preordained order of things. The universe is made of corporeal units having a soul according to the divine force given to them at the time of creation. Likewise, in holism man is considered as a part of nature and in treating a patient the environment must be taken into consideration with him. No cell can possibly live without oxygen or in a reduced atmospheric pressure. The environment is a necessary part of the organism.

Nature's undivided life is a whole intelligible by intuition, according to Paracelsus. In holism a similar view is held, which is that the whole determines the function of the various parts and for intelligibility the whole is assumed and we study parts in order to analyze them. Analysis gives us only a fragmentary kind of knowledge completed only when we view it as a whole. This is well illustrated by the Gestalt method of teaching and learning where one sees a thing as a totality immediately and intuitively rather than first studying the parts and then synthesizing, e.g. in learning the structure of a

(188) Charles Greene Cumston, An Introduction to the History of Medicine, pp. 4-30.

word one does not have to learn the alphabet separately and then form the word but learns to read the word as a whole block.

The ontological and etiologial views are related when the origin and the cause of disease is in the imagination. Van Helmont tells us that the highest virtue is due to the excitation of the internal soul by contemplation or intense imagination. In this concept as well as in his view that the universe is composed of innumerable seeds which are made of neither body nor soul but of both, lies the basis for psychosomatic medicine. In a holistic view where all aspects of the organism are intimately related and where all parts are mutually interdependent, emotions are a part of the organic structure and they play a vital role in causing illnesses of organic nature such as gastric ulcers, skin conditions, allergy and others. Emotional and nervous events are inseparable and when one is affected the manifestations are going to show in the other.

In ontology individuation is breaking away from the original divine unity and the struggle of man to live. In the case of disease where there is individuation creating disintegration into a fluid form and where the Vita Media prevents complete perishing of a being, disease represents primitive or lower forms of life. It is an expression of the struggle of the individual for existence as well as reversion to lower forms of existence. Lower forms are integrated in the human body and any outweighing of one direction of life or exaggeration of a normal process gives rise to disease. Similarly, in holism the cell

is in constant state of adaptation to the external and internal factors in order to continue living. Any shock to the nervous system will affect the circulatory system, which in turn affects the function of the glands. The cycle may be repeated until the organism may disintegrate and be reduced to lower forms of life. The stimulus may be so strong that it might affect the whole organic structure and destroy it.

Another point which is parallel in the ontological and holistic views is the concept of inflammation. According to Van Helmont inflammation is a reaction of the local Archeus to any kind of trauma. Fever is an attempt of the chief Archeus to act as a counterirritant and get rid of any foreign agent. The holistic view regards inflammation in a similar fashion. It has a purposive nature. Judging from its signs and symptoms, pain, redness, swelling, heat, limitation of function, increase in leukocytes, one would infer that all these signs and symptoms are an expression of an activity whose aim is to try to get rid of some foreign element in order to restore balance between bodily constituents.

Just as there are similarities between the two views of medicine, i.e. the ontological and the holistic, there are also dissimilarities. From astronomy rose the study of localism. Virchow identified pathology, in which the essence of the disease and the cause become confused. The cause gave rise to various anatomical changes and metabolism disorders rather than disturbance of harmony. Disease is an "Ens" and each

fiber in an organ has its own life and represents a "relative totality". Each disease has a body which causes it to spread in specific places and individuals, and as such has a specific remedy. The anatomical changes which a disease body causes and the distribution of these changes reveal the type of the agent causing the disease. In this respect it is apparent that the roots of the cellular pathology of Virchow lie in the ontological conception of disease. Virchow's cellular pathology is of great significance, since it gives us an idea about the type of germ invading the organism so that one can begin specific treatment before one has to wait until signs and symptoms of the disease appear and are far advanced. For example, the blood count may give the physician an idea of what a disease is and lead him to start any chemotherapy helpful in that type of blood pathology. Also performing an early biopsy on an enlarged gland in the body helps the physician to know whether a tumor is of a benign or malignant type, and enables him to begin his treatment of that condition without waiting until the disease is far advanced and constitutional symptoms show in the last stages. (In this connection, I should like to mention the significance of the Virchow gland situated under the left clavicle and whose enlargement gives a clue to the doctor that there is metastasis of a tumor in the body.) Examining cells and smears is a more scientific way of confirming the hypothesis of a doctor about a case and helps him know whether the basis of a pathological condition is organic or functional, so that he may administer the cure or care. In such a case, treatment would be specific to that particular

condition rather than symptomatic. The question which might here arise is whether the germ attacks the body from the outside or is located in the body and is part of it. It seems to me there ^{are} two sides to the argument. In malaria, for example, where a third host is needed before the disease becomes communicable, the organism is outside the body. On the other hand, in the case of cancer, which is assumed to be an abnormal growth of tissue cells which secrete poisons and intoxicate the whole system, one would tend to think that the etiological cause of the disease is part of the organic system and is from within. Of course, this is only hypothetical and research may reveal whether the cause in such a condition is external or not. Whether to have the germs reside in the body is better or not is another question. Again here one can argue both ways. In some cases, where tuberculosis germs reside in the lung it is considered harmful, since if the resistance of the body declines the germs may get loose in the body, multiply, and eat up the tissue of the lung, spread throughout the body and kill the patient. The other side is that if a patient is gradually exposed to a disease, that is, if a dose of the germs ^{is} ~~are~~ given at intervals the patient will develop immunity and not be affected, if later on the same type of germs attack him.

The holistic theory argues that disease is not local but constitutional. The patient is to be studied as a whole. Biochemical changes take place in the body before the signs and symptoms appear. The significance of the incubation period during which the germs

multiply and manifest themselves in various ways is obvious. Here one might wonder whether the cells, in invading the organism, do so individually or collectively. That is, is one cell enough to bring about a pathological condition, or ~~do~~germs exist in clusters, colonies or groups. Holism and evolution have been defined as an activity integrating units in the physical world and, as such, separate action disappears and function of the parts is the sum of their activities. Holism overemphasized the inner creative factor as the motive force. In such a system an isolated reflex is an abstraction. This is illustrated by the simple reflex of tickling the throat with a swab which might cause vomiting, during which the whole body is involved. Also if one has a mild infection, say in his toe, he may get nervous, irritable, febrile, nauseated and so on. He might feel very tired and exhausted. Glisson tells us that irritable fibers develop action influenced by the excitement of the brain and Stahl also says that biochemical and biophysical processes may be changed by the sensitive soul which shapes them according to its own ends and interests. How often do we attribute irritability in a human being to some elevation in his temperature, whereas we should, according to the holistic theory, say that his fever is an effect rather than the cause of irritability. In such a case treatment would be symptomatic and constitutional rather than specific unless the fever is due to a germ seen under the microscope. (Fever may sometimes be due to dehydration.) Schelling believes that disease results when parts that have life only by being part of

the whole and living in it try to exist by themselves. This view is contrary to the ontological view where lower forms of being force themselves on the higher ones trying to live as parasites and thus the outcome is a pathological condition. (189)

The holistic pathologist believes that in disease, whether acute or chronic, there is a hidden element beyond the grasp of human speculation. However this does not mean that holistic thinking and mysticism are necessarily opposed to localism. Walter Pagel tells us that the holistic thinking and mysticism in Paracelsus and Van Helmont helped the development of science and that no barriers exist between the two views since they are complementary and necessary for each other. (190)

In this interesting study I have found out that there is a great connection between the medical and the philosophical aspects of the ontological and the holistic theories of disease. The ontological theory of disease has had a great influence upon the philosophical views of Leibniz as expressed by his Monadology. Whereas the holistic theory of disease has been derived from the philosophy of holism as expounded by Jan Christian Smuts.

(189) Alfred Plaut, "Rudolf Virchow and Today's Physicians and Scientists," Bulletin of History of Medicine, XXII (May-June, 1953) pp. 236-252.

(190) Walter Pagel, Paracelsus, p. 53.

APPENDIX A

BIOGRAPHICAL NOTES ON PARACELSUS

PARACELSUS (1493-1541)

Paracelsus was the son of a Swabian physician. His mother was a Swiss matron of a hospital. At a very early age his father took him on his rounds where he was in direct contact with nature and plants teaching him their healing qualities. When Paracelsus was ten years old his father moved from Switzerland to Carinthia, where he taught at a school of mining. This helped Paracelsus to learn the practical arts such as elements attracting and repelling each other, fundamentals of chemical analysis, and others. By this time the mother had already died. (191)

At the age of sixteen Paracelsus adopted this name, probably anxious to be more famous than Celsus, the Roman physician, whose influence lasted over 1500 years. His real name in full is Philippus Aureolus Theophrastus Bombastus Von Hohenheim. (192)

Paracelsus visited Wurzburg where he developed his strain of occultism by studying magic under Johannes Trithemius, the abbot of Spanheim who also taught him the Bible. He also studied at Ferrara, Italy, under Leoniceno, a classicist and a humanist, who had translated many of Hippocrates' aphorisms.

After he completed his studies in medicine Paracelsus started travelling all through Western Europe visiting mines, springs,

(191) Henry Sigerist, The Great Doctors, p. 109.

(192) Charles La Wall, Four Thousand years of Pharmacy, p. 240.

observing everything in nature and learning a lot about illness and remedies from various peasants, old wives, handicrafts men, barbers, barber surgeons etc. Thus he came to believe that Galen's doctrine of the four humors though logical ^{is} ~~are~~ not capable of standing the test by one in harmony with nature and so he concluded that the traditional art of healing was on a wrong road. (193) During all this time he kept a record of his own observations and ideas and wrote a book called the Paramirum about health and diseases.

At the age of thirty Paracelsus went to Strasburg aiming at an intellectually stimulating place where printing presses and surgical schools were multiplying. While at Basle he treated Frobenius, the famous book printer, who suffered of severe pains in his foot. The doctors had dreaded gangrene and advised amputation but Paracelsus was able to cure the case successfully without any surgical interference^{vention}. This incident made him famous and helped him become the town physician and a lecturer at the university. At his first public lecture he publicly burned the works of Galen and Avicenna claiming that they were false. He also wrote a pamphlet against traditional medicine basing modern medicine on observation and experimentation. The faculty, which had not been consulted about his employment, felt greatly insulted since he had neither registered formally nor presented his diploma, and so they prevented him from using the lecture room. However, in spite of their opposition, Paracelsus continued to lecture incessantly

(193) Henry Sigerist, The Great Doctors, p. 111.

in pathology, therapeutics, drugs, prescriptions, purging, venesections, injuries, examination of pulse, urine and other subjects. He used the German language instead of the Latin and this made it easier for them to understand what he was speaking about. Students who at first were attracted to him later ~~discovered~~^{discovered} him and said all sorts of vulgar verses about him which wounded him. (194)

It is said that at one time Paracelsus disagreed with the town council on account of a fee which a rich man owed him but failed to ~~do~~^{pay up} so. The case went to court and Paracelsus lost it. This was a decisive factor to help him move from Basle and return to Alsace. He settled in Colmar for some time during which he expanded his lectures to books and wrote the Paragranum in which he bases the art of healing on four pillars: Philosophy, astronomy, chemistry, virtue.

By philosophy Paracelsus does not mean medieval scholasticism but knowledge of nature. Both disease and cure are the outcome of nature. (By astronomy he means that human beings are understood only if their cosmic affiliations are recognized i.e. the attitude of the heavens toward human beings are analogous to that of a father towards his son. (195) Here we have the concept of Neoplatonism where the microcosm and the macrocosm are closely related man being the microcosm corresponding to the universe the macrocosm, with all the parts of the organism spiritually contained in the universe. In each body

(194) Ibid., p. 115.

(195) Ibid., p. 117.

there exists the spiritual and the material essences. The spiritual is also the astral possessing its Idea or "par^adig^m", in the heavenly intelligences living in the stars. The material contains the signs of the spiritual and the philosophers' aim should be to interpret these signs by renouncing all sensuality and obeying God's will i.e. suppressing his own intelligence in order to receive the heavenly intelligence. (196)

The object of chemistry should be to clarify biological processes and provide effective drugs. Nature is the ideal chemist and chemistry is in the service of therapeutics. Paracelsus taught the use of sulphur, lead, antimony, mercury, iron, copper etc. in their various combinations. He opposed the use of a large number of vegetable products. Everywhere he discovered the three principles, the combustible the volatile and the incombustible. What transformed the inanimate to animate is the peculiar force which he called the "Archeus".

By virtue Paracelsus meant love as the foundation of Medicine, and only a sincere, God fearing and altruistic man can become a physician. (197)

Though Paracelsus wrote no one printed his books until he finally went to Nuremberg where the town council members were more liberally minded and they published them for him. In 1531 he went to

(196) Charles Greene Cumston, An Introduction to the History of Medicine, p. 246.

(197) Henry Sigerist, The Great Doctors, p. 119.

Saint Gall where he visited the humanist, Vadian. During this time the Reformation crisis kept the people busy and they did not care for the reforms of Paracelsus. It is believed that at this time he was undergoing a religious crisis about which very little is known.

In 1535 the Plague broke in Inn Valley and so he wrote a treatise on it as well as another one on surgery. From Carinthia he was summoned to Salzburg by Prince Ernest of Bavaria, Patron of the natural sciences. He followed but wounded in a tavern brawl at Salzburg he died on December 24, 1541. (198)

"While philosophy, alchemy and astronomy were the pillar of his faith, his watchword in practice was experimentation controlled by the authoritative literature". (199) Paracelsus taught the doctors to substitute chemical preparations for alchemy since disease is disturbance of body chemistry and the task of chemistry is the preparation of efficient medications. He attacked them and demanded the right to inspect their stocks and laboratories and the kind of work they were doing. (200) He also attacked witch craft and the strolling mountebanks on basis that they butchered and mutilated the body instead of operating surgically. (201) But as a physician and pharmacist Paracelsus is criticized on basis that some of his remedies

(198) Ibid., p. 120.

(199) Fielding Garrison, An Introduction to the History of Medicine, p. 206.

(200) Charles L. La Wall, Four Thousand Years of Pharmacy, p. 246.

(201) Fielding Garrison, An Introduction to the History of Medicine, p. 206.

were based upon superstition, a fact inconsistent with his views as a scientist. (202)

Even though his views were based on astronomy Paracelsus opposed starcraft. He was interested in diathetic diseases, gout, arthritis, stones, regarding them as tartaric processes caused by precipitated substances which, as a rule, are excreted with the urine. Seeing a great deal of similarity between the bodily processes and illness on one hand and chemical reactions as observed in his laboratory on the other, Paracelsus was the first to attempt at chemical etiology making it an important part of his doctrine of concretions and calcifications. (203) He was also the first man to establish correlation between goiter and cretinism. He taught that nature heals wounds without much meddling. Stressing asepsis he says: "Do not touch wounds, because they cure themselves; it is the external agents which complicate processes of cicatrization." (204) He introduced mineral baths making minerals part of pharmacopea, and also introduced tinctures and extracts. (205)

Though Paracelsus is believed to be an egotist and a drunk yet he was full of intuitions and insight. He is also believed to be several centuries ahead of his time. (206) He believed in the descent

(202) Charles L. La Wall, Four Thousand Years of Pharmacy, p. 247.

(203) Fielding Garrison, An Introduction to the History of Medicine, p. 206.

(204) Samuel Evans Massengill, A Sketch of Medicine and Pharmacy, p. 94.

(205) Fielding Garrison, An Introduction to the History of Medicine, p. 206.

(206) Samuel Evans Massengill, A Sketch of Medicine and Pharmacy, p. 206.

of living organisms from primordial ooze and Baas credits him as anticipating Darwin's view of the strong eating the weak. (207)

He was a believer in God and during his stay in Switzerland he distributed the Bible but was driven out by the priests who believed that the Bible was not for the common people. (208)

The Encyclopedia Britannica speaks of Paracelsus as "the pioneer of modern chemists and the prophet of a revolution in science."

An Epitaph on his monument at Salzburg says: "Here lies Philippus Theophrastus, the Famous Doctor of Medicine, who by his wonderful art cured the worst wounds, leprosy, gout, dropsy, and other disease deemed incurable and, to his honor, shared his possessions with the poor." (209)

(207) Fielding Garrison, An Introduction to the History of Medicine, p. 206.

(208) Charles H. La Wall, Four Thousand Years of Pharmacy, p. 246.

(209) Ibid., p. 249.

APPENDIX B

BIOGRAPHICAL NOTES ON VAN HELMONT

JAN BAPTISTA VAN HELMONT (1577-1644)

Van Helmont is one of the founders of the Iatrochemical school of Medicine. Iatrochemistry, according to Webster's New International Dictionary, is chemistry united with medicine; applied to the chemistry of the period (1525-1660) which was dominated by the teachings of Paracelsus.

Born in 1578 in Brussels Van Helmont went to the university of Louvain where he finished his studies at the age of seventeen. He was interested in Martin del Rio's lectures on Magic and in the philosophy of the Stoics, particularly Seneca and Epictetus. Later he discovered that Stoicism is a form of pride and that man needs the inspiration of God. During this time he was offered a rich living if he took orders but he refused the offer because, influenced by the teachings of Saint Bernard, he did not want to live upon the sins of the people. Thus he turned to law and political science and for recreation he studied botany which ultimately led him to the study of medicine which at that time was thought to be a plebeian occupation for his noble birth. He read the writings of Hippocrates and Galen.

At the age of twenty two Van Helmont was lecturer on surgery at Louvain during which he discovered that the art of Medicine is full of deceit. He read Thomas a Kempis and Tauler, a fourteenth century German mystic, which made him decide to leave the medical profession. But when the Plague broke out he sympathised with the people and

returned to it. (210)

Travelling through Switzerland, Italy, France and England Van Helmont met several alchemists on his way who taught him the secrets of the use of fire. He believed that chemistry would provide the clue to the comprehension of nature.

Van Helmont was married to a rich lady of Brabantⁿ, the fact which made him the owner of an estate in Vilvorden near Brussels. In 1609 he settled there until the end of his life devoting himself to his studies. (211)

Wisdom, Van Helmont believed, is a divine gift and is obtained by prayer and by giving up the exercise of the will. A spirit is said to have appeared to Van Helmont in all important circumstances he met with. Though a devout Roman Catholic Van Helmont opposes the church by stressing the importance of magnetic virtues and by dismissing miracles. Using the parable of the Good Samaritan as an illustration he supported the doctors rather than the priests as the real sons of nature. The result was that he was condemned, by the Holy Inquisition of Spain, on ^{the} basis that his views were heretical. Thus he was put in 1634 in the conventⁿ of the Franciscans as a prisoner for two weeks and later served the remainder of his imprisonment at home. (212) His trial dragged on and although he recanted it was useless during his life time and he was not acquitted until two years after his death and the grounds of his acquittal was that he

(210) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV (October, 1932) Part I, pp. 23-29.

(211) Henry Sigerist, The Great Doctors, p. 159.

(212) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV (October, 1932), Part I, pp. 23-29.

had led a pious life. (213)

The works of Van Helmont which his son François published post humously are called the "Ortus Medicinæ". It is a general view of man and the universe in terms of medicine. It deals with method, first principles of human beings and life, matter, the universe, stars and meteors. It deals with pathology, origin and development of disease and therapeutics. It ends with monograph on lithiosis and fever. (214)

The achievements of Van Helmont in the field of chemistry are numerous and, prior to Lavoisier, he is considered the greatest chemist. He made sulphur dioxide and nitrous oxide. He believed that metals continue to exist throughout various stages of chemical changes. (215) He studied the quantitative aspects of chemical reactions and discovered that from a piece of glass the exact weight of silica can be obtained. (216) He also introduced the gravimetric idea in the analysis of urine. (217) Van Helmont has a two-fold view, that of an empiricist possessing exact chemical knowledge and that of a spiritualist and this is indicated in his use of the two terms "gas" and "Blas" which were explained in chapter one. He regards all changes in the body due to ferments consistent with his view of the influence of the Blas or Archeus in that these spiritual agents, with help of

(213) Henry Sigerist, The Great Doctors, p. 161.

(214) Ibid., p. 278.

(215) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic," Proceedings of the Royal Society of Medicine, XXV (October, 1932) Part I, pp. 23-29.

(216) Ibid., p. 25.

(217) Fielding Garrison, An Introduction to the History of Medicine, p. 251.

ferments, act indirectly on matter. (218) Each gas is an instrument for its specific Blas which in turn is presided over by a sensory motive soul located at the pit of the stomach. (219) This view had a great impact on Van Helmont's successors where the puzzle of the animate as derived from the inanimate prevails and instead of a view of a sensitive soul we have fainter views of a vital principle held by some currently. (220) An Archeus which encloses the sensitive soul and this containing the intelligent soul implies duodynamism which was later more fully developed by Descartes and Stahl. This vatalism helped the unification of chemistry and physics with medicine and in this respect Van Helmont may be considered as the father of biochemistry. (221)

Regarding the relation of digestion to spirits Van Helmont believed that when food is absorbed from the gastro-intestinal tract to the liver it is endowed with natural spirits which, upon reaching the heart, change to vital spirits and later upon reaching the brain are converted to animal spirits. (Descartes gave a similar explanation afterwards). These upward steps are of the nature of fermentation and are actually six in number. The first stage of digestion takes place in the stomach where ferment from the spleen changes the food to chyle.

(218) Sir Michael Foster, Lectures on the History of Physiology, p. 134.

(219) Fielding Garrison, An Introduction to the History of Medicine, p. 251.

(220) Sir Michael Foster, Lectures on the History of Physiology, p. 143.

(221) Charles Greene Cumston, An Introduction to the History of Medicine, p. 281.

In the second stage the acid chyle goes to the duodenum where ferment from the bile changes it to salt. In the third stage the alkaline chyle digestion continues in the gastro-intestinal tract and liver and ferment from the liver changes the chyle to crude blood and serum. In the fourth stage digestion continues in the heart and arteries where the thick blood becomes lighter and brighter. In the sixth stage the blood in the arteries changes into the vital spirits of the Archeus and here the ferment multiplies. In the last stage of digestion there is action of the individual ferment of the many tissues. Thus Van Helmont believed that problems of the human body are of chemical nature and could be solved by the knowledge of chemistry. (222) He opposed the teachings of Aristotle and Galen, the Arab school of medicine and the demonstrations of deductive logic as a means of attaining scientific truth. Real knowledge consists of intuition whereby subject and object are identified. (223)

In his Ortus Medicinae Van Helmont speaks about asthma as being of two kinds, dry and moist. It may be due to the womb where it involves the whole woman or it might be common to both sexes. In asthma, Van Helmont says, the lungs contract and are drawn to each other. Hot weather, dust, wind, fried fish cause such a condition, according to Van Helmont's observations. He mentions a clergyman who suffered from

(222) Sir Michael Foster, Lectures on the History of Physiology, pp. 135-139.

(223) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic" Proceedings of the Royal Society of Medicine, XXV (October, 1932) Part I, pp. 23-29.

asthmatic attacks during the summer season and each of these attacks was accompanied by urticaria. The clergyman's mother and sister also had urticaria. Another case had asthma because of psychic causes.(224)

In 1628, sixteen years before Van Helmont's death, Harvey published his discovery of the circulation of the blood but Van Helmont does not seem to have heard of it. Like the Galenists Van Helmont believed that the blood was carried from the heart to the body by arteries and veins, and that the blood passed through the septum ventriculorum from the right to the left ventricle but not vice versa. The vital spirits, however, which are always present in the left ventricle were able to pass in the opposite direction, from the left to the right. (225)

The works of Van Helmont are of enduring and great value. They have a great impact upon the modern views of Medicine. The two main elements of modern medicine being chemistry which deals with acids, alkalies, occult qualities of assimilated substances, and secondly physiology. In the field of physiology Van Helmont spoke of the inherent vital force kept by nutritive substances. (226)

(224) E. Stolkind, "The History of Bronchial Asthma and Allergy", Proceedings of the Royal Society of Medicine, p. 1122.

(225) R.O. Moon, "Van Helmont, Chemist, Physician, Philosopher and Mystic, Proceedings of the Royal Society of Medicine, XXV (October, 1932) Part I, pp. 23-29.

(226) Hermann von Helmholtz, "Of Thought in Medicine," Bulletin of the History of Medicine, VI (February, 1938) pp. 117-144.

APPENDIX C

JAN CHRISTIAN SMUTS (1870-1950)

JAN CHRISTIAN SMUTS (1870-1950)

Jan Christian Smuts, South African statesman and general, was born of a Dutch father and a French mother near Riebeeck West, Malmesbury district, Cape Colony, in 1870. Having had a sickly childhood and being brought up on a farm Smuts did not begin his studies until he was twelve years old. At the age of sixteen he went to Stellenbosch university, near Cape Town, where he proved to be of outstanding ability. In his nature he was reserved and retired from other people but possessing a great passion for physical nature which set him thinking about the origin of things and men and creating in him a scientific as well as a philosophical urge. He was adventurous and had a great liking for climbing mountains irrespective of danger. In his relationship with other people he was diplomatic preferring to use persuasion rather than force. When Smuts was twenty one years old he took his degree with honors and was granted a scholarship to continue his studies in Cambridge where he proved to be a brilliant student. Four years later he was admitted to Cape Town bar and in that year he delivered his first political speech at Kimberley, center of diamond industry, in support of the policy of Rhodes which aimed at uniting the English and the Dutch people in South Africa into one nation. At the age of twenty six he translated Schiller's Das Ideal und das Leben, a study in personality evolution in which lay the core of psychoanalysis and the idea of Holism. Smuts was well grounded in Plato, Aristotle,

Bacon, Hegel, and Darwin. He preferred to read Shelley's poetry because, he thought, it contained a meaning of life. (227) During that same year the Jameson raid took place creating a change in South African politics. The idea in the raid was that a distracted Transvaal should hand itself to the British. Jameson was supposed to bring this distraction to a head but he failed. The English were enthusiastic about exploring South Africa whereas the "Boers", the Dutch, wanted to go slow on things. In the meantime Germany wanted to help the Boers and defeat England for its own purposes and interests. Rhodes, whom the Boers trusted, suddenly turned against them not because he was anti boer but because he was anti Kruger, ruler of the Raad (Head parliament) which interfered in legislation. Kruger had issued a law which emphasized that foreigners could be eligible for citizenship only after having lived in Africa five years rather than just one year. He also dismissed the chief justice who gave judgement against the government in a mining case which resulted in the government's loss of one third million pounds. Smuts supported Kruger in these decisions and in 1898, with help of Kruger, he became State Attorney, in control of the detective force. Milner, an Englishman, had a lot of pride to accept Kruger's terms and so he went to South Africa to continue Rhodes' policy on basis that unity of South Africa with England makes it safe for both against Germany. Chamberlain tried to

(227) Sarah Gertrude Millin, General Smuts, V.I, pp. 6-54.

convince Milner that it was better policy to be Lenient with the Boers but it was a useless effort since Milner believed that Transvaal and South Africa had to go to England. Kruger, on the other hand, was of the view that the inherent right of the Republic as a sovereign state i.e. self government, must held. At a conference at Bloemfontein Smuts and Kruger negotiated with Milner who increased his demands on the Boers on franchise and dynamite monopoly and they got to the conclusion that war was "inevitable." (228) After the conference both parties ordered arms from Germany. Kruger closed the mines, seized the railways, stopped gold exportation, commandeered 15 pounds from each citizen and gave orders to the Free State to mobilise British and Dutch burghers. Thus the Boer war began on October 11, 1900. During the war Smuts was employed in legal and organization work but when Pretoria was occupied he joined the Boer field forces where he rescued 500,000 pounds in the state treasury rushing it out under British fire. From the East Transvaal where his government was hard pushed Smuts moved to the West where he fought under De la Rey in a capacity of commander-in-chief of the Boer and Cape rebel commandoes in the Cape. During this time Botha sent for him to negotiate for peace at Vereeniging.(229) In the war he proved to be adventurous and unyielding to difficulties.His aim was to get rescuits in the Cape

(228) Ibid., pp. 62-130.

(229) Nathan Levy, "Smuts, Jan Christian," Encyclopedia Britannica, XX (1957) pp. 845-846.

and to create a general rising. He organized rebels on the Orange River but his efforts were in vain since the Boers were defeated when Smuts went for peace negotiation. He convinced the Boers to yield and after peace was declared he became a loyal supporter of Botha whose policy was loyalty to the new order and racial conciliation. Smuts brought together the Boer nation and supported by part of the British people opposed several points in Milner's policy e.g. the importation of 50,000 Chinese coolies to work in mines because their labor was cheaper whereas the natives were unemployed, and Milner's offer of seats in the nominated legislative council. (230) Smuts' policy was that the Boers in the Transvaal be given self government so that England can win Boers leaders. In 1904 Smuts and Botha organized "Het Volk" i.e. people's party, open to both races, and in 1906 Smuts went to England to see about a responsible government in the Orange Free State and the Transvaal and he succeeded. Smuts was not a revengeful man. He possessed a sense of collective opinion and was an advocate of race admixture. He was all for cooperation, fusion and Holism as the main and fundamental principle of his life. His aim was to unite all the people of South Africa, Jews, negros and European alike. Still in spite of the fact that he was liberal in thought, fair in action and possessed a great sense of equal rights he believed that power must remain with the white race. Because of his mental superiority Smuts became the core of Botha's cabinet, a colonial secretary and minister of education.

(230) Ibid., p. 846.

Hemada the mine owners admit that they were wrong in their treatment of the Chinese coolies and as a token of the new Boer loyalty he was willing to buy for the king the Cullinan diamond, the largest diamond in the world. He put education under government control making the English language compulsory. He made a good stand against labor offering white laborers relief employment and solving strikes of miners. (231)

When in 1910 union of the self governing colonies under the British crown was achieved Smuts was elected member of the Legislative assembly for Pretoria and became minister of the interior, mines and defence. During this time Hertzog felt that in making the education of English compulsory and of Dutch optional there was discrimination against the Boers. Hertzog approved of the union of Africa but believed that South Africa must be governed by the Dutch and by using this as an argument he stimulated the pride of the Boers many of whom joined him and so he remained in the cabinet. (232)

A series of strikes which began in 1913 in Johannesburg lasted for nine years. There was a great crisis which involved industries, railways, coal supply and which was saved by Smuts and Botah. They negotiated with success departing nine leaders of the strike without trial. (233)

Aiming at spreading the power of Frederick the Great beyond

(231) Sarah Gertrude Millin, General Smuts, v.1, pp. 210-236.

(232) Nathan Levy, "Smuts, Jan Christian," Encyclopedia Britannica, XX (1957) pp. 845-846.

(233) Sarah Gertrude Millin, General Smuts, v.1, p. 279.

Prussia, Bismarck sent missionaries to Africa where the English had already been. Thus hostility and antagonism between the two nations arose. Africa provided raw materials for Europe's industries and also markets and hence the competition. Also the strategic position of Africa served the interests of England in East Asia and the South seas. On the other hand Germany needed expansion and aimed at taking all Africa so it built a fleet and declared war on England challenging it to enter war. The union supported England according to the desire of Smuts whereas Hertzog voted against it. The Germans crossed the borders of German South West Africa into the union, and Smuts with his energy and patience suppressed the rebellion by pacifying the rebels who wanted to overthrow England and have the union be declared a republic. Seitz, German governor of German South West Africa, surrendered and peace was declared. (234)

During the First World War, 1916, Smuts became Lieutenant General, commander-in-chief of the imperial forces in German East Africa. He led his own men as well as the British men side by side enduring a lot by pushing the Germans from Kilimanjaro to fever stricken marshes of Pangani cutting their supplies and reinforcements. He was confronted with all sorts of hardships especially in rainy seasons when he had few supplies, when his horses died, and when the enemy left him behind wounded soldiers to take care of. All the empire had great confidence in his judgement, industry, insight into problems and adaptability to

(234) Ibid., pp. 292-326.

various situations. He lived as his troops lived in German South Africa which he actually won but had to go to London for an imperial conference of war to represent South Africa in 1917. (235) There he organized the Royal Air Force, became privy councillor, accepted a seat in the war cabinet which accepted his proposals for unification, became chairman of the war priorities committee. (236) Lloyd George introduced him as "one of the most brilliant generals in this war," and Churchill thought of him as an altogether extraordinary man. At a dinner, after the conference, given by both houses of Parliament Smuts declared the idea of a British Commonwealth of Nations to keep peace and build the world. He wanted grouping of free states held together with common allegiance based on equality and freedom rather than a union by federation with a central imperial parliament. (237)

During his stay in London, in 1917, Smuts completed a successful plan for defending London against German aggression. Also his inspiring speeches about freedom stimulated five thousand engineers and miners as well as police to quit striking and return to their work. He agreed to a plan which Sir Douglas Haig presented in which offense against Germans on Ostend would force them off the Belgian coast through Flanders, forcing the Germans to come to terms. The scheme turned out to be a failure and for help England looked for allies, Arabs, Kurds,

(235) Ibid., pp. 337-351.

(236) Nathan Levey, "Smuts, Jan Christian," Encyclopedia Britannica, XX (1957) pp. 845-846.

(237) H.C. Armstrong, Grey Steel : J.C. Smuts, p. 285.

Greeks, Armenians and above all Jews, from America and Germany. To ensure the help of the Jews Balfour, Foreign Secretary, with the consent of France and America, promised that if the allies won the war then the Jews are promised a home in Palestine. (238) Smuts sympathised with the Jews and supported Chaim Weizman and the Zionists.

When the Germans attacked the Allies in the Middle East the latter counteracted forcing the Germans to retreat. The crisis which was prevalent in Germany ended by the capitulation of Germany following the example of Bulgaria, Austria, and Turkey. Thus the war ended and Smuts was getting ready for a peace conference. He wrote The League of Nations; A Practical Suggestion, a plan consistent with his philosophy of Holism in which small units keep uniting into bigger ones in a continuous process. e.g. the four colonies becoming the Union of South Africa which in turn united with England and other colonies to form the British Empire, and this will unite with all other nations to form the League of Nations. (239) Smuts' plan was supported by president Wilson and Lloyd George. (240)

While Smuts was in Paris at the peace conference Hertzog was leading a campaign against England claiming that taxes were high, cost of living was high and that conditions were in need of improvement. Hertzog's aim was to gain popularity at any cost. At the conference

(238) Ibid., pp. 291-300.

(239) Ibid., p. 308.

(240) Nathan Levy, "Smuts, Jan & Christian," Encyclopedia Britannica, XI (1957) pp. 845-846.

Smuts sympathized with Germany and discouraged breaking it down because it is a good defense against Bolshevism which is a threat to civilization, he argued. Upon his return to South Africa in 1919 Smuts became prime minister of the union succeeding Botha after his death. There he found the people busy with their own problems and conditions were unsatisfactory. Diamonds and ostrich were out of demand, taxes were high, bankruptcy, depression and unemployment prevalent and he did nothing about them. He was subject to attacks from people and especially from Hertzog who was interested in becoming a prime minister himself. Smuts was moody, indifferent and pessimistic. He lost interest in social activities especially because he felt he was above the understanding of the average man. (241)

During the elections of 1920 attempts to reunite the South African party with the Nationalists failed. The Unionists, however, dissolved their organization and joined the South African party resulting in Smuts' loss of a big number of supporters among the Dutch and the English. A general election left him with a working majority and the combined party did well in Parliament. (242)

Crisis in Johannesburg continued. The Bolsheviks activated the people and trade unions wanted to have control of mines. The owners refused to give in and so battle between labor and capital started. Smuts negotiated and had full control of the situation.

(241) H.C. Armstrong, Op.Cit., pp. 328-341.

(242) Nathan Levy, "Smuts, Jan Christian," Encyclopedia Britannica, XX (1957) pp. 845-846.

Upon his return to Cape Town he found Hertzog getting to be more popular. His speeches for reformation were useless since the people wanted someone interested in their own problems rather than in the affairs of the world at large, as Smuts did. He grew to be aloof, impatient and nervous and when elections took place again in 1924 Hertzog was the winner. (243)

Smuts gave up office and was inactive in politics for ten years. He indulged in the study of botany, philosophy and other intellectual activities. It was during this time that he wrote Holism and Evolution and Africa and Some World Problems. He travelled a lot and started getting interested in his people and remodelling himself. Another election which took place in 1929 was also won by Hertzog who gained his popularity on basis that Smuts was a supporter of England rather than the Boers and that he aimed at establishing a black dominion (Kaffir state), which was not true. (244)

Smuts went on a tour to England and the United States where he gave speeches and lectures about saving Germany and civilization, peace, and the League of Nations. Many scientists and men of literary importance attended these lectures and he was honored with degrees, scrolls and decorations. (245)

In South Africa things were going against Hertzog. There were locusts, exports dropped, bankruptcy and depression hit the people.

(243) H.C. Armstrong, Op.Cit., pp. 348-368.

(244) Ibid., pp. 360-376.

(245) Ibid., p. 378.

Hertzog had kept South Africa on gold at a time when England had come off gold. Smuts profitted from this occasion and he used Hertzog's techniques in attacking him. Insisting that South Africa must come off gold Smuts policy proved to be of great benefit and tremendous prosperity to the people. After winning Smuts could not make up his mind whether it was better for the general welfare to become a prime minister or to join with Hertzog. (246) Finally, in order to give South Africa a chance to grow into a strong nation, he joined Hertzog and became minister of justice.

In the 1933 elections there was no Dutch and English party but a union government working for peace and prosperity. Smuts remained minister of justice until 1939 when England declared war against Germany and then he became prime minister. He formed a war cabinet and the union, supporting Britain, proclaimed a state of war with Germany. In 1941 Smuts became field marshal in the British army and in 1945 he was delegated by the union of South Africa to attend the United Nations conference in San Francisco writing the preamble to the United Nations charter. Defeated in the general elections in 1948 Smuts resigned from the office of prime minister keeping a seat in the assembly for Pretoria East. In 1950 he retired from leadership and dies at Irene, near Pretoria, on September, 1950. (247)

(246) Ibid., pp. 379-381.

(247) Nathan Levy, "Smuts, Jan Christian," Encyclopedia Britannica, XX (1957) pp. 845-846.

In the San Francisco Charter Smuts tries to reaffirm "faith in fundamental human rights, and in the dignity and value of the human personality."

In 1947 he was honored by the order of merit.

In 1948 he was honored by the chancellorship of Cambridge University. (248)

(248) Maybelle Fay Bitensky, "Smuts, Jan Christian,"
Chamber's Encyclopedia, XII (1950) p. 619.

BIBLIOGRAPHY

- Armstrong, F. C., Grey Steel: J.C. Smuts. London, Arthur Barker Ltd., 1937.
- Aschoff, Ludwig, Lectures on Pathology. New York, Paul Hoeber Inc., 1924.
- Bitensky, Maybelle Fay, "Smuts, Jan Christian," Chamber's Encyclopedia, XII (1950), p. 619.
- Cawadias, A.P., "Neohippocratism," Proceedings of the Royal Society of Medicine, v. XXXI, 1937-1938, pp. 27-39.
- Culpin, Millais, "The History of Psychology in Medicine," Proceedings of the Royal Society of Medicine, v. XXIX, 1936, pp. 1569-1577.
- Cumston, Charles Greene, An Introduction to the History of Medicine. New York, Alfred A. Knopf, 1926.
- Foster, Sir Michael, Lectures on the History of Physiology. Great Britain, Cambridge University Press, 1924.
- Galdston, Iago, "Book Reviews," Bulletin of the History of Medicine, v. XVII (January, 1945), pp. 108-110.
- Garrison, Fielding, An Introduction to the History of Medicine, 2nd ed. Philadelphia and London, W.B. Saunders Company, 1917.
- Gilson, Etienne, Being and Some Philosophers, Toronto, Canada, Garden City Press Cooperative, 1949.
- Golla, F.L., "The Nervous System and the Organic Whole," Proceedings of the Royal Society of Medicine, v. XXIX, 1936, pp. 109-119.
- Haldane, J.S., "The New Physiology," The Harvey Lectures Series XII. Philadelphia and London, J.P. Lippincott Company, 1918.
- Langley, L.L., "An Historical Introduction to the Physiology of Anoxia," Bulletin of the History of Medicine, XIV (1943) p. 336.
- La Wall, Charles, Four Thousand Years of Pharmacy. London and Philadelphia, J.P. Lippincott, 1927.
- Levy, Nathan, "Smuts, Jan Christian," Encyclopedia Britannica, XX(1957) pp. 845-846.

Macht, David, "Psychosomatic Allusions in the Book of Proverbs,"
Bulletin of the History of Medicine, v. XVIII (October,
1945), pp. 301-328.

Massengill, Samuel Evans, A Sketch of Medicine and Pharmacy, S.E.
Massengill and Company, 1943.

Medicus, Fritz, ed., "The Scientific Significance of Paracelsus,"
Bulletin of the History of Medicine, v. IV (May, 1936)
pp. 353-366. Translated by Fritz Marti.

Mayer, Claudius, "Metaphysical Trends in Modern Pathology," Bulletin
of the History of Medicine, v. XXVI (January-February 1952)
pp. 71-82.

Meyer, Adolf, "The Tradition of Ancient Biology and Medicine in the
Vitalistic Periods of Modern Biology and Medicine,"
Bulletin of the History of Medicine, v. V (November 1937)
pp. 800-822.

Millin, Sarah Gertrude, General Smuts. 24 Russell Square, London,
Faber and Faber Ltd., 1936. v.I.

Moon, R.O., The Relation of Medicine to Philosophy. London, New York,
Calcutta, Longman's, Green and Co., 1909.

Moon, R.O., "Van Helmont, Chemist, Physician, Philosopher and Mystic,"
Proceedings of the Royal Society of Medicine, v. XXV (October
1932) pp. 23-29.

Pagel, Walter, London and Kent, Francis, Librarian A.U.B.,
Correspondence, March 1, 1960.

Pagel, Walter, "Julius Pagel and the Significance of Medical
History for Medicine," Bulletin of the History of Medicine
v. XXV (May-June 1951) pp. 207-226.

Pagel, Walter, Paracelsus Paracelsus: An Introduction to Philosophical Medicine in the Era of the Renaissance. Basel and New York, S. Karger, 1958.

Pagel, Walter, "Religious Motives in the Medical Biology of the XVIIth Century," Bulletin of the History of Medicine, v. III (February 1935) pp. 97-129.

Pagel, Walter, "Religious Motives in the Medical Biology of the XVIIth Century," Bulletin of the History of Medicine, v. III (March 1935) pp. 213-232.

Pagel, Walter, "Religious Motives in the Medical Biology of the XVII Century," Bulletin of the History of Medicine, v. III (April 1935) pp. 265-313.

Pagel, Walter, "The Position of Harvey and Van Helmont in the History of European Thought," Journal of the History of Medicine and Allied Sciences, XIII (1952 Number 2).

Pagel, Walter, The Religions and Philosophical Aspects of Van Helmont's Science and Medicine. Baltimore, The John's Hopkins Press, 1944.

Pagel, Walter, "The Speculative Basis of Modern Pathology. Jahn, Virchow and the Philosophy of Pathology," Bulletin of the History of Medicine. v. XVIII (June 1945) pp. 1-44.

Plaut, Alfred, "Rudolf Virchow and Today's Physicians and Scientists," Bulletin of the History of Medicine, v. XXVII (May-June 1953) pp. 236-252.

Riese, Walther, "An Outline of the History of Ideas in Neurology," Bulletin of the History of Medicine, v. XXIII (March-April 1949) pp. 111-137.

Riese, Walther, "Claude Bernard in the Light of Modern Science," Bulletin of the History of Medicine, v. XIV, (October 1943) pp. 281-292.

- Riese, Walther, "Philosophical Presuppositions of Present Day Medicine," Bulletin of the History of Medicine, v. XXX (March-April 1956) pp. 163-175.
- Riese, Walther, The Conception of Disease, New York, Philosophical Library, 1953.
- Riese, Walther, "The 150th Anniversary of S.T. Soemmerring's Organ of the Soul," Bulletin of the History of Medicine, v. XX (July 1946) pp. 310-322.
- Riese, Walther, "The Structure of the Clinical History," Bulletin of the History of Medicine, v. XVI (December 1944) pp. 437-450.
- Sherrington, Charles S., The Integrative Action of the Nervous System. London, Constable and Company Ltd., 1911.
- Sigerist, Henry, Civilization and Disease, Ithaca, New York, Cornell University Press, 1945.
- Sigerist, Henry, Man and Medicine, New York, W.W. Norton & Company Inc., 1932.
- Sigerist, Henry, The Great Doctors, New York, W.W. Norton & Company Inc., 1933.
- Smuts, Jan Christian, Holism and Evolution, New York, The Macmillan Co., 1926.
- Stolkind, E., "The History of Bronchial Asthma and Allergy," Proceedings of the Royal Society of Medicine, XXVI (1933), p. 1122.
- Temkin, Owseo, "The Philosophical Background of Magendie's Physiology," Bulletin of the History of Medicine, XX (1946) pp. 20-22.
- Von Helmholtz, Hermann, "Of Thought in Medicine," Bulletin of the History of Medicine, v. VI (February 1938) pp. 117-144.