

RHAZES CONTRIBUTION TO THE DEVELOPMENT AND PROGRESS OF MEDICAL SCIENCES.

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ABSTRACT

Rhazes was fond of music since his childhood, then studied philosophy and wrote several books about it. Later on he indulged himself in the study of chemistry and medicine. After finishing his studies, Rhazes went back to his home town and practised medicine and soon became very famous. He wrote more than 224 books on various subjects. His most important work is the medical encyclopaedia "continens" (Al-Hawi) which greatly effected the human civilization specially in Europe.

Rhazes (835-925 A.D.) as known to the Europeans is Abu Bakr Mohammad ibn Zakaria Al-Razi, born in the city of Al-Rayy (few miles south of Tehran, Persia). He was fond of music since his childhood, then studied philosophy and wrote several books, about it but became very obstinate to reason which he considered as the only resolution. He resented some theological ideas which were far more higher than the human mind to understand thus be-

came much criticised by his contemporaries.

He indulged himself later on in the study of chemistry and medicine, so he read several books by Hippocrates, Galen and some Indian wisemen which included physics and chemistry. He left after sometime to Baghdad where he studied medicine under the famous physician Ali ibn Raban Al-Tabari (the author of the famous medical book

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"Firdaus Al Hikmat" i.e. Paradise of Wisdom). After finishing his studies, Rhazes went back to his home town, Al-Rayy where he practised medicine and soon became very famous and was later on, appointed as head of the hospital of Al-Rayy.

Rhazes was called to Baghdad after few years by the Calif Al-Mansour to become head of the newly erected hospital there. The Abbasid Calif Odod Al-Dawlah consulted Rhazes during the erection of the Ododi hospital and when completed he was made its head of the staff.

Besides his extreme fondness of medicine, Rhazes loved wisdom and philosophy, then established his own philosophical sect based on five principles: God, soul, matter, place and time which he believed to be very necessary to the existence of this world.

In his later years, Rhazes fame became widespread as an excellent teacher and an expert physician, with many students around him as well as sick people calling upon him from many parts of the eastern provinces of Asia. This made him quit working with chemistry, and prac-

ticed medicine only, thus became the most learned scientist and physician of his time.

He is also considered the greatest Arabic physician of the golden era of medicine throughout the young Islamic empire, since he mastered clinical medicine and followed the course of organized experience which was declared long ago by the famous Greek physician Hippocrates and could survive for 14 centuries.

When Rhazes grew older, his eye sight grew weaker but refused to regain it surgically since he had no trust in his colleagues. But some people say. That when he failed in one of his experiments, the Calif Al-Mansour struck him on the head several times with a big book thus his sight was weakened. Other people claim that much reading and copying books lead him to poor eye sight, becoming nearly blind after he was appointed chief physician of the new Al-Rayy hospital which was considered the biggest of its kind.

Rhazes was considered as the greatest physician during the Medieval Ages due to his great efficiency in medicine, massive power of ob-

servation, many inventions and a lot of criticism to old theories which denoted his extreme intelligence. He was kind to his patients, worked hard to cure them and was thus recognized as the most brilliant physician ever born during the Islamic rise up, and even equalized with Hippocrates. He was also reputed as a high rank physicist and encyclopaedic in mind.

He wrote more than 224 books (most of them were lost) in various sciences and subjects. His medical volumes comprised all what he could collect of the sciences of the Greeks and Indian, together with his personal experience and was very honest in his quotations.

His compilations consist of 56 on medicine and materia medica; 32 on physics; 21 on chemistry ; 11 on mathematics and astronomy ; 38 on theology, philosophy and metaphysics; 12 on miscellaneous subject etc.

Rhazes writings had a great influence on medical theories and practice throughout all of the Islamic empire due to its accurate observations, precise descriptions on symptoms of diseases. He was the first to

recognise the psychological effects on therapy and urged other physicians to do their best to raise up the morals of the patients (this was stated in one of his books where he said that" the physician has to convince his patient that he is well and has to wish him progress in cure although he is not believing in it, because the patient's body temperaments follow the behaviour of the soul and its condition"). This is due to his belief in that certain digestive disorders arise from psychological effects in the first place. This made him write his book on " Spiritual Medicine" intended to cure the soul.

He was interested in writing down the clinical observations of his patients to check with the progress of the disease, also he used to study the patient's behaviour during his sleep and awakesness, his temper, age, occupation, some hereditary diseases in his family as well as his social and economic state, also his diet... thus Rhazes was considered an excellent clinician (he had deep concern in diagnosis and accurate observations clinically of his patients).

Rhazes method of comparative diagnosis denote that he was a clever physician, evident in his classification of some cases, e.g. a case of dysuria was divided into : 1- the physician has to examine all of the diagnostic symptoms and discuss its reasons and be able to differentiate between the symptoms of the same disease, e.g. the urine is retained inside the body because the Kidneys can not extract it out, or might be due to the presence of a tumour or inflammation or ulcer or might be due to a calculus present inside the Kidneys or bladder.

2- the physician has to deal with similar diseases and compare between each of their symptoms accurately, this will help in arriving to a decisive diagnosis, e.g. symptoms that differentiate between colitis, Kidney calculi and Aelaus (Ileus) a disease mentioned in old medical books and characterized by a hot tumour in the small intestines accompanied by fever, thirst, inflammation and redness of the skin).

Thus Rhazes proved to be a great medical practitioner and clinician with vast experience in diagnosis

with correct conclusions of the nature of the diseases and ways of curing it. He rejected the current ideas of his colleagues to suffice with urine examination in diagnosing the disease and prescribing the treatment without examining the patient himself.

Rhazes is also considered as an exquisite medical teacher and one of the best capable professors to explain, simplify and get benefit from. He advised his students to study the diseases carefully by examining the patient then diagnose the disease after coming to know its reasons wether arising from one or more causes, then differentiate between each, proceed in prescribing the treatment, not neglecting the prognosis and precautions.

He also advised them to read different medical books and try to keep them, write down important notes about them as an abstract with description of every disease. He was intrigued to explain the medical texts and comment on them because he found Hippocrates' book " Seasons" full of confusion and disarrangement, also mysterious and vague,

missing a lot about the art of medicine.. thus he was forced to state the missing parts in his own compilations in a simpler manner.. easy to be memorised and remembered.

Rhazes had a wide medical knowledge never attained by a person since the time of Galen, and kept looking for more knowledge by reading all available medical books, performing clinical examinations and chemical experiments. He urged his students to behave in manner and virtues, stressing on the holyness of the medical profession, opposing all kinds of jugglery, caring much with healing the poor free of charge and even give them money.

Of Rhazes famous medical sayings; 1- The art of healing is a sage and solid science, its misuse causes harm to the practitioner (since he was fully saturated with Hippocratic doctrines and its spirit, thus went on combating ignorance and quackery in this profession which was dominating medicine at his time).

2- The physician has to encourage the patient and cheer him up even if he is dying because the strenght of the human body depends

upon his morals.

3 - To commence with the treatment, the physician should first strengthen the patient's vital and mental forces which make his task easier afterwards.

4- In most cases, it is difficult to reach fro the truth in medicine, and this art comes second after practical experience which a clever physician attains.

5- If a patient consults too many physicians, then he becomes confused and his recovery is delayed.

Rhazes wrote his most important medical encyclopaedia "Continens" (Al- Hawi) which greatly affected the human civilisation specially in Europe. This voluminous work contained all medical knowledge since the time of the Greeks and up to his death. At the begining of it, be described every disease separately as quoted from the Greek, Syrian, ancient Arab, Persian and Indian texts, then put down his remarks, observations, experience and all informations he could get, and at last he put down his final decision about the disease.

This book is considered a complete encyclopaedia that comprised all medical knowledge, but unfortunately Rhazes died before its completion and left it as a manuscript for his pupil who completed it and made several copies. European scientists depended greatly on this work and considered it as the main medical text book till mid 16th century, specially in Montpilier and Paris universities after it had been translated into Latin by the Jewish physician Farag ibn Salem according to the request of King Charles D' Anjou of Sicily in 1279, and was printed several times.

Rhazes in that work followed the scientific integrity where he stated the name and author of every quotation he made or abridged such as when he mentioned the name of Galen as the author of the book "Diagnosis of Diseases". He also advised his students and readers to get acquainted with the works of Hippocrates and Galen although he used to oppose their opinions, e.g. Rhazes mentioned that Hippocrates stated in his book "The Seasons" (Al-Fousoul) that if the oedematous

patient coughs without reason i.e. not having a cold or other affections, but was caused from his illness itself due to excessive water retention present, then he is doomed to die because it shows that water has reached his lungs and thus is about to suffocate.. but Rhazes says that this is wrong and erroneous because the water is actually present below the diaphragm, then how can it reach to the trachea. The correct explanation is that excessive water processes on the diaphragm upwards to the extent that it produces difficulty in breathing and cough occurs.

Another example; Rhazes says that Hippocrates stated that urine increase in amount during winter considerably with a lot of sediments inside because it matures greatly and abundantly, but Rhazes say that this is wrong because excess urine is due to less perspiration and sediments occurs as he mentioned.

The Continens comprises 22 volumes, only ten of them exist and the rest are lost. According to Dr. M. Nizamuddin former Director of Dairatul Maarif, Osmania University Hyderabad,

the manuscript of Escorial library contains the 24 parts and 25th part is found in the National Library at Madrid (Bull. of the Dept. of History of Medicins. Vol.1 No.3. 1963 page 172-173). Dr. Nizamuddin has given the headings of the 25 chapters of the book according to the Latin translation and stated that they adopted the natural order of the treatment of the diseases and organs of the human body from head to foot, hoping that was a reasonable arrangement about the succession of books and chapters according to the design of the author. 23 Volumes of the continens have already been published by Dairatul Maarif, Osmania University, Hyderabad during 1955 to 1970 AD. This set is also available in the library of Indian Institute of History of Medicine, Osmania Medical College, Putlibowli, Hyderabad. It is divided into two big sections; the first on *Materia Medica* (A qrabadin) and the second on clinical observations dealing with the progress of the disease and its reaction to the drugs, then the follow up of the patient's condition and finally the the result of the treatment.

The clinical remarks in this book are 33 in which Rhazes described

each disease separately according to what was stated in the Greek, Syrian, Persian and Indian books, then he put down his remarks, observations and result of his experience. Finally he stated his opinion about the disease which he already discussed. (Unfortunately the book contain a lot about ancient medicine's superstitions).

The Continens include description of all diseases of the human body from head to toe, with their etiology, signs, diagnosis and therapy. He also mentioned his personal views and ideas towards those ancient ways of treatment either favouring it or opposing, and introduced new methods of healing. He surpassed many medical practitioners when he stressed on psychological effects when diagnosed internal diseases and prescribed the treatment, also was aware of the sensual effect of music on the patient's soul and regarded it as a kind of treatment.

He was the first to discover the infection with Guinea worm (*Dracunculus medinensis*) which brings skin ulcers, blisters, urticaria, fainting and tumours in the body. He also

encouraged the use of abdomen-belts, considered fever as a symptom and not a separate disease (he shows that higher body temperature at night is a sign of the body counteracting the disease), and applied cold water compresses in order to decrease the elevated temperature.

He described how to detect sugar in urine as a sign of diabetes mellitus (the ancient Egyptians were the first to detect that disease), by making the patient urinate on the ground and watched ants gathering around the spot which denoted the presence of sugar in the urine. He also urged tuberculosed patients to drink much milk with honey. He strongly believed in animal evolution as well as plants. He was the first to announce the contamination in heredity, was interested in surgery and recognised as one of the first physicians in the Islamic world to perform surgical operations.

The book "The Continens" is divided into several parts; Part I :includes 10 chapters;

Chapter 1: on apoplexy, palsy,

numbness, trembling, weak sensations, quivering, head troubles, melancholy.

Chapter 2: on primary shaking that occurs after onset of diseases; nervous pain and flaccidity.

Chapter 3; on melancholy .. its antagonists of drugs and food.

Chapter 4: Bell's palsy, jaw dislocation.

Chapter 5 : head diseases.

Chapter 6: head diseases.

Chapter 7: on epilepsy, nightmares etc.

Chapter 8: spasmodic convulsions, tetanus, nerve and joint troubles.

Chapter 9: on head diseases.

Chapter 10: on head diseases.

Part II : eye diseases; etiology, diagnosis and treatment.

Part III to VIII : description of body organs such as head, nose, ears, teeth etc.

Part IX : on urology and venereology; includes treatment of vagina, uterus, haemorrhoids, kidneys, bladder, penis and other urinary tract or-

gans. He described the use of catheters accurately and invented catheters with side-way pores for the first time in history to prevent its blockage with blood or pus. He also encouraged the use of lead catheters to treat certain cases, mentioned in detail the contraction and narrowness of the urinary tract and favoured the use of bladder perforation (or tapping) in some other cases. He described the treatment of urinary inflammations by using bladder enema with tipped vinegar or opium dissolved in rose water.

Part X : deals with surgery for the treatment of contusions or split joints inwards, treatment of ulcers or inflammations of the genital organs or anal area; surgery of nerves, muscles, cords, ligaments; treatment of nerve confusions, abdomen suturing including those of the mesentery, intestines; ulcers of omentum or arteries, healing of ulcers, vein ramifications, difficulty or easiness in healing of after surgeries applied on different organs. He also discussed surgery of the head, abscesses inside the ears; also dealt with governing rules of the treatment of internal

ulcers and their haemorrhages; bleeding of cut veins. He also mentioned accurately some scientific methods on surgery of removing parts of diseased or gangrenous bone or total amputation. He mentioned abdominal tissue suturing using catguts very frequently. It included also a treatise on anatomy of recurrent laryngeal nerve, was the first to mention the changes that occurred in decayed bones after infection.

Other famous books by Rhazes are: 1-"Al-Mansouri"; he wrote this book specially as a request of the prince Mansour ibn Ishaq of Khorasan and named it after him (this prince looked after and cared for Rhazes during his early medical profession in Persia). This book is smaller in size than the other book (The Continens), he made it more abridged and simplified. This book became very famous during the medieval ages after its translation into Latin.

This book is composed of 10 parts and 19 chapters, of which part VII deals with general surgery "collections from the art of bone fixing, surgeries, ulcers and their treatment", where he mentioned the structure

of the different organs and temperaments of the human body, forces owed to foods and drugs, and health conservation.

Part IX deals with internal diseases and their treatments. The book's most important part is that dealing with anatomy where he discussed ophthalmology and eye surgeries specially cataract extraction or removal.

2- "Small-Pox and Measles"; this book is considered one of the most valuable books on medicine, where Rhazes put down all his personal experiments and experience together with his keen observations as a physician who knew how to examine the patient and come out with accurate conclusions and results about his disease, which denoted Rhazes, great brilliance and understanding. This book was translated into Latin and was considered one of the most important text-books on medicine in Europe. He was the first to distinguish between small-pox and measles, revealing the symptoms of each separately, also showed that elevation in temperature helps to spread the rash, and advised to use cupping for the

fever to decrease.

This book was considered the best one dealing with epidemics and infective diseases, describing rashes, their relation with the rise in temperature and its spread. Rhazes emphasized in this book on the importance of checking the heart, pulse, respiration and faeces, also mentioned several methods for the protection of the face, eyes, mouth and to guard against the formation of deep scars.

3- "For those who can not get a physician"; this book was commonly known as "the book on medicine for the poor", and comprise simplified ways of treating some diseases with simple kinds of food.

4- "The Benefit of Foods"; this book is a kind of information on preventive medicine, composed of 19 chapters, in which Rhazes gave mention of the benefits of some food stuffs such as wheat, bread, potable water whether hot or cold or even ice, also benefits of some sugary drinks or non-sugary syrups and also their side effects. Also mentioned meat whether fresh or dried and their side

effects; cooked food, cheese, olives, pickles, milk, eggs, legumes, spices, fresh or dried fruits and different types of sweets and candy.

He thus discussed the harmful effects of these foods taken orally and showed their appropriate time of intake and those which sick persons should avoid so as to help in their recovery. He believed that absence of some food elements in the diet brings about certain diseases. This book comprised also description of animal organs with their benefits and characteristics.

5- "Secret of the Secrets"; this is one of the most important book of Rhazes on chemistry, and his knowledge about it had a great influence on his medical practice which made him the first to use it in medicine in his time. It shows the high degree he attained in that matter and so he is considered the founder of modern chemistry second to Gaber ibn Hayyan.

He attributed the recovery from illness to certain chemical reactions undergone in the sick body. He divided the known chemicals in nature into : mineral, vegetable, animal

and those inbetween. Minerals were divided into six big groups owing to their enormous number, thus showed his great experience and experimentation and true knowledge of its reactions. He emphasized on the importance of performing experiments and individual experience and trials in treating the patients with chemicals, and considered them as more valuable than just rearing the medical books. He also considered experimentation as a true science governed by specific rules and regulations which all practitioners should know perfectly.

Rhazes tried some chemicals, acids and drugs on himself such as using acid vinegar as gargle several times daily as astringent in case of inflammation of the palate, tonsillitis and sore throat. His system in doing chemical experiments started by describing the materials used, then the tools or instruments necessary for the experiments, followed by procedure.

He described also the method for the separation of gold from its adulterated alloys, distillation of some drugs and method of preparation, use of

calcination for the preparation of compounds such as red mercuric oxide. He was the first to use mercury in skin ointments, also tested mercury and its salts on monkeys (he gave mercury orally to monkeys and noticed the resulted severe abdominal pain). He used chemicals extensively as laxatives.

Rhazes was influenced in writing this book on chemistry by the writings of the great Arab chemist Gaber ibn Hayyan (721-825 A.D) and also from his readings of old Greek, Persian and Indian book on that subject.

He prepared some acids (following Gaber's procedures) such as sulphuric acid (oil of vitriol or green vitriol), also prepared alcohol by distilling fermented starchy and sugary materials and used it in the pharmacies to prepare drugs specially during his stay in Baghbad and Al-Rayy. He was interested in calculating the specific gravity of liquids and invented a special measure which he called "The natural scale".

Rhazes in this book also described more than twenty laboratory instru-

ments made of metals or glass in a clear and understandable way specially these used in dissolution, drug preparations, also blowers, bottles, hoses, cups, coolers, ladles condensers with full details.

6- "Spiritual Medicine"; in this book, Rhazes put the human mind high up in rank, and considered it as the greatest gift of God to man, and that, God gave man both mind and life in order to attain greater benefits as his extreme goal.

Other books of Rhazes are;

"Available Drugs "(Known also as Royal medicine),

"Physician's crisis", "Gynaecology". "Venereology",

"Bladder and kidney stones", "Wisdom Handcraft" (i.e. Chemistry), "Hippocratic medication" (in which he was the first to reveal that insect-causing scabies and gave full description of it), "The Compendium", "Introduction to natural science", "The Sufficient one", "The Exquisite one". "The Proof", "The Devine Science"... (the last six book were translated into latin).

Rhazes wrote also some treatises, of them; Treatise on "Reasons for catching cold in spring after smelling roses" (here rhazes was the first to mention cases of running nose due to allergy towards smelling pollen grain of some flowers),

Treatise "Time, place periods, ages and void", Treatise "Structure of the Universe", Treatise "Reason of earth's creation inside the universe", Treatise "Reason of movement of the Universe circularly",

Rhazes thus proved to be the founder of a great school of medical

philosophy in the Islamic empire. He represents those practitioners who took great care in handling diseases and their diagnoses, in a philosophical way aiming at the end to cure the different diseases using careful observations and signs (in contrast to Avicenna who belongs to those methodist physicians and got interested in medicine as a part of indispensable knowledge, cared a lot with its organization and logical classification.. thus was considered as a follower of these philosophical physicians).

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आयुर्विज्ञान के विकास एवं प्रगति में रेजेस का योगदान

– समीर याह्य अल गम्माल

बाल्यावस्था से ही रेजेस को संगीत से बहुत लगाव था, फिर उसने दर्शन शास्त्र का अध्ययन किया तथा इस संबंध में अनेक पुस्तकें लिखीं। तत्पश्चात् वह रसायन शास्त्र एवं आयुर्विज्ञान के अध्ययन में रुचि लेने लगा। अपनी शिक्षा की समाप्ति पर रेजेस अपने जनमस्थल को चला गया और वहां चिकित्सा व्यवसाय प्रारंभ किया और शीघ्र ही बहुत प्रसिद्ध हो गया। विभिन्न विषयों पर इसके द्वारा लिखित 224 से अधिक पुस्तकों का वर्णन मिलता है। इनमें से इसका सर्वाधिक महत्वपूर्ण ग्रन्थ चिकित्सा – विश्वकोष कर्नटेनेस (अल-हवी) है, जिसने मानवसभ्यता, विशेषतः यूरोप को बहुत प्रभावित किया।