Medicine in Ancient Assyria and Babylonia

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Introduction

History

Knowledge of Assyro-Babylonian history and civilization was obscure until the nineteenth century. Available information was limited to a few paragraphs in the Old Testament of the Bible and sketchy information by the Greek historian Herodotus. Assyria was thought to be an extinct nation and Assyrians were remembered predominantly as a warrior race. Knowledge of the significant Assyrian contribution to successor civilizations remained buried deep in the sands of Mesopotamia.

In the following short commentary, Herodotus inaccurately characterized the extent of and the attitude towards medicine in ancient Assyro-Babylonia: (1)

"Having no use for physicians, they [the Babylonians] carry the sick into the marketplace; then those who have been afflicted themselves by the same illness as the sick man's or seen others in like case, come near and advise him about his disease and comfort him, telling him by what means they have themselves recovered of it or seen others to recover"

It was only in the 19th century, and through the inspired work of European archaeologists in Mesopotamia, that the world learned of the importance of medicine in Assyro-Babylonian times. Not until then did we begin to appreciate the true measure of their legacy.

The discovery of Ashurbanipal's library by the Assyrian archeologist Hormuzd Rassam (2) and Sir Henry Austin Layard, and the finds by German archaeological teams in the city of Assur, unearthed many thousands of clay tablets, which included approximately two thousand categorized as medical tablets. In December, 1901, the French Orientalists Jacques de Morgan and Jean-Vincent Scheil, while excavating Susa, the ancient capital of Elam, discovered and translated the diurite stela code of Hammurabi. Hammurabi's Code, as it is generally acknowledged today, contains 282 laws which cover all areas of social life, eleven of which are related to medical practice. The discovery provides indisputable evidence of advanced medical knowledge in ancient Assyria and Babylonia, contradicting previously-held notions such as those of Herodotus. Sadly, quite a large number of these documents remain to be translated. As of 1965, over 500,000 clay tablets had been found. In the last 25 years, this trove

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has been enlarged by periodic finds, with no end in sight. Indeed, even if we made the unrealistic assumption of no further discoveries, it would still take decades to decipher and translate what is on hand. The task becomes more daunting when it is recalled that the earliest tablets were deciphered and translated by scholars, who, while most dedicated, possessed a limited knowledge of ancient languages. The ongoing re-evaluation of earlier scholarship simply adds to the work yet to be completed.

The publication of reference tools, such as the English-language *Chicago Assyrian Dictionary*, and *Das Akkadisches Handworterbuch*, a German-Assyrian dictionary, has facilitated accurate translation. In 1969, in his brief review of the history of medicine in ancient Mesopotamia, Dr. Robert Biggs offered the following observations:

"In the years between the World Wars, medicine received due attention from Assyriologists. The principal authors of general surveys during this period were B. Meissner, whose few pages on medicine were a masterly summation, and G. Contenau, a staff member at the *Museum du Louvre* and himself a physician, who wrote an entire volume on Babylonian medicine which contributed a number of new insights, but failed to distinguish adequately between the two disparate elements, magic and medicine, which constitute "medical texts".

A great impetus to Babylonian medical studies at this time was the publication in 1923 by R. Campbell Thompson of *Assyrian Medical Texts*, the tablets coming from the British Museum's excavation of the library of the Assyrian king *Assurbanipal* in the ruins of *Nineveh*. When *Nineveh* was destroyed in 612 B.C., these tables were badly broken, but as the fragments were joined to one another, or joined to unpublished fragments in the British Museum, it became possible to reconstruct entire tables dealing with such illnesses as chest diseases, intestinal difficulties, or infections of the urinary tract. Thompson himself published translations of many of these texts. At approximately the same time a German scholar, E. Ebeling, published a number of medical texts in his *Keilschriftexte aus Assyr religiöser Inhalts* (Leipzig, 1915-9). The texts (some of them from about 1,000 B.C.) all come from the Assyrian city of Assur. These two sites, *Nineveh* and *Assur*, have, in fact, supplied the largest proportion of the Babylonian-Assyrian medical texts known to us.

A significant point in the general history of medicine was reached in 1951 when Henry Sigerist published the first volume of his *History of Medicine*, entitled "Primitive and Archaic Medicine", dealing principally with Egypt and Mesopotamia. Although modern study has fully concurred with Herodotus in his high opinion of Egyptian medicine, with its many specialists, the Mesopotamian evidence is more elusive, partly because the textual material is so extensive, and so little of it is available in competent editions. Sigerist recognized certain rational elements of Babylonian medicine, but overemphasized and confused the magical and religious aspects, partly because of his erroneous idea that the physician was a priest and, in early times, a
diviner (a conclusion based on an incorrect etymology of the word for physician). Labat, in an important review of Sigerist's book, emphasized the necessity of distinguishing two distinct elements in the "medical" texts, the magical (ipu) and the therapeutic (asūu). E. Ritter has recently studied these two approaches in some detail and has attempted to determine under what circumstances a magical or medical treatment was considered appropriate..." (3)

Other Assyriologists have made significant contributions to the history of Assyro-Babylonian medicine, including but certainly not limited to the following: A. Leo Oppenheimer, M. Civil, Erica Reiner, Robert Biggs, J. V. Kinnier Wilson, Guido Majno, Franz Kocher, Pablo Herrero, P. B. Adamson, Martin Stole, J. M. Durand and Dietlinde Goltz.

**Concepts Of Life And Death**

Assyro-Babylonians were very religious and believed that God created man and gave him the breath of life as a gift from the gods. Marduk was considered the creator of man, although other gods could also provide the gift of life. This can be perceived in such names as Ashur-bani-pal which translates as "Ashur has given a son;" or Sin-akhi-rib, literally meaning "Sin increases brothers."

Every person had a fate or a certain destiny arranged by gods. The course of this destiny could be influenced or changed by divine pleasure or displeasure. It was believed that every person had a divine spirit or guardian angel, protecting him from evil spirits and demons, illness, failure, and mishap. Wrong-doing or committing a sin angered the gods and resulted in abandonment by the protective spirit. The loss of this protective spirit was the cause of personal failure, misfortune, and illness (allowing disease-generating demons to enter the body, leading to premature death). The pleasure of the gods was maintained through prayer, sacrifices, and observance of the divine laws. Mothers employed amulets on their children for protection from evil spirits. Winged bulls were placed on the entrance to palaces to guard the king and his court. The Assyrian word for these winged bulls, lamassus or kurub (4), may be the origin of the word "cherubim" or "cherub."

The gods could not only cause death but could also raise the dead. Marduk was considered the resurrection of the dead. The gods Gula and Shamash were also given this title, although it is more probable that they were the healers of the sick or dying.

These concepts of divine nature and the sources of life and death may explain the relative indifference toward knowledge in anatomy and physiology.
Personal Hygiene

Assyro-Babylonians washed their hands before and after each meal. Anointing the body and hair with oils was considered essential at all socio-economic levels of society. This served the double purpose of softening the skin which was irritated and dried by the scorching sun and dry climate, and killing vermin in the hair. Houses had bathrooms with asphalt floors. The wealthy had bath tubs in their homes. A mixture of oil and alkali provided them with liquid soap. Toilets were found in houses connected to sewage systems constructed of tile pipes and brick which drained bath water and toilet waste to the exterior and eventually out of the city.

Ear scoops, toothpicks and combs are found in the ruins of private homes. Uncleanliness was considered a cause of disease. The body was to be kept clean and away from lice, flies and mosquitoes.

Public Health

Drinking water came from wells, rivers, and canals. There seems little doubt that these sources of water were often contaminated and that intestinal parasites and diseases occurred quite frequently. Taboos of all sorts were attached to the various sources of drinking water, as it was well known that the welfare of the country depended largely on them. It was considered a sin to pollute them with human waste; even spitting in a river was considered a punishable act.

An organized and strict system of public health was established. Epidemics were reported immediately and most probably quarantine was implemented. Several reports have been found, documenting epidemics occurring in various cities or neighborhoods. The high degree of organization and administrative attention given to epidemics can be seen in the accurate reporting of the total number of afflicted and the steps taken to prevent the spread of disease into surrounding areas. Some reports seem to indicate that the entire population of certain towns had been evacuated and resettled in another location in response to particularly virulent epidemics. The spread of deadly diseases such as plague (sibitu) and pestilence (mutanu) were well recognized.

Assyrian Healers

Gallabu

The barber (gallabu) who was mentioned in Hammurabi's Code served various functions in Assyro-Babylonian society. His services were employed to brand slaves on the forehead or hand with the owner's identification mark, and may have performed dental extractions. It is interesting that, as in many later civilizations including the early American, the barber provided dental services to the community. The term used for the surgeon's knife (naglabu) literally means "barber's knife".
Baru

The "baru" was in a specialized category and higher class of the priesthood, being a diviner and interpreter of omens. His role in medicine was mainly as a prognosticator. After prayer to the gods for guidance, the baru sacrificed an animal, usually a sheep and based the prognosis of the patient on extispicy and inspection of internal organs, especially the liver (hepatoscopy). He would also be able to predict events in the country or in the lives of individual people based on these examinations. The baru had to be physically handsome, healthy, and without observable blemish or defects. A mere chipped tooth or skin mark would disqualify one from being a baru. The chief diviner or "Rabi Bari", whose services were employed by the royal court or temple, oversaw the performance of the other diviners.

Ashipu (Mashmashu)

The "Ashipu" was from the class of clergy, carrying considerable prestige, and was well-educated and trained. He wore red garments and, while performing his ceremonial routine, he would wear an animal mask (typically that of a fish, lion, eagle or scorpion).

His particular function was one which had a major psychological impact on the patient and his family. He would carefully examine the patient from head to toe, investigate complaints and symptoms, and conclude with a diagnosis. This latter diagnosis would reveal whether the disease resulted from "the anger of a god", "the hand of a ghost", or from possession by a demon or evil spirit. Then he would proceed accordingly, performing the rituals necessary to remedy the illness. These remedies may have included: 1) incantation; 2) prayers; 3) libation; 4) laying hands on patient; and 5) medications (usually unpleasant putrid or nauseous substances intended to drive out disease-causing demons). The ultimate aim was to placate the angered gods by any means available.

Evidence of acts of exorcism depicted on some amulets have been uncovered. The most interesting is the exorcism of the dreaded demon, Lamashu who usually attacked pregnant women.

Before approaching the patient, the ashipu was required to cast an incantation upon himself. In a series of medical tablets translated by René Labat, and published under the title Traité addakién de diagnostic et pronostic médicaux (Treatise on Medical Diagnostics and Prognostication, abbreviated as "TDP") (see section on Medical Knowledge), a tablet advises the ashipu:

"If in your approach to the sick man (you have not yet done so) until you have cast an incantation on yourself, do not approach him in order to cure him" (7)
This seems to indicate that the *ashipu* requires an incantation to protect himself when approaching or touching a patient, most probably to prevent transmission of a disease from the patient to himself. But there could be another interpretation, namely, that having been exorcised from the patient, the demons might well turn upon the healer. The concept of demons leaving one person only to attack another is evoked in the New Testament, (Mark, Chapter 5).

There is evidence that the *ashipu* may have cooperated with the "asu" (discussed below) in the treatment of some patients. The *asu*, another healer, was called to continue treatment if the *ashipu* failed. There are indications that the *ashipu* was usually attached to a temple and royal court. Again, there was a chief *ashipu*, the "rab-ashipi" appointed to supervise the functions and practice of *ashipus*. Finally, there appears to have been female *ashipus* who were called "*ashipta*".

**Asu**

The "asu" (physician), contrary to the *ashipu*, was not a member of the clergy and was categorized as a craftsman. The Sumerian word for physician, *azu* (*asu* in Akkadian), has traditionally been etymologized as "he who knows the waters." This concept has been questioned by Biggs (3), based upon recent findings dating to the third millennium B.C. It can only be said that the etymology of this word remains unknown. The law code of *Hammurabi* only mentions the *asu* and the regulation of the practice of medicine. The early medical records discovered, dated as old as 2150 B.C., as well as other evidence including prescriptions and texts from the third millennium B.C., attest to the practice of medicine (*asūtu*).

Information is as yet unavailable concerning the social status, training, and practice of physicians. From "The Tale of the Poor Man of Nippur" (8), we learn that the *asu* was clean-shaven including the scalp, wore scanty clothing of patterns distinctive from the general population. He carried a bag containing instruments, bandages, herbs, various other medications and a censer and may have advertised his services and the source of his training. In one tablet from his library, Ashurbanipal writes:

"Healing-prescriptions (effective against diseases) from the top of the head to the (toe)- nails, (including) the non-canonical collections, the most expert learning, the great physician's craft of Ninurta and Gula, whatever was formulated, on tablets I wrote down; I checked them over, examined them; then for my reading and reciting again and again (on request), I deposited them forever within my palace" (7)

This excerpt indicates that the *asu* is a healer and uses "healing-prescriptions", and his patron gods are "Ninurta" and "Gula".
Physicians worshipped the healing deities "Ninib" and Gula in particular. Ninib, Enlil's son, was invoked by the physician and patient alike. Gula, his consort was the great female physician who resurrected the dead by touching them with her pure hands. She was the goddess of potions and poisons. Ninazu, the "Lord of Physicians", was another important healing deity. The emblem of his son, Ningishzida was a double-headed snake (9). The present-day medical emblem with the serpent is a variant of this emblem.

- The asu not only was a well-trained technician, but must have had some scribal training to be able to use medical tablets as a source of information and reference. Rarely resorting to incantations and supernatural methods, the asu examined the patient and from the signs and symptoms made the diagnosis, prescribing treatment accordingly. The methods of therapy included:
  - Bandage: pressing medication on a cloth or strip of skin and applying on affected parts of the body. The use of bandages was a common method of therapy. The effectiveness of bandages is demonstrated by a common curse against those who deface the code of Hammurabi, "...a persistent sore that the physician cannot relieve with bandages"
  - Massage: massaging and rubbing the body and affected organs with oil, ointments, etc.
  - Lavage: use of lavage for eyes, or sponging the body for sunstroke and skin diseases or wounds.
  - Salves: use of medicinal ointments to smear eyes, wounds or skin lesions.
  - Tampons for insertion in ears, rectum and vagina.

Others suppositories, enemas, purgatives, pills, potions, fumigation, catheterization (urethral and rectal), instillation, insufflation, inhalation, bone setting, and surgery.

In some medical texts, the comment "tried and tested" followed the prescription to emphasize the effectiveness of medication.

During his thorough examination, the asu would check pulses and the temperature in several parts of the body (10). It seems that physicians were aware of diurnal fluctuations of temperature and the regression of fever in the morning, in certain disease states (11). This is well demonstrated from texts dating to the Middle Babylonian period. A physician, caring for hospitalized female students from a music academy, was reporting the condition of his patients twice daily.

Physicians were attached to the royal court with a chief physician ("rabasi") in charge of the medical team. Women physicians were called "asu\. Physicians did not work on the 7th, 14, 19th, 21st and 28th days of each month. Those particular days were considered to be unlucky. (9)
Ethical issues in the practice of medicine are certainly not just a modern medical and public concern. Evidence of ethical considerations for the practicing physician have been identified in ancient Assyro-Babylonian times. The right-to-die issue which is currently embroiled in courtroom debate was addressed in ancient times. It was considered unethical for physicians to attend a hopelessly dying patient, as in the following illustration:

"If a man suffers of *ahhāzu*-disease, his head, his face, his whole body and even the root of his tongue are affected: to such a sick the physicians shall not put his hand, such a sick man will die, not recover" (9)

In the Assyrian empire, physicians in the service of the royal court, along with other officials and craftsmen, were required to take an oath of office.

"To the king, my lord, your servant *Iššār-*šum-erēš: May *Nabu* and *Marduk* bless the king my lord. The scribes, the seers (*bara*), the magicians (*āšipu*), the physicians (*asu*), the bird gazers, the courtiers, residing in the city, took the oath (of office) on the 16th of *Nīṣan*. Accordingly, tomorrow they may swear allegiance to the king" (9)

Physicians were supposed to provide certification for patients who were unable to report to work, so as to excuse them from their duties until their full recovery. This certificate was respected by the civil authorities, even by the king. The king was often petitioned by his subjects to send a consulting physician to visit patients and assist the attending physician. Following such consultations, detailed reports of their work were submitted to the authorities. The petitioners were not limited to the upper classes, reports indicate that royal court physicians were sent to treat patients from all walks of life. The following appeal was addressed to the king:

"The servant of the king; the woman, *Baugamelat*, is very ill. Therefore, o king, my master, order that a physician to be found; he must come; he must see her." [7,12,13] Here they want physician *bel-*ubani, [master of pulse] to come see her. [It is possible she had heart problems or some kind of arrhythmias]"

In another record, request is for the *bel*-imti, or the "master of the knife" (most probably a surgeon). The following is an appeal to the king to send a physician to a town or military outpost:

"To my Lord say this: thus speaks *Itur-Asdu*, thy servant. There is no physician, no mason. The wall is crumbling, and there is no one to rebuild it. And if a sling-stone wounds a man, there is not a single physician. If it please my lord, may my lord send me a physician and a mason" (14)

- Numerous texts attest to the fact that physicians were also sent to treat the kings of friendly countries. For example (13):
• The Babylonian king Kadashman-Enlil (reigning 1279 - 1265 B.C.) requested the return of a certain physician who had been on loan to the Hittite court for a number of years.

• In 1280 B.C., the Hittite monarch Hattusil asked the Babylonian king to send an asu and an ashipu to his court, for his treatment. It seems that Hittite kingdom was exclusively dependent upon Assyro-Babylonian medical science.

• A physician was sent to treat the Egyptian pharaoh, Amenophis III. Egyptian physicians, though highly advanced in medical knowledge, occasionally consulted Assyrian physicians.

• To cure the illness of Tushrata, King of Mitanni, a statue of Ishtar of Nineveh and a physician (asu) were sent.

Medical Education

As yet, no documents have been discovered which describe the specific aspects of the training of physicians. Schools were established in temples, complete with library and priest-librarian. There was an indexing system and tablets were classified according to subject matter. Medical tablets have been found in these temple libraries, although there is no proof that medical sciences were taught in these temple schools. As documented earlier, the royal libraries also contained large numbers of medical tablets. One piece of evidence that medical training was carried out in an organized fashion can be extracted from the famous Tale of the Poor Man of Nippur (8). We learn that, traditionally, physicians from Isin were famous possibly because of an old medical academy located there. The city of Isin was a cult center of Gula, the goddess of healing and other healing deities. Recent excavations in Nippur, the ancient religious center of Mesopotamia, by a team from the Oriental Institute of the University of Chicago, resulted in the discovery of a very large temple (15). According to Professor McGuire Gibson, team leader at the excavation site, the temple is believed to honor Gula. Further discoveries from this particular site may shed new light on the origins of Assyro-Babylonian medicine and specific aspects of medical education.

Dr. Robert Biggs comments:

"No doubt there were various levels in the training and skill of physicians. It is not known for certain that they were literate, but if they were themselves able to read the medical texts, a long training in the scribal schools before their apprenticeship would be implied. It should be stressed, however, that we do not know to what extent the medical texts served as handbooks for actual medical practice, since illnesses covered in the texts are rarely referred to in letters, while wounds and broken bones, mentioned in letters, are not included in the written medical repertory" (3)

The physician's training should naturally have included training in the pharmacopeia. It is to be expected that copies of the material necessary for a physician's education and medical practice would be made. In some medical texts there is indication that they were copied by an apprentice physician called asu agashgu (8,11) The lack of physical evidence documenting
formal medical education may infer that the medical profession was a family tradition and therefore taught individually, father to son. Fragmentary evidence of this may be read in a cylinder seal, Makur-Marduk, a physician indicates that he learned the craft from his father.

A large number of the discovered medical texts describe the signs and symptoms of diseases in different parts of the body and prescribe medical, pharmacological and magical intervention. Surprisingly, there is almost no information uncovered describing surgical therapy, techniques, or procedures. Not a single document has been found which describes the treatment of the war wounds. René Labat provides a possible explanation:

"The scribes did not try to record all existing knowledge. They concentrated only on those traditions that required an aide-memoire, a written guide, leaving the rest to oral transmission. So they never bothered to describe the daily tasks of most artisans". (14)

Medical Knowledge

Our information about the nature and extent of Assyro-Babylonian medicine is derived from translations of the original cuneiform tablets. These consisted of a series of medical tablets used as handbooks, collections of prescriptions, medical letters and reports, references in law codes, and allusion in legal or literary texts. The majority of the medical tablets were found in two major libraries: the collection found in the royal library of Ashurbanipal in Nineveh, and those from the ancient city of Assur. These tablets date from about 1000 to 612 B.C. Many of the tablets were found broken and in some instances pieces of a single tablet were dispersed in different institutions. It has taken many years of scholarly and investigational effort to find different fragments and join them together.

The majority of medical texts from the British Museum, discovered in the royal library in Nineveh, were published in 1923 by Reginald Campbell Thompson under the title "Assyrian Medical Texts" (AMT) in London. The texts from Assur were originally scattered among different older publications. Recently, they have been presented by Franz Köcher in "Die Babylonisch-Assyrische Medizin".

In addition to the texts mentioned above, numerous tablets have been found in other cities of Mesopotamia such as Nippur, Ur, Harran (Sultantepe), Boghaz Keui (Hattusa, capital city of Hittite Kingdom) and other sites in the ancient Assyrian empire. Oppenheim comments that

"The main characteristic of this entire corpus of documents is the fact that their content, arrangement, and even wording is rather constant throughout the more than one millennium of attestation. They form a body of texts which must have originated in Babylonia in the middle of the second millennium, and which was carefully maintained by the tradition-conscious scribes who copied these tablets until the second half of the first millennium. For the historian of medicine this is rather important because it means that all these texts can be utilized solely as evidence for the
practices and the medical knowledge of the physicians of the earliest period—the Old Babylonian. Later copies, or copies found outside of Babylonia, do not reflect actual practices but rather testify to the scholarly interest of the copyists." (8)

These medical texts belong to two clearly separate traditions, originating in the "Old Babylonian" period, and this differentiation is essential to the understanding of Mesopotamian medical science.

From the evidence, the two traditions, or schools, appeared to have co-existed from the beginning of medical practice in Mesopotamia. Leo Oppenheim (6) refers to them as the "practical" and the "scientific" traditions. Others have used the more descriptive characterization, "therapeutic" (in lieu of "practical") and "diagnostic" (in lieu of "scientific").

The therapeutic tradition was that of the practitioner of medicine, and it recorded the lore of the physician. Most of the texts of this type, termed by Assyriologists as "medical texts," follow a typical pattern characteristic of Assyro-Babylonian scribal practice. They are somehow similar to the "omen texts" and are arranged in an organized fashion. The usual format for these texts is to begin with the statement: "If a man is sick and has such and such symptoms." Subjective symptoms and objective signs are usually described in detail. This is followed by: "You prepare the following." What follows are instructions as to what ingredients are needed, their preparation, and the application of the cure in technical terms. Each prescription usually concludes with the assurance that "he will get well" although the physician at times was warned that the patient would die.

Numerous variations or elaborations can be included in the prescription. For example, specific quantities of ingredients to be used, the time of day and how often to administer the therapy, and sometimes warning on the toxicity of certain ingredients (16). Some texts present a diagnosis and the given name of the disease, while others refer to the etiology of the illness. The etiology of the illness may have included evil magic, sin, or touching and contact with another ill person. The majority of the tablets contain prescriptions listed either according to symptom or to the affected parts or organs of body.

The diagnostic group has a large number of tablets characterized as diagnostic and prognostic omens. The most important document in this tradition is the series SA.GIG (in Akkadian, "Sakikku"). This series consists of 40 tablets, the first of which has the incipit "when *ashipu* (exorcist or conjuror) goes to the house of a sick man". This series of tablets was edited by René Labat under the title *Traité akkadien de diagnostic et pronostic médicaux* (Treatise on Medical Diagnostics and Prognostication, abbreviated as "TDP") (17). The complete collection is comprised of 3000 entries or syndromes. The first two tablets are not strictly medical and in fact are omen texts, prognoses based on the encounters that *ashipu* has with animals, persons, and other portents en route to the patients home. The subsequent tablets contain information derived from the *ashipu*'s observation of the patient. The arrangement of these observations is from the top of the head to the feet and toes.
The TDP is divided into five books. The second section, consisting of 12 tablets, is organized according to the parts and organs of the body in which the symptoms are observed. Based on the affected part or organs of the body, the ashipu derived the diagnosis, naming the disease and sometimes naming its cause, and predicted the outcome. The entries range from simple observations such as "If his tongue is red, he will recover" to more complex syndromes such as "If his face and eyes are inflamed, the rims of his eyes are red, his breath is hot, and he cannot pass urine, it is the hand of god Ninurta". And, "If he suffers from his middle and his belly, he cannot eat or drink, and his eyes cannot focus, he will die". (11)

The third section, ten tablets in all, deals with the progression of the illness on a day by day basis or for periods as long as months. At the end of this section, syndromes are listed indicating specific disease. Some examples being:

"If, having been ill four days, he keeps putting his hand on his belly and his face is overcast with yellow, he will die...If, having been ill for five or ten days continuously, he suffers from chronic difficulty in breathing (?), he will die...If a man's body is yellow, his face is yellow and his eyes are yellow and the flesh is flabby, it is jaundice" (18)

The fourth section, contains ten badly damaged tablets. In what is left of these, references can be found to the treatment for specific disorders, and various syndromes are described. For example,

"If something like sleep keeps taking him, if his limbs are unsteady, his ears sing, his mouth is gripped and cannot speak, it is the hand of alu-demon...If, after washing with water, as he comes up from the river he is taken with convulsion and falls down, the croucher-demon of river has struck him"

There is a listing of diseases under the general term "Fall", found in the third and fourth books; we will return to this topic in our discussion of neurological and mental disorders.

The fifth book (consisting of 6 tablets) relates to women's diseases, pregnancy and delivery, and children (further comments below, in Gynecological and Obstetrical Problems).

The final chapter (a lone tablet) is on infants.

The therapeutic medical texts do not specifically mention children's illnesses or the treatment of infants. This was apparently in the domain of the ashiptu or magician. However, based on information derived from medical letters, there is some evidence of physicians treating children.

Despite its medical contents, the diagnostic prognostic series (TDP) is strictly a part of Assyro-Babylonian omen tradition and there was no medical therapy involved. It can be seen that some of these sections were based on rational thinking, while others on superstition. It is
not known to what extent the ashipu used the TDP texts in practice. It's main usefulness may have been to identify the god to be addressed in prayers or consultation for healing the patient. There are some omens accounting for birth defects, childhood maladies, and multiple births. These were usually related to the fate of the country or community.

Whenever a treatment is prescribed, which is rarely the case, it is not medical but exclusively magical. Even the names of the diseases mentioned are not medical; as a rule they point to an angry deity or some demon.

**Anatomy and Physiology**

It is certain that mumification was not practiced in Mesopotamia. Therefore, it is unlikely that human corpses were dissected. Thus, knowledge of human anatomy in Mesopotamia was significantly less than in Egypt. However, exsurgency was highly developed among Assyrians with detailed observations of the internal organs of sacrificial animals. They carefully studied the liver, gall bladder, kidneys, intestines and lungs. Numerous tablets have been found which depict these organs including some with anatomical aberrations or anomalies.

Physicians were definitely aware of human anatomy, with documented names for all the parts and organs. (9) This knowledge must have been obtained by analogy with animal (mostly sheep) anatomy, or directly from humans during surgical exploration of wounds.

Their understanding of physiology was even shallower than anatomy. Since the etiology of disease was based on supernatural powers, they did not attempt to evaluate and understand the physiology of the human body.

Heart - The heart (Libbu) was the center of emotion as evidenced by changes in heart rate during excitement or emotional outburst. It was also considered the center of thinking and intelligence. The term "libbu" not only was used for the heart as an anatomical organ but also as a general term for the internal contents of the abdomen, including the stomach. Today's Assyrians, similarly use the term "libba" for both the heart and the abdomen.

Liver - The liver ("kabittu") was deemed as the seat of the soul and the center of life. This was the basis for hepatoscopy. The intentions of the consulted god would be best reflected in the liver of the sacrificial animals. There have been a number of clay models of the liver found during excavations. These clay models may have been used for teaching purposes. During excavation in Mari (9), 32 clay models representing abnormal livers, were discovered. The science of hepatoscopy spread from Mesopotamia to the Middle and Near East and as far as Italy, and was practiced many centuries after the fall of the Assyrian and Babylonian empires. The liver was also considered the seat of affectivity and the organ that was responsible for the production of blood; it was also the center of energy. The connection was made between bile and the liver, since the gall bladder was associated with jaundice.
Kidneys - The kidneys ("kellitu") were recognized as the center of physical strength. It must have been known to them that urine was produced in the kidney, as they were checked, along with the liver and other organs, during divination. Kidney stones and the different types of renal calculi were documented.

Spleen - The function of the spleen ("tulima") was unclear, but the organ was described in medical texts in such terms as "hurting" or "standing". (16)

Intestine - The intestine ("irru" or "gerbu") was obviously known as a part of the digestive tract and was examined during extispicy.

Lungs - The function of the lungs ("hashu") in breathing was recognized, as was the association of the lungs to shortness of breath, cough, etc.

Abdomen - center of emotion

Stomach - center of living

Uterus - center of compassion

Ears & Eyes - seat of attention.

Blood - Blood ("danu") was considered the source of life; (arterial blood known as "day blood" and venous blood known as "night blood"). The importance of blood in sustaining life was well-known. Physicians checked the pulses, but we do not know if they were aware of the principles of circulation. The veins and arteries were known as "sherianu." Blood was also known as a possible carrier of evils, causing disease; this concept became the basis for the practice of blood-letting.

Brain - The brain ("muhu"), although given a name, was not mentioned

It is interesting that after several thousand years, other cultures continue to allude to similar beliefs. For example, we have all heard such colloquial expressions as heartless, heart-stricken, heart-broken, kind-hearted, bright-eyed, eye-opener, choleric, and gutsy.

Etiology Of Disease

Assyro-Babylonians, like all ancient peoples, believed in evil spirits. These spirits were everywhere, wondering in ruins, cemeteries, and deserts. They hid themselves in dark places and roamed the city streets and country roads at night, always looking for an opportunity to assail human beings. If a person was careless, committed sin or otherwise angered a god, the divine protection would be denied and he would fall prey to virulent demons and disease-causing evil spirits.
Black magic and witchcraft was another supernatural cause for illness. Therefore, the average man felt haunted and always in danger of becoming possessed, bewitched or attacked by demons. Hence, he tried to live a righteous life, being careful not to break the divine law. A certain measure of protection was believed to be afforded by amulets. Religious duties were carefully performed to satisfy the deities.

"By way of comparison, we may say that today, we know that we live in a world which is haunted by bacteria. They are in our homes, in the food we eat, in the air we breathe, in the dust of our cities; and if we climb a high mountain where the air is pure and the soil is covered with virginal snow, we still cannot escape bacteria because we carry them with us, having millions of them in our intestinal tract. And yet we are not afraid of them. If we live hygienically, keep fit, and possess not amulets and charms but the necessary immunizations, they have no power over us even though they get the better of us sometimes without apparent reason" (9)

An individual might have committed a sin, consciously or unconsciously resulting in sickness as a punishment. The concept that disease was a punishment for sin was dominant in the Old Testament of the Bible. Throughout the Middle Ages and even later, epidemics were frequently deemed as punishment for the sins of the nation. Christian doctrine has attempted to overcome this concept by glorifying suffering.

Families in Mesopotamia being closely knit, it was possible for one person to suffer for the sins of his parents or close relatives. Centuries later a question was posed to Jesus:

"[H]is disciples asked him, Rabbi, who sinned, this man or his parents, that he was born blind? Neither this man nor his parents sinned, said Jesus" (19)

Today, infants suffering from congenital syphilis, the innocent victims of their parent's sins, are termed "pueris insontium" meaning syphilis of the innocents.

Biggs comments:

"It is incorrect to assume, as has been done, that all illnesses were due to witches, demons and other malevolent beings (against which one might consider a magical treatment particularly appropriate) or to divine displeasure, since the effects of heat, cold, indigestion, etc., were recognized" (3)

Injuries sustained by obvious means such as fractures, wounds, sickness or injury incurred by living creatures (snake bites, mauling, etc.) or definite substances such as intoxication (alcohol, etc.) were not attributed to supernatural causes and no magical treatment was advised or practiced. Meissner cites a physician's letter rejecting the king's idea that his illness might be due to some wrong-doing.
Transmission of disease through air, water and food was recognized (20). One letter referring to a female patient indicates the communicability of some diseases by one person from another. That same letter includes the injunction that "no one drink from the same cup, sit on the same seat, sleep in the same bed, or enter her room." The illness of this female was obviously viewed as contagious, and the letter reveals an application of the principle of quarantine for such cases (3,20).

The role of insects in the transmission of disease may have been suspected. "Nergal", the god of pestilence, was represented by an insect or fly.

Problems of the Oropharynx

Henry Sigerist, in his book entitled History of Medicine has discussed a few oral problems from the medical texts. For example, concerning bad breath ("jetor") and salivary problems:

"if a man's saliva comes when he is talking and he ejects his spittle into a man's face, his teeth ache, his mouth hurting him, the eructation of... the saliva in a man's mouth does not cease to flow, that man has been bewitched" (9)

In these instances, therapy appears more rational without magical involvement. Various prescriptions are identified. A potion of mustard, "oak galls", licorice root, and "liquid-ambar" has been suggested. Another prescription includes "tamarisk galls", galbanum, fir turpentine, and pine turpentine all mixed together in a potion with astringent and disinfecting properties. A serious condition is described with symptoms including pain in the mouth, twisting of the mouth to one side, inability to speak, facial paralysis or hemiplegia (9).

Two interesting oro-pharyngeal problems have been discussed by J.V. Kinnier Wilson (21). The first is "Bushanu"-disease; a name derived from the verb "ba ashu" (to smell bad). Bushanu-disease or "stinking disease" was interpreted by Kinnier Wilson to be scurvy or vitamin C deficiency. The prescriptions and incantations for this disease are found in the therapeutic text tablet series which concerns the teeth. Bushanu-disease has also been associated with tooth worm ("nalu") (tooth decay). This disease is expressed as foul smelling mouth with painful, swollen and bleeding gums. One treatment is use of juice of the thermometer which Wilson believes to be a wild grape. Wild grapes contain vitamin C which is an appropriate and rational treatment for this deficiency disease.

The next problem is a disease classified in the children's section of the TDP, called q-t-Gula. In this disease, the symptoms are described as:

"baby shows signs of suffocation, larynx is constricted, it will not feed at the breast, it is burning with heat (fever) and has stinking mouth"

This could have been diphtheria or epiglottitis.
Dentistry and dental problems will be addressed in a separate article.

Treatment of Epistaxis

The only interesting text related to therapy for nasal problems is some correspondence from Arad-nana, the Rab aššu (chief physician to the Court of King Esarhaddon). For the treatment of nose bleed, Arad-nana orders the following therapy:

"let him hold a tampon of the seeds of...at the base of the nostril...they will then recite an incantation ...and will put it into the nostril according to the text that I sent they should act." (7)

When he is notified that the bleeding continued, Arad-nana writes back

"The rab-mugi reported to me; yesterday toward evening, there was profuse bleeding. Those bandages (tampons) are applied inexperitly; they are placed upon the cartilages of the nose, bandaging the cartilage. On account of bleeding, the dressing (tampon) should be placed inside the nostrils, the breathing will be hindered, but the flow of blood will cease. If agreeable to the king, I shall come there tomorrow and teach them how to do it" (9)

In effect, he is explaining why the previous treatment was ineffective, and he describes the application technique indicated for successful therapy.

Ear Problems

Ear diseases were largely a matter of earache, infections, tinnitus, and varying degrees of deafness. Earache and otitis media were described as "fire extends into the interior of his ears and it dulls his hearing." The treatment included the application of various drugs, fumigation and, on the fourth day, the external ear canal was to be cleaned and "alum" was blown into the ear through a tube. This is well documented in an Assyrian Medical Text, translated by R. C. Thompson.

"If a man...("fire") extends into the interior of his ears and it dulls the hearing, thou shalt mix one shekel of pomegranate-water...two...sprinkle it on wool, put it into his ears: for three days thou shalt do so. On the fourth day, the pus which comes out thou shalt remove, and cleanse (the ear). As the pus exudes and is deposited, thou shalt bray alum, and blow it into his ears through a reed tube, and he shall recover" (22)

Pomegranate juice was often used for ear problems because of its astringency which had been thought to be effective (16).

Ear infections were treated from a long list of drugs. These medications were usually mixed with wool, rolled up, and inserted inside the ear. This is described in another text:
"you roll 7 drugs into tampons, place them in the middle of his ears; proved tampons...you wrap a chunk of salt in a tuft of wool and place it in his ears" (7)

The hand of a ghost seizing a man also caused diseases of the ears and a series of tablets were devoted to them (22).

"If a man's ears hurt him as though it were the hand of a ghost, and makes him swell, thou shalt compound separately oil of opoponax, oil of acorus calamus, oil of pine-turpentine, mix together put into his ears; thou shalt roll up a lump of nitre in wool put it into his ears. Thou shalt mix sweet beer, flour of lathyrus (chick-peas) flour of fenugreek, wheaten flour, flour of roses, flour of cedar in beer, apply and he shall recover" (22)

For chronic, purulent otitis media:

"If from the interior of a man's ear pus comes....If pus gathers in a mans ears. Thou shalt pour pomegranate-water into his ears. Thou shalt bray styrax and blow it into his ears through a reed tube. Thou shalt bray oil of cedar, oil of....and cumin. Roll up wool, put it into his ears" (22)

For the treatment of tinnitus ("singing ears"):

"If, when the hand of a ghost seizes on a man, his ears sing, thou shalt fumigate his ears with seed of juniper, seed of laurel and...by means of fire....Thou shalt fumigate the interior of his ears with fir-turpentine, pine-turpentine, myrrh, cedar, acorus calamus, ferula communis, roses, mercury, eight drugs as a purification for ears, by means of fire" (22)

For deafness or hard of hearing:

"If a man's ears are dull (of hearing) (thou shalt sprinkle) one shekel of pomegranate-water and one shekel of opoponax-water on wool, put it into his ears; thou shalt do this for three days, on the fourth day thou shalt cleanse his ears, bray alum and blow it into his ears" (22)

The above are only some examples of the therapies prescribed for ear problems.

In concluding this section, let me refer to an interesting passage from a letter at the Royal Archives of the ancient city of Mari. Because success has eluded two physicians in their treatment of an ear abscess, the king is asked to send a skilled specialist. The letter, probably dating back to 1800 B.C., was kept in the king's archives.
"To my Lord say this: thus speaks I \textit{Aquim-Addu}, thy servant. A child who is with me is ill. From beneath his ear, an abscess is discharging. Two physicians of mine are tending him but his disease does not change. Would my Lord, now, dispatch his physician to me...or an expert physician, that he may examine the disease of the child, and treat him " (14)

This is obviously a chronic infection with a fistula caused by mastoiditis, a complication of middle ear infection or tuberculosis of the cervical lymph nodes.

\textbf{Ophthalmic Disorders}

Considering the climate of the Middle East, it is not surprising that ophthalmological problems would have been widespread. In fact, a large number of texts discussing eye problems have been found. From the signs and symptoms described in these tablets, we can assume that the conditions encountered by the ancient physician included, among others, itching of the eye lid, photophobia, enteropion, chalazion, pterygium, dacryocystitis, conjunctivitis and iritis.

Medical texts grouped ocular diseases together according to the symptoms, such as: "If a man's eyes are full of blood" or "If a man's eyes hurt". If the eyes were affected in a systemic disease, the diagnosis would be found under descriptions of the appropriate condition. For example, jaundiced eyes were classified in the disease of liver or gall bladder.

Exophthalmos (21) was expressed by the verb "\textit{zaqapu}" meaning "to stand out" or protrude. A fragmented text refers to prominence of the eyes and the dimness of the upper part of vision that could be suggestive of retinal detachment.

Day blindness (Hemeralopia) and night blindness (nyctalopia) recently have been discussed by Martin Stol (23). Animal liver in association with the recitation of an incantation was advised for the treatment of these syndromes. Minced liver was applied to the eyes and, according to some texts, it should be eaten by the patient. Liver is a rich source of vitamin A, and the fact that both nyctalopia and xerophthalmia are caused by a vitamin A deficiency lends some credence to this therapy, although it was only a part of a long ritualistic performance.

A condition when the eyes became dry, possibly xerophthalmia or xerotic keratitis, was often noted during famine. In one prescription, the use of an onion was advised most probably to improve diminished lacrimation. There is a possibility that trachoma was known in ancient times. In some texts there is a description of eyelashes growing inwardly into the eyes. Entropion or trichiasis are both complications of chronic trachoma (21).

Assyrian physicians compiled lists of the diseases affecting the eyes, gave the diagnosis, and made up prescriptions and suggested therapy. These prescriptions were carefully made with accurately measured ingredients. The original powdered drugs were made into tinctures, decoctions, and extracts and then mixed with oils or fats to make ointments. These ointments
were applied to dressings over the eyes. A metal tube or reed was used to introduce the medication into the eyes. Specialized instruments such as a metal blade were employed to smear the medication into the eye or inside the eye lid.

The list of the drugs employed in ocular treatment was long, but only some of these provided a degree of therapeutic value. The nomenclature for the ingredients used in prescriptions may be misleading, in that some of the designations of animal organs in fact might be referring to homonymous plants.

In any case, most ingredients by far were derived from plants (and from their different parts), and included caraway, cassia, cumin, grains, mint, onions, reeds, storax, shrubs, tannin, and thorny plants. Use was also made of alkalies, salts, and minerals such as alum, sulfur and copper oxide. There was widespread resort to honey, wine, beer, oil, and curd, with curd no doubt the most common vehicle for drugs used in treating of eye problems.

The following is an example of an elaborate recipe that was used for a man whose eyes are sick and full of blood, tears coming from the eyes and film closing over the pupils:

"thou shalt beat leaves of tamarisk, steep them in strong vinegar, leave them out under the stars; in the morning thou shalt squeeze them in a helmet: white alum, storax, 'Akkadian salt,' fat, corn flour, nigella, 'gum of copper,' separately thou shalt bray: thou shalt take equal part of them, put them together: pour them into the helmet in which thou hast squeezed the tamarisk; in curd and shunish-mineral thou shalt knead it, and open his eyelids with a finger and put it in his eyes. While his eyes contain dimness, his eye thou shalt smear, and for nine days thou shalt do this" (9,24)

The reference, in the above prescription, to "leave them out under the stars" represented some magical element referring to the supernatural power of the stars.

In a letter found in the royal archives, the court physician (Arad-nana) communicates to the Assyrian king Esarhaddon the nature of the treatment of the eyes of a prince.

"Following prayers and salutation....It is very well indeed with this unfortunate man whose eyes are diseased. I had put a dressing on them that covered his face. Yesterday toward evening, the bandage which held it on I removed. I took off the dressing that was there. There was pus upon the size of the tip of the little finger. Whoever of your gods has put his hand to this case, has himself surely given his orders (explicitly). It is extremely well. May the heart of the king my lord be of good cheer. In seven or eight days he shall be well." (25)

The most important and interesting document in regard to eye therapy is the Code of Hammurabi, Law 215, 216, and 218:
"If a surgeon (asu) has made a deep incision in (the body of) a (free) man with a lancet (?) of bronze and saves the man's life or has open the naqabti: in (the eye of) a man with a lancet of bronze and saves his eye, he shall take 10 shekels of silver."

"If (the patient) is a villein, he shall take 5 shekels of silver."

"If a surgeon has made a deep incision in (the body) of a (free) man with a lancet of bronze and causes the man's death or has opened the naqabti in (the eye of) a man and so destroys the man's eye, they shall cut off his fore-hand." (26)

This therapy has been interpreted in various ways. The transliteration and translation of the word "naqabti" or "nakkaptu" has been a problem and has given rise to several translations. This procedure on the eye has been interpreted as an operation for cataract extraction, scarification of the temple, incision of a caruncula or an abscess of the lacrimal duct. The words "naqabti" or "nakkaptu" may be phylogenetically related to the Syriac words "nqab" and "niqba" (foramen), which refer to the lacrimal duct.

There is another reference found in a damaged text in which surgery on the eye was alluded to:

"If a man's eye is covered with a shadow, with a lancet."

The tablet was broken and the complete text is unavailable.

An Assyrian medical text includes an incantation that encourages the diseased eyes to be cured before surgical treatment becomes necessary:

"Before the (surgeon's) stone knife and razor have reached you."

R. L. Miller (27) in his discussion of the above text and also of the word sillu (translated in the aforementioned Chicago Assyrian Dictionary as "an opaque spot or discoloration in a diseased eye") has indicated that the pathology here is pterygium which is a degeneration of conjunctival tissue encroaching on the cornea. Because of its superficiality, surgical removal of a pterygium is not a difficult procedure. The above medical text definitely indicates that the surgical approach was employed to remedy the situation. And, finally in Neo-Babylonian texts, there is a reference to a specialized eye physician, the "Asu ini" (6).

Gastro-intestinal Problems

The stomach and intestines were the site of many complaints and diseases. There is a whole group of texts which prescribe different medications and methods of therapy. The complaints, signs, and symptoms were mostly nausea, vomiting, diarrhea, constipation, abdominal swelling, pain, cramps, colics, burning, and passing blood (melena). Intestinal problems were
usually described as swollen or puffed up (*napakhu*), or diarrhea, or bloody discharge. The problems of the lower intestines were discussed as anal problems. Here are a few examples from medical texts:

Signs and symptoms of gastritis or peptic ulcer are described as:

"If a man's stomach holds fire " or "If a man's epigastrium (reesh libbi) blows the fire of his stomach" or "If a man's epigastrium is over loaded with heat"

"If a man's stomach is hot, and will not accept food or drink, you shall take the seed of tamarisk, and mix it with honey and curd. He shall eat and recover." (18)

There are several illustrations of bowel obstruction:

"If a man's bowels are contracted by cramps and his stomach keeps retching."

"If a man is suffering from an ailment of the anus, his anus gives him a stinging pain, his bowels are inflated and he suffers from constipation." (28)

"If there is a piercing or burning pain in his epigastrium and he is constipated, he will die." (28)

A variety of therapies are noted:

"To remove heat in the stomach, you shall bray together the seven drugs elder, sweet reed,...[the names are missing], *asa foetida*, dates, and fir-turpentine. You shall strain, steep in beer, heat in an oven, take out, strain and cool. You shall add thereto husks (?) of barley, and on the top you shall put rose-water. you shall put this into his anus and he will recover." (18)

"You mix (various herbs) with oil, you make a suppository sprinkle it with cypress oil, introduce it into his rectum and he will recover." (29)

"You pour the enema in his anus, he will purge and get well." (28)

"These aromatic plants, all of them, you moisten in drawn wine, you boil and strain them...pour honey and pressed oil into them, give him an enema (with the preparation) and he will get well." (7)

"You roll 14 pills, you recite the incantation over the pills, he swallows them (as a purgative) and recovers...you moisten 7 pills with honey, he swallows them on empty stomach." (30)

In case of rectal stricture (*khingu* meaning narrow), suppositories were normally used to cope with flatulence or rectal bleeding.
"You make a finger (shaped) suppository and place it in his rectum."

"You make an acorn (shaped) suppository of 15 drugs, sprinkle ghee over it, place it in his rectum; the flatulent wind will come out: a proved healing prescription." (7)

Potions were also used:

"He drinks a potion of 7 drugs in wine for rectal disorders...specified drugs are mashed together." (7)

For rectal problems, ointment with bandages were used:

"30 drugs to be used in bandages for rectal disorders" (7)

Dr. Alfred Leix reported an interesting case (probably a rectal prolapse) where an ointment whose

"ingredients are precisely indicated, is smeared on a dressing that is applied and left in place for three days. Conclusions regarding the possibility of a cure are then drawn from the color. If the intestine is white, red (inflamed), or green (due to pigmentation by bile), then a prospect for a cure exists; if it is black (if necrosis is present) then the outlook is hopeless" (13)

To induce vomiting, nauseating substances were sometimes used. More practically and with less discomfort, the physician might tickle the patient's throat with a feather.

Liver And Gallbladder Problems

The term " kabittu or kabattu " is lexically equated with " gabidu ", referring to the liver. Neither of these terms occur in medical texts referring to the human liver. The term " kabittu," similar to " libbu " (heart), was used as a general term for the inside of the human body. The Chicago Assyrian Dictionary has translated this term as "Liver, inside of body, emotions, thoughts, mind, and spirit." The Assyro-Babylonian beliefs concerning the function of liver was discussed earlier in the section on anatomy and physiology and in hepatoscopy. Nevertheless, the gallbladder (" Martu " ) and its involvement in jaundice was well recognized. The term martu has also been used for bile. Some references to vomiting martu, could include the vomiting of gastric contents.

There are numerous tablets which describe jaundice " ammuriqana " accompanied by other signs and symptoms. From these texts few pathological conditions could be deduced. For example: cirrhosis of the liver with ascites was described as a jaundiced patient, with abdominal distention, and prominent veins over the abdomen. Hepatitis could be the cause of the following sickness:
"If a man is sick with jaundice, and his head, his face, all his body and base of his tongue are affected, his affliction will last long and he will die." (31)

Icteric eyes were classified in diseases of the liver and gallbladder. Deep jaundice in the eyes always was considered a symptom of a serious condition:

"When a man suffers from jaundice of the eyes and his disease rises into the interior of his eyes, the water of the interior of his eyes is green like copper ... his interior parts being raised (swollen, ascites?) returns (vomits) food and drink, the disease desiccates this man's entire body: he will die." (9)

"If a man is sick with either gallbladder or akhazo-jaundice or amurriqanu-jaundice." (31)

"The lotion is proven good for akhazo-jaundice or amurriqanu-jaundice."

"The patranu-plant is a herb for jaundice, to bray and give to drink in beer" (31)

The following could be cholecystitis or gallbladder stone:

"...If a man is attacked by gallbladder disease...siburu-plant’ a medication for gallbladder disease, to bray and give as a potion in beer."

*Arad-nana* describes the treatment for a liver ailment to King Esarhaddon:

"The herbs which I have sent to the king are for (use on) two (different) occasions. They are called 'BU' herb and 'PA.TI' herb. They are dissimilar. One is like a sprout, the other is for the thread on the cavity (?) (of the liver). The liver will be considerably benefited. At once, the king my lord will say, 'For what else are they good?' They are good for an incantation of deliverance, they are helpful to a woman with birth pangs." (9)

**Respiratory Diseases**

Diseases of the respiratory tract must have been common in ancient Mesopotamia, and there are many texts dealing with them. Major symptoms (cough, phlegm, shortness of breath, chest pain, coughing up blood) have been described. For example, the above symptoms in Assyrian medical texts have been described as follows:

"'A man is affected in his lung passage' or 'suffers from the "pipe of the lungs," ' means that the patient has a disease of the bronchi or upper respiratory tract." (9,32)

For a dry cough: "If a man coughs dry, ejecting no saliva (sputum)."
For a productive or purulent cough: "If a man's lungs cough up pus and inward parts."

For spasmodic cough such as in whooping cough which usually ends in vomiting:
"If a man is affected in his lung and they vomit exceedingly."

For severe hemoptysis: "if black evil blood comes from the mouth of the left lung of a man."

For dyspnea (shortness of breath):
"if a man's lungs pant with his work 'or' when the breath of a man's mouth is difficult."

A description and treatment for bronchitis:
"If the patient suffers from hissing cough, if his wind-pipe is full of murmurs, if he coughs, if he has coughing fits, if he has phlegm: bray together roses and mustard, in purified oil drop it on his tongue, fill moreover, a tube with it and blow it into his nostrils. Thereafter he shall drink several times beer of the first quality; thus he will recover." (9)

Another text, probably referring to pneumonia, lists as symptoms: fever, chest pain, coughing and much sputum, loss of flesh, and "the leg is heavy to him" (9). In the tablets dealing with diseases of the chest, we have a number of diagnoses although they do not go beyond naming the affected organ.

"If a man's breast hurts him, his epigastrium burns him, his stomach is inflamed (swollen) ... that man has lung trouble." (9,32)

Thompson translated a tablet about a patient who was rescued after a fall in water, and probably afflicted with pneumonia, developed "pain in his side when he breathes." (33)

The treatment recommended in the case was very sensible. The chest was fomented with water in which fennel had been boiled, after which balsamic poultices were applied over the chest. This remained the treatment for pleurisy and pneumonia for several thousand years (9).

J.V. Kinnier Wilson suggests that in the Assyrian medical texts there is evidence that lung disease is mentioned as a possible complication to Bushanu (scurvy). Scurvy is known to predispose to bacterial infections, especially to pneumonia. He also questioned whether the disease called "shušlu limnu" translated as "evil cough" could be pneumonic plague or pulmonary tuberculosis.

There are quite a few documents possibly referring to pulmonary tuberculosis. A tablet from Ashurbanipal's library describes a patient's symptoms as follows:
"The sick one coughs frequently, his sputum is thick and sometimes contains blood, his respirations give a sound like a flute, his skin is cold but his feet are hot, he sweats greatly and his heart is much disturbed. When his disease is extremely grave, his intestines are frequently opened." (34)

The above could be a good description of pulmonary tuberculosis, complicated by intestinal tuberculosis with diarrhea or intestinal cutaneous fistula. Another reference to tuberculosis comes from the Code of Hammurabi, which refers to a disease state associated with fever "which makes the woman incapacitated or unable to perform her marital duties" (Law 148).

"If a man has married a wife and fever attacks her (and) he sets his face to marry another woman, he may marry (her). He shall not divorce the wife whom fever has attacked, she shall dwell in the house which he has built, and he shall continue to maintain her so long as she lives."

The fever has been assumed to be tuberculosis. Driver and Miles have translated fever to be ague or malaria (26).

The treatment of respiratory problems included oral medication by pills or potion, poultices, bandages and interestingly enough inhalants. A number of vegetable ingredients were prepared and infused in oil, beer, and curds. Then, say the instructions:

"You shall prepare a great ... pot, stop up its sides with wheaten dough, boil the brew (therein) over a fire, put a reed tube into it, let him draw the steam up so that it strikes against his lungs, and he shall recover." (9)

Assyrians must have been familiar with the trauma of penetrating injuries to the chest and their attendant complications. A hunting scene (bas-relief) in the palace of Ashurbanipal, depicts a wounded lion having hemoptysis following perforation of the lung caused by an arrow penetrating his chest.

**Cardiovascular System**

It is believed that Assyro-Babylonians were not aware of the function and physiology of the cardiovascular system. Although the heart was considered the center of emotion, the function of the heart and its beating during life and the lack of beating being associated with death was recognized. The Epic of Gilgamesh, in reference to the Enkidu’s death, says:

"He touched his heart but it was not beating."

Pulse was checked during examination of the patient, although we do not know if it was counted. There is reference to pulse rate by describing slow (*nekh* or *nekho*) and fast (*alaku*). Slow pulse is described as "When the blood passes the vessels slow," and fast pulse as "When the blood passes the vessels fast."
Physicians observed the size, color, arrangement and distribution of veins in the body. A physician states that: "When I check the patients limbs I check the veins of patient." Pulsating movement of the vessels was also checked (10). Varicose veins of legs were thusly described as:

"If a man is suffering from varicose veins and his heels are swollen, the veins of his legs are very thick and he can not walk." (10)

During examination of patients, observation of the veins in forehead, temple, neck, arms, legs and abdomen were emphasized (10). It is not clear why only one term, "sheriani", was used for the various cord-like structures in the body, including veins, arteries, nerves, tendons and ligaments. This has created a great deal of confusion and difficulty in translating the Assyrian medical texts. It is interesting that in classical Syriac as well as modern vernacular Assyrian, the term "sheriani" has been used similarly, even to include joints.

Finally, the reference to the physician as "bel-ubani" (master of the pulse) could mean that their knowledge of the cardiovascular system and its problems was more than we currently believe; they may even have had specialized physicians in this field.

Genito-urinary Problems

Numerous problems of genito-urinary systems have been mentioned in the medical texts. Complaints concerning the urinary tract are less frequent than other systems and were mainly a matter of calculus, stricture, "mumu", bloody or purulent urinary discharge, or incontinence.

For renal calculi there is evidence that Assyrians were aware of differences between hard and soluble stones and certainly knew how to dissolve renal calculi. Thus a prescription read:

"Whether it be hard or soluble stone, or gonorrhea, or strangury, or anus-trouble, or urine coming drop by drop."

The drugs prescribed for the above condition (black saltpeter, ostrich eggshell, and pine-turpentine) may not have had any therapeutic value by present-day medical standards. Yet it was not so long ago that saltpeter was used for diuresis, pine turpentine was used to dissolve gallbladder stones, and the eggshells (containing carbonate of lime) were used to dissolve soluble (uric acid) stones of the kidney (33).

A common complaint, "mumu-disease" which was associated with hematuria and urethral purulent discharge has been labeled as "gonorrhea" by some authors. Translations such as the following ascribe to this theory:
"If a man's urine is like the urine of an ass, that man is sick of gonorrhea; if a man's urine is like beer-yeast, that man is sick of gonorrhea; if a man's urine is like wine-yeast, that man is sick of gonorrhea; if a man's urine is like gummy paint (varnish), that man is sick of gonorrhea." (35)

The above text recommends pouring medication by bronze tube into the urethra. J. V. Kinnier Wilson (21,36) suggests that musu-disease is not gonorrhea. The fact that Assyro-Babylonians did not associate this disease with sexual relationships may support his opinion. His argument is that musu-disease is schistosomiasis, which is an endemic disease in Mesopotamia and the Near East. Major symptoms include pain in micturition (dysuria), bloody urine (hematuria), purulent urethral discharge, involvement of the bladder wall and production of bladder stones and strictures (calcified bladder wall). Musu-disease has been associated with stricture (37) and calculi called musu-stones. This further supports the opinion that musu is schistosomiasis. (see section on Parasitic Diseases).

Urinary retention was described. Bronze copper tubes were employed to empty the bladder and to blow medication into the urethra. Incontinence was described as "he keeps dribbling his urine and cannot hold it in." Incontinence also was treated by introducing medications into the urethra.

In some texts hematuria, purulent discharge and stricture, alone or in combination have been mentioned, and gonorrhea as an etiological factor cannot be ruled out. The TDP series assumed supernatural causes for urinary tract problems; for example: "If a man has urethral bleeding it is the hand of Shamash".

Genital Organs

Spermatorrhea was described. Circumcision was not practiced in Mesopotamia. Castration was practiced in humans as well as animals:

"It was probably the physician who performed castration on human beings. The principal reliable source for the existence of eunuchs is a series of regulations for the royal harem in the Middle Assyrian period (c.thirteenth to tenth centuries B.C.). The particular type of operation and the age at which it was performed are unknown, but it is unlikely that it included severing the penis as well as the testicles - as was often the practice in Turkish harems, a dangerous operation with a high rate of mortality. The fact that a physician needed to examine men entering the Assyrian harem may imply that the testicles were crushed or damaged in such a way as to destroy the function of the seminal ducts. There is no evidence in ancient Mesopotamia for any other deliberate mutilation of the human body." (3)

Assyrians severely punished those who injured a man's genital organs.

Paragraph 8 of the Middle Assyrian Laws read:
"If a woman has crushed a man’s testicle in an affray, one of her fingers shall be cut off; and if although a physician has bound it up, the second testicle is affected with it and becomes inflamed or if she has crushed the second testicle in the affray, both her (nipples?) shall be torn off." (9)

Sexual problems in men, especially impotence, were treated by both therapeutic and magical means. The therapeutic method included the use of potions made of male parts of animals noted for their sexual vigor. A frequent therapy was rubbing the sexual parts of both partners with a lubricant mixed with magnetic iron (16). Magical therapy also was used and included prayers to various deities and erotic incantations recited by a woman to a man (3).

**Gynecological And Obstetrical Problems**

Abortion was considered a crime against the state and society. The Code of Hammurabi states that:

"if a woman brought about her own abortion, she would be killed and denied a proper burial." (26)

If someone, by assault, caused a miscarriage in a woman, he would be penalized according to the social status of the victim. Spontaneous, traumatic and accidental abortions were recorded in Assyrian medical texts. A fragmented tablet from Assur may be the only evidence of a prescription to induce abortion. It consists of eight ingredients dissolved in wine to be given to a pregnant woman on an empty stomach. The statement prognosticates that "that woman will drop her fetus" (16). Knowing the severe punishment for abortion, it is not clear under what circumstances this prescription was advised.

A number of texts give prescriptions for infertility and to ease conception in sterile women. (16) Physicians may have been involved in the management of post-partum problems, but midwives were in charge of the delivery of babies. Birth stools were used during labor. Some clay models of birth stools have been excavated. As physicians were not involved, delivery procedures were not listed in medical texts. Numerous records refer to difficult childbirth; treatment with solanum berries was advised. Solanaceae are known to have antispasmodic properties (21). In extreme situations, to save the mother (and possibly the baby), the fetus was extracted from the womb employing surgical instruments. The first documented successful use of forceps in Europe did not appear until the Medieval period, yet forceps or similar instruments were in use in Assyria and Babylonia.

**Caesarian Section**

Oppenheimer, in 1960, reported a case of caesarian section from the translation of a legal text published by E. Szlechter. The tablet (document) concerned the adoption of a two-year old boy, named Shilip Remim which Oppenheimer translated as "pulled out of the womb". "Pulled
out of the womb” could be interpreted as pulled out of the womb by an instrument (forceps) or pulled out by surgery known as caesarian section. His discussion favored caesarian section on the basis that the boy’s mother died during or after labor. Caesarian section was used in early history to save the child of a dying mother. The following interesting translation by Oppenheim is reprinted here in its entirety.

"Ibiq-ilum, the son of Sin-magir, adopted the male child, born through caesarian section (literally: pulled out of the womb), the son of the deceased (woman) Atkalshim, from his (the child's) oldest brother Shamash-nasir and his wife (text: sister) Tarish-matum. Ibiq-ilum handed over one shekel of silver and the nursing expenses for two years (consisting of) barley, oil and wool, to Shamash-nasir and Tarish-matum. They have received them and are satisfied. Shamash-nasir and Tarish-matum will not make other claims against Ibiq-ilum. Even if he (Ibiq-ilum-later on) has ten (more) sons, Mar-Ishiar is to be his eldest and his heir. They (all) have taken the oath by the gods Shamash and Aja and by (the king) Hammurabi (five witnesses and date)." (38)

The child has a new name and is an heir to his adopted father.

Later, Oppenheim claims that the same procedure was performed on slave-women (3,21), the practice being based on economic rather than humanitarian concerns (21). In my opinion, it is less likely that the above-mentioned child was born to a slave girl. My opinion is based on the following considerations: 1) the child was raised by his brother and sister-in-law and they were compensated for the expenses in two years; 2) they were the parties to the adoption agreement and its signatory. If they were slaves, they belonged to their master and only the master could agree or allow the adoption of the child; 3) with the mentality of ancient cultures, the possibility of an adopted slave child called "first born" and made an heir is infinitely remote.

In the "Treatise on Medical Diagnostics and Prognostics" (TDP), a section has been devoted to problems of the female, mostly pregnancy and childbirth. Some of these reports could represent some pathological situation known to present-day medicine and some may not have any relevance to modern medical knowledge. For example, reported signs and symptoms such as recurring nausea and vomiting and bilateral swelling of feet and ankles could represent toxemia of pregnancy (21) or "If the pregnant woman keeps vomiting, she will not bring to completion (her pregnancy)" (18) could both be prognoises for toxemia of pregnancy. A pregnant woman has bilateral swelling of the legs, the result of compression of large pelvic veins by the enlarged pregnant uterus. Venous stasis in lower extremities is the mechanism by which swelling occurs.

Yellowness of the face of the pregnant woman (probably anemia) was considered an indication of the child being a boy. Or if the "nipples of a pregnant woman are yellow" she will have a miscarriage. There is a long list of abnormal births, monstrosities, and conjoined twins.
These abnormal births or anomalies were considered bad omens, and not given medical or clinical significance. Birth prognoses or prediction of the sex of the fetus are found in the TDP texts and in physiognomic omen series.

Erica Reiner (39) has credited the Babylonians with the first pregnancy test. These tests were to determine if a woman was able to conceive or whether she was pregnant. The pregnancy test included insertion of a pessary (prepared with wool and a few drugs) into the vagina. It would be removed after three days, and checked for color change or some other chemical reaction. If the diagnosis was made that a woman was unable to conceive, it was followed by prescriptions and directions to induce pregnancy in a barren woman.

**Parasitic Diseases**

There is some indirect evidence that "schistosoma haematobium" existed in early populations. H. Zakaria (21) examined the ruins of a number of historic sites in Iraq and discovered shells of the fresh-water "mollusc bulinus" in the mud bricks of the buildings. The oldest of these shells is 4 to 6 thousand years old. The author states:

"It appears from the findings of large number of subfossil shells of Bulinus in historical sites as described in the text that the snail must have been widely spread in irrigation canals in central Iraq in early times."

Since it has been shown by other workers that bulinus is today the intermediate host of schistosoma haematobium in Iraq, Zakaria suggests that the disease was probably common in ancient if not pre-historic times. Therefore, schistosomiasis probably occurred in ancient Mesopotamia since we know of many texts describing a condition characterized by urethral bleeding. (21) (see section on Genito-urinary Problems)

**Intestinal Worms**

Cuneiform texts indicate that intestinal worms were known to Assyro-Babylonians. However, they were not divided into different types. From these worms, ascaris infestation was well-known, the worm being depicted on amulets. In one incantation for jaundice and ascaris worms, probably hepatic ascariasis, the ascaris worm could have entered the biliary duct through the duodenum and caused pain and obstructive jaundice (21).

Assyrian medical texts describe a patient who has a sore anus and scratches it constantly (pruritus ani). The additional indication of "wind" makes it more likely that intestinal parasites were responsible (21). Pinworms could be the irritating parasites.

There is no direct evidence that ancyllostomiasis or hookworm disease existed in Mesopotamia. In the TDP series, there is mention of severe pain in the epigastrium, with the passing of blood (melena) and a prognosis of death. This could represent an advanced and fatal case of infestation with ancylostoma duodenale (21).
Other Parasites

Arthropod parasites and pests can also be traced in the ancient literature. The fly symbol of Nergal, god of disease in ancient Mesopotamia, suggests that the relationship between insects and disease was already suspected. Assyro-Babylonian physicians treated pediculosis and scabies using sulfur for the latter. Malaria as an intermittent fever also occurred and its symptoms and signs were described. Some descriptions of lesions on liver, seen during hepatoscopy, could be indications of small cysts caused by echinococcus.

Pediatrics

Children's diseases and problems were mostly detailed in the TDP series. It seems that usually the ashipu was involved with children's therapy as there are few references to children in Assyrian medical texts. On the other hand, from the royal and medical letters, there is indication that physicians indeed did attend to children (see section on Ear Problems).

There is evidence that the city of Mari was known as a center for the treatment of sick children and that children were frequently sent from considerably distances to Mari. It is presumed unlikely that the healing processes were undertaken by physicians; more probably, it was by divine power (16). Interestingly enough, the case reported in the section on ear problems also occurred in Mari and the request was for a specialized physician. Other evidence for treating children by the asu comes from the Kassite period:

"Mukallim' overseer of a school for the princes and princesses (na'ri, na'ra'it) of court personnel, apparently somewhere on the outskirts of Nippur, reports to Enil-kidinni, governor of Nippur, on the therapy and progress of eight youngsters who are afflicted with sever abscesses (ishatiatu) accompanied by fever and upper respiratory distress...In one letter he states:...[X]-muballit (the asu we assume) is giving the patient potions...From a letter by [X]-muballit we learn the following:... (a long list of drugs follows)...Concerning the one whose chest is sick, I supplied the bandages that they applied and the potion for tracheitis that he keeps on drinking. Concerning the second patient who (keeps on scratching) his chest, [...] I acted in accordance with the text: "If a man has symptoms as though he has scabies " (We assume that this memorandum refers to a prescription from a medical text; if so, this is the only specific citation of a text relating to direct application that we have found)." (7)

Poisons and Intoxication

For poisonous animals we should mention the scorpion sting and snake bites, for which we have a few references. Some viper snakes could be found in the area, then as now. It is interesting that a horned viper snake, called in Assyrian "seru qarnu" has a similar name in
Latin "Ceratus cornutus" which could be a derivation of the Assyrian name. There are a few prescriptions to treat poisoning, such as henbane (Hyoscyamus niger, Withonia somnifer) mixed with cedar oil for scorpion stings (40). For snake bites:

"He drinks a potion made of 13 drugs against snake bite." (7)

Alcohol intoxication: Beer and wine were available and consumed. Banquets at which wine was served liberally became noisy affairs. The bodies of the guests became joyful, they shouted much, their heart was exalted or the drinker's 'liver was loosened and he became gay.' On the way home he felt unsteady on his legs and sometimes the drunkeness was such that the doctor's advice was sought. A recipe has been preserved which gives a striking description of alcoholic intoxication:

"If a man has taken strong wine and his head is affected and he forgets his words and his speech becomes confused, his mind wanders and his eyes have a set expression; to cure him take licorice...beans oleander...to be compounded with oil and wine before the approach of the goddess Gula and in the morning before sunrise and before anyone has kissed him let him take it, and he will recover...." (9)

Nervous System Disorders

In a bas-relief of the palace of Ashurbanipal, a hunting scene depicts the famous Dying Lioness of Nineveh. In this piece, the lioness's spinal cord has been severed by penetrating arrows. The animal is crawling toward her tormentors, snarling furiously, and dragging her paralyzed limbs. This indicates a familiarity with trauma to the spinal column resulting in paraplegia. In a society, almost continually involved in military campaigns, this could not have been an unusual occurrence.

The signs and symptoms of sciatica have been described as:

"The patient has pain in his buttock and back of his leg and is unable to walk."

A disease named, "qat etimmi", literally meaning "hand of the ghost" has been described. The patient has a headache (frontal area) which continues from sunrise to sunset. The neck is retracted and painful. The patient lies on his side, his legs drawn up toward his chest. The ears are roaring and fever, delirium, restlessness, and sleeplessness are also reported to be associated with this disease. These symptoms appear surprisingly similar to meningitis or encephalitis (21).

Other neurologic derangements described:
Fractured Cervical Spine

"If neck is fractured and muscles of his body are paralyzed (quadriplegia), he will
die."

Basal Skull Fracture

"Trauma to back of his head, has black eyes and eyelids (ecchymosis of eyes & eye
lids), has bleeding from his mouth and has paralysis, patient will die."

The 4th and 5th books of the TDP series address a group of diseases under the general
category of "fall". These diseases are attributed to demonic possession. What follows below
might be the description of an epileptic seizure:

"If he has an attack on the road, and rubs his hands and feet against ground, his eyes
are sunken, his nostrils are curled out, or he heard a voice and cries back and
convulses, then falls in a deep sleep after crying, and does not know and forgets that
he was crying after attack is over, his eyes show different colors, red, brown and
yellow."

These changes of colors could be hallucinatory flashes of light associated with epilepsy or
may be changing colors of ecchymosis resulting from injury during convulsion. (21)
Parkinson's disease was also described

"if his head, hands and feet are trembling at the same time, when he walks, he falls
forward (festinating gate), his words embarrass him in his mouth, his mouth forces
itself into speech, in speaking salvia falls (drooling)." (41)

A syndrome whose symptoms included involuntary movements of the extremities and face,
with associated joint pain could have been rheumatic (Sydenham's) chorea.

Psychiatric Syndromes

Assyro-Babylonians, with a highly advanced civilization and organized society, had their
share of psychological stress and trauma. Being no different from other nations, its people
suffered from psychological problems. The intensive studies of J. V. Kinnier Wilson (42,43)
have made a significant contribution to the field of historical Assyro-Babylonian psychiatry.
Wilson was able to identify symptoms of several psychological aberrations or disorders, such
as schizophrenia and persecution delusion, to name just two.
The symptoms of delusions of persecution are well-described in a syndrome called "going to the palace". In this state, the patient has the delusion that he is the center of a conspiracy; everyone, from family to government officials, has turned against him and is accusing him of wrong-doing. To prove his innocence, the patient is exhibiting the urge to go to the king's palace and ask for justice.

A collection of nine tablets named "Maqlû" (literally burning), and another group also consisting of nine tablets named "shurpu", contain most of the available information on psychiatry. The maqlû group is a collection of incantations against witches and persecutors. In this therapy, the image of witches and persecutors were made of wood, wax and other materials that could be melted or burned in front of the patient as an aid in curing him. If the therapy was ineffective, the involvement of witches from foreign nations and lands was suspected. Assyro-Babylonian priests or gods were unable to control these by incantation.

The element of illusion was usually disguised; the following typifies a patient's complaint:

"They (witches) have made me eat bewitched food...They have made me drink bewitched water...They have washed me in filthy wash water...They have anointed me with salves made with evil drugs." (42)

In another tablet, the patient attributes his physical problem to the influence of witches:

"They push in my chest, weaken my heart, bind my arms, bend my back, pluck out my hair" (42)

These complaints, like the witches themselves, having only perceptual existence, could be hypochondriasis or psychomotor hallucinations.

Some psychopathic states and neuroses have been described in the Shurpu tablets. There are no witches or persecutors involved in the shurpu. No physical symptoms are mentioned. For example, in the second tablet, the observation, probably based on numerous patients, is documented in one patient.

"Be the [mystery?] resolved, in that So-and-so the son of So-and-so does not know it is wrong...when he gives with a small measure...uses a false balance...takes money not lawfully his...sets up a false boundary stone...when his mouth says 'yes' but his heart says 'no' and whatever he says is completely untrue, when he..., shakes, and trembles [with rage], destroys [things], throws them out [of the house] or makes them disappear; when he accuses, incriminates, spreads gossip, wrongs, robs or incites others to rob...when he disarranges the prepared alter-table and angers his god and goddess." (42)

This describes a pathological liar, the swindler, the kleptomaniac, the gossip monger, the social misfit, and the murderer.

37
"Be the [mystery] resolved, in that he does not know why he is compelled to take [things], to hide [things]...to point the finger [of condemnation] at a protecting deity...to step in blood or walk about over a place where blood has been shed...[or why] he has a phobia of meeting an accursed person or of an accursed person meeting him, or of sleeping in the bed, of sitting in the chair, of eating at the table, or drinking from the cup, of an accursed person." (42)

This part describes an obsessive-compulsive state and a phobia of fear of contamination.

"[Be the mystery? resolved in that he does not know why] he has a morbid fear [or 'aversion' *maditu* for beds, chairs, tables, lighted stoves, lamps...stables, animals, ploughs, well, etc....or for the sanctuaries of [this or that] god or goddess; or why he fears to leave or enter [such and such] city, city-gate or house, or fears [such and such] street, temple or road." (42)

This part is about the fear of things and places. Subconsciously these fears of anxiety could be related to guilt, shame, or other emotions.

Kinnier Wilson contends that the third tablet of *shurpu* is "man's first attempt at the classification of 'compulsive behavior.'" This tablet describes some 170 states, obsessive and compulsive. Here the word "*mamit,*" a derivative of the verb "to swear" and meaning oath (in modern Assyrian "*momita*”) has been used to describe these abnormal states. Such patients have sworn an oath to do or not to do certain acts. For example

"if a man ceaselessly pronounces words of salutation, peace be unto you, peace be unto you, he is suffering from the 'mamit-disease'." (42)

Some of the positive compulsive states and their modern psychiatric labels are:

To slaughter a sheep and touch the death-wound--blood lust.

To smash the doors or door locks--malicious conduct.

To implore (stretch out the hands to) the lamp-god--Pyromania.

To lie and blaspheme --psychopathic behavior

To dig pits and ditches (for the unwary to fall into) --delinquent behavior. (42)

Some negative compulsive states, dealing with fears or phobias (and today's equivalent terms) are:

Of certain days or months --based on suppressed experience.

Of hunger or hardships --based on suppressed experience.
Of having the name of a god invoked in his presence --guilt complex.

Of eating an accursed man's food --fear of contamination. (42)

Other documented syndromes include hallucinations and delirium states. For example, in "crossing the desert" a patient has an hallucination of "traveling in the desert, hearing the noises, and encountering wild animals and reptiles which are attacking him and trying to kill him.'

There is a great deal of material still to be translated and edited, and it could shed new light and better understanding of Assyro-Babylonian psychiatry.

Psychotherapy

Psychotherapy was a branch of medicine that was dominated by magic and religion. The purpose was to rehabilitate an individual and to reconcile him/her with the transcendental world. The soul-searching of a patient who was convinced that he suffered because he had sinned had a liberating effect. The rites performed and the words spoken by the incantation priest had a profound suggestive power. Mesopotamian medicine, specifically ashipu, was psychosomatic in all its aspects (9). Exorcism of evil spirits (or demons) have been found depicted on amulets. The most well-known amulet is the Lamashu amulet, which shows a supine patient with priests performing the ritual. Exorcism is still performed today.

Dermatological Diseases

Cutaneous Leishmaniasis

Cutaneous Leishmaniasis (Tropical or Oriental sore; Delhi, Aleppo or Baghdad boil) is a parasitic skin infection caused by Leishmania, transmitted by the sandfly, and results in single or multiple skin lesions in exposed areas of body. Healing (without treatment) occurs spontaneously in 2 to 18 months leaving a depressed scar. Evidence for the existence of Baghdad boil comes from an Assyrian astrological tablet in a report from an astrologer to the king. Translated as

"concerning this evil of the skin, the king, my lord, has not spoken from his heart. The sickness lasts a year; people that are sick all will recover." (21)

In another text the parts of the body that may be affected are described as the cheeks, neck and arms—in other words, the exposed parts of the skin. Popular belief in the Middle East is that the boil lasts a year.
A generalized and irritating skin lesion termed "Reshutu" has been described in numerous texts. It involved the face, head, and body and could have been considered a serious disease because of its relation to the god Nergal. It may be a recurrent disease and may occur in animals. R. C. Thompson suggested that this ailment could be the results of pediculosis (lice infestation) ("qalmatu").

Because of the widespread involvement of the skin, the head, the face, and the rest of the body and the association of Reshutu with other skin lesions, Adamson, recently suggested (44) that this ailment could be impetigo (a bacterial infection following traumatized skin or secondary to dermatitis, pediculosis, scabies or insect bites).

Eczema (Dermatitis)

The association of skin lesion of the feet (rutiptu-disease) and exposure to mortar used for pounding or grinding grain and household material is described in a few tablets. For example:

"He shall not stand behind a mortar (or) he will be ill with rutiptu-disease...He shall not go where a mortar lies (or) he will be ill with rutiptu-disease."

Repeated exposure of the skin to the products ground by mortar could result in contact or allergic dermatitis of the feet (44).

Leprosy

Leprosy: ("sāharshubbû") (in Sumerian literally "falling out") or "garabu". Garabu is similar to "Jirva" in classical and modern vernacular Assyrian. Evidence of leprosy in ancient times would depend mainly on pathological changes found in skeletal systems especially in the bones of extremities. There is no osteological evidence of leprosy in the ancient Near East. But more particularly, only a small number of skeletons have been recovered from the Mesopotamian digs, and it is just the skulls that are preserved for anthropological study. It is possible that leprosy victims were interred in segregated sites well distanced from communal burial places, and this may have made them less likely to be found.

In the Chicago Assyrian Dictionary, three words are translated as leprosy: 1) sāharshubbû (borrowed from the Sumerian word); 2) eqpu; 3) garabu. This ailment was a skin disease covering the whole body, considered incurable and communicable, and therefore required excommunication. A tablet from the Old Babylonian omen texts was translated as:

"If the skin of a man exhibits "white pusu-areas", or is "dotted with nuqdu-dots", such a man has been rejected by his god and is (to be) rejected by mankind."
J. V. Kinnier Wilson (21,45), has taken the view that this text describes the two main types of leprosy. Type A, the neural type (anesthetic) in which pusu lesions will represent the whitish or depigmented macular areas, and Type B, the nodular (tuberculous) or lepromatous type, which involves the nerves and affects the skin where nodules may have been called nuqdu-dots. He assumes that the ancient Babylonians not only had observed leprosy but had already learned to divide it into the two types which did not occur in Europe until the mid 19th century.

Adamson (44) disagrees with this diagnosis and believes that the scaliness of the skin lesions would suggest that this disease most probably was psoriasis. The unpleasant appearance of the skin and desquamation of the plaques was considered unclean and therefore the afflicted were forced to leave the community until disappearance of the skin lesions when they were allowed to return.

Recently Martin Stol (46) suggested that sāharshubbū is a general term covering at least two diseases: garabu (favis of head) and epqu (psoriasis). Garabu was a disease of the head and therefore it could have been favus, ephu, with generalized scales covering the body and sāharshubbū as a general term covering both diseases.

Problems And Diseases Of Extremities

There are several descriptions for diseases of the legs and feet.

"If the flesh of a man's legs has been strained so that he can not walk, or if the feet are bent and cannot straighten themselves; if a man's feet hold 'poison'...his feet being out of control; if sickness comes out on a man's leg and it growses like a pustule." (9)

Treatments were largely pharmacological and drugs were prescribed for internal as well as external use.

A separate series addressed symptoms of problems in lower extremities.

"If a man has a disease of the ankle, the tendons of his heels are full of clay...you make a bandage." (30)

"If a man has a disease of the ankle and the affliction spreads upward as far as his shin." (30)

"If a man is ill, he is sick from paralysis of the tuhru of his heel...attack of tuhru."

Adamson (41) translates "Tuhru" as Achilles tendon.

"If the hands and feet of a sick child become swollen again and again." (47)
There are prescriptions for ailments such as sciatic neuralgia and some rheumatic disorders. Adamson (44) describes *rapadu-disease*, a severe disease with acute onset and involving joints and wandering from joint to joint, as acute rheumatic fever. This was treated with henbane (*Hosocyamus niger*), which has sedative effects.

**Physical Therapy**

Physical means were also employed in the treatment of patients. The application of heat, the use of medicated baths, and massages were common. Cramps were treated with hot or cold water and various manipulations as described in the following instructions:

"If a man has cramps, let that man sit down with his feet under him, pour boiled...and cassia juice over his head and he will recover. If *ditto*, let him kneel and pour cold water on his head...If *ditto*, place his head downwards and his feet [under him?], manipulate his back with the thumb, saying 'be good,' manipulate his arms fourteen times, manipulate his head fourteen times, rolling him on the ground" (9)

"Practical experience had revealed that an individual suffering from a colic is relieved when placed in a position which relaxes the abdominal wall. Massage was known but was regarded as a magical ceremony-the number of strokes was determined by the number seven and the masseur was also required to strike the ground according to precise directions." (13)

**Instruments**

Physicians carried with them a bag called "*takaltu,*" containing bandages made of cotton or skin; and cane or reed for blowing medications into the ears or nostrils, or to inhale fumigated or vaporized drugs. They also carried metal tubes or sounds made of copper or bronze for injecting medications into the urethra or bladder, and possibly to empty a distended bladder during urinary retention. The physician's bag included other metal tubes for blowing medication into the rectum, and still others to administer enemas.

Metal spatulas were used for the application of ointments into the eyes and smearing the eye lids. Various knives were employed for surgery. The existence of needles used for suturing wounds and incisions is demonstrated in an interesting cylinder seal from a physician named *Ur-lugal-edina,* dated from the third millennium, B.C. (25) Boards were used for bone-setting in fractures and dislocations.

**Surgery**

In the Royal Library of Nineveh, King *Ashurbanipal* claimed to have documented, on tablets, the three ways to health (14):
1 The art of healing with drugs (bultitu)
2 The way of operating with the knife (shipir bel-imti) surgery
3 Prescription of ashipu

Hammurabi’s Code of Law, which is called “and outstanding document of humanity, provides the strongest evidence of Assyro-Babylonian surgical practice. These laws only address the asu and there is no reference to ashipu. There are strict regulations of fees, for successful operations, based on a sliding scale; and there were penalties for failure. The rewards and liabilities of physicians were based on the social status of the patient. There were three classes of people:

• "Awilum" (noble, upper class, free man) landowners, holders of high office in court and temple, city administration and army.
• "mushkenim" (villein) small merchants, small office holders, craftsmen, and laborers. Could own property and slaves.
• "warad (ardu)" slaves

The following are some of the laws of Hammurabi’s Code dealing with physicians (26):

Law 215: If a surgeon has made a deep incision in (the body of) a free man with a lancet of bronze and saves the man’s life or has opened the "naqabiti" in (the eye of) a man with a lancet of bronze and saves his eye, he shall take 10 shekels of silver.

Law 216: If the patient is a villein, he shall take 5 shekels of silver.

Law 217: If the patient is the slave of a free man, the master of the slave shall give 2 shekels to the surgeon.

Law 218: If the surgeon has made a deep incision in (the body of) a free man with a lancet of bronze and causes the man’s death or has opened "naqabiti" in (the eye of) free man and so destroys the man’s eye, they shall cut off his fore-hand.

Law 219: If a surgeon has made a deep incision in (the body of) a villein’s slave with a lancet of bronze and causes his death he shall replace slave for slave.

Law 220: If he has opened his "naqabiti” with a lancet of bronze and destroys his eye, he shall pay half his price in silver.

Law 221: If a surgeon mends the broken bone of a free man or heals a diseased muscle (sprained tendon) the injured person shall give the physician 5 shekels of silver.

Law 222: If he is a villein, he shall give 3 shekels of silver.

Law 223: If he is the slave of a free man he shall give the surgeon 2 shekels of silver.
Law 224: If a veterinary surgeon (literally a physician of an ox or an ass) has made a deep incision in the body of an ox or an ass and saves its life, the owner shall give the surgeon (1/6) a sixth of (a piece of) silver (as) his hire.

Law 225: If he has made a deep incision in the body of an ox or an ass and causes (its) death, he shall give (1/5) a fifth of its price to the owner of the ox or the ass.

Physicians were highly paid. By way of comparison, 10 shekels (85 grams of silver) was equal to a carpenter's fee for 450 days. These laws clearly indicate that ophthalmic, general and orthopedic surgery along with veterinary surgery were practiced. Hammurabi's Laws were so draconian that it is doubtful that they were ever enforced. Obviously no surgeon would dare to operate with threat of such punishment. It is more likely that severity of punishment was a deterrent to pranksters or untrained people from illegally entering the risky and dangerous field of surgery.

Despite the large volume of texts related to medical practice, there is remarkably little information about the techniques of surgery. It seems obvious from the above code that surgery was practiced. It was also known that during military campaigns, armies would have physicians and surgeons on hand for the treatment of the wounded. People who suffered from abscesses, tumors, wounds and the like were helped by surgeons.

"There is no doubt, however, that the physicians did lance boils and make incisions. The word used in the Code of Hammurabi for the special surgeon's knife employed occurs several times in the therapeutic texts, and also in a description of the paraphernalia of the patron god of medicine." (3)

It is very possible that continued study of the undeciphered tablets or further excavations will bring such texts to light.

Excerpts referring to surgical technique can be gleaned from the few tablets on this subject in Ashurbanipal's library.

"you shall take the knife." (14) (the rest of the tablet is broken off)

In another tablet, though most of the text is damaged, a few words are legible:

"three ribs...fourth rib cut open...fluid."

There is a strong possibility that the artu was trying to reach a pocket of fluid, either an abscess in the chest or pleura (empyema), or an abscess in the liver (a common complication of amebiasis), to improve drainage of a fistula or pus. Opening the third intercostal space is not the proper place for drainage of an empyema or of a liver abscess, which requires an incision in the lower levels of the chest. Labat suggests that they may have counted the ribs upward (in reverse
order of the modern practice, as the Greeks did centuries later). Counting the ribs from bottom up, brings the incision to the proper level (eight or ninth rib) for drainage of a liver abscess or an empyema (9, 14).

An interesting text describes a boil or abscess of the skull or scalp, as reported by Labat with translations and comments by Majno:

"If a man, his skull contained some fluid, with your thumb press several times at the place where the fluid is found. If the swelling gives way [under your finger], and [pus] is squeezed out of the skull, you shall incise, scrape the bones and [remove] its fluid...

If [instead] when you press [the diseased part], the swelling does not give way (under the finger), you will make all around his head an application of hot stones [lit. "a fire of stones"]."

I read the lines of thought as follows: "If you can feel a collection of pus, then cut: if the abscess is not yet ripe, bring it out with heat." The asu seems to have realized the helpful effect of heat in speeding up the formation of an abscess. The process, empirically referred to as maturation, is not an old wives' tale but a fairly precise biological fact. It is the last stage in a sequence of events whereby a focus of infection is first surrounded by white blood [pus], then walled off, cut off, and finally digested by enzymes contained in the pus; at this stage it is "ripe" and ready to be let out. Heat tends to speed up this process by increasing the flow of blood, hence the supply of white blood cells. The word for pus, incidentally, was shakku, "white sap". (14)

For the postoperative care of the above wound, the following dressing was recommended:

"...Wash a fine linen in water, soak it in oil put it on the wound. Bray powder of acacia and ammonia salt, and put it on the wound: let the dressing stand for three days. When [you remove it] wash a fine linen in water, soak it in oil, put it on the wound, and knot a bandage over it. Leave the dressing three more days...Thus continue the dressing until healing ensues...." (14)

"So this was a common dressing, presumably with sesame oil in Mesopotamia. Oil and grease cannot do much harm on raw flesh, and they also serve the useful purpose of preventing the bandage from sticking to the wound, like today's first-aid creams. Bacteria do not grow in oil. In fact, we tested the survival of staphylococci in sesame oil and found that they were rapidly killed. Beyond these practical facts, oil had very special connotations. To us it means salad dressing and lubrication; in the ancient Near East it was a basic need of life; it was the main source of light, a ritual offering, a measure of wealth, and a spiritual symbol in many anointing ceremonies. When the asu applied it to a wound, he certainly felt that he was doing something basically good, and so did his patient" (14)
Pharmacopoeia

A variety of substances was used by physicians for medical therapy. Basically three groups of substances were used: plants, minerals, and animal products. Herbs and plants were by far the most commonly used, so much so that the word for herb "shammu" became a common term for "medicine" or "drug".

R. Campbell Thompson has done much of the research in this area, identifying 250 medicinal plants, 120 mineral substances, and some 180 other drugs, not including solvents or vehicles used in prescriptions. Thompson's efforts were rewarded by publication of three excellent reference sources in this field: 1) *The Assyrian Herbal*, London, Luzac 1924; 2) *The Chemistry of the Ancient Assyrians*, London, Luzac, 1925; and 3) *A Dictionary of Assyrian Botany*, London 1949, in addition to his monumental work on "Assyrian Medical Texts".

Identifying some medicinal materials has been a problem. Assyrian herb-lore applied many colorful names to the various plants. The English translations for some of these names are "human bone", "doves dung", bulls' horn, "lizard's stool", "lizard's stomach", and "snake's intestine." This shows some striking similarity to the use of colorful names in the English language, such as "foxglove," for the digitalis plant. In the same manner, "lion's fat", "black dog's fat", and "fat of mankind" were synonymous with opium. Another term, the "enemy of muscles," was a more descriptive name for opium. "Daughter of the fields" was the opium poppy, and "lion's blood" was the sap of the tamarisk plant (40).

For many years, it was believed that these colorful names were employed to impress or psychologically influence the patient by the use of such unusual, rare and exotic drugs. Similarly, nauseating and unpleasant drugs were used to make the patient's body unfit for demonic habitation. Currently, it is believed that these were indeed real plants of some therapeutic value. Different parts of plants were used, such as the root, bark, leaves, flower, and fruit. In some plants, the fruit or flower was supposed to be picked at a certain time when their medicinal properties is maximal. This has been scientifically proven and is still practiced today.

Most plants and herbs were used in combination with other medications with different modes of application. For example a plant named "azallu," which P. C. Thompson identified as cannabis (hemp or hashish), was known as "a drug when there is depression of spirits" (40). The "azallu plant is a plant for forgetting worries", and was used as a potion, as a salve mixed with other drugs to make a bandage against the disease, "hand of a ghost." It was also used for fumigation "fumigate him with azallu plant along with other dried plants". Opium was used for the treatment of double vision, for broken footsole: "Dry alone, pound mix in fat bind on". For stomach ailments: "Mix opium with other drugs and drink". "Opium alone with beer and drink" was prescribed for kidney stones. For anal problems,a suppository was made: "mix opium with mandrake root and other drugs, and fat; make finger shape and insert in rectum".

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Describing and discussing Assyrian pharmacopoeia is beyond the scope of this presentation and, therefore, we touch on only a few points of interest.

To emphasize the effectiveness of some prescriptions, "this is a tried and true remedy" has been mentioned. This could be a reference to its ancient origins or some other source of lore attached to it. In other prescriptions, a different emphasis was stressed such as:

"Proved and tested salves and bandages which have been collected according to the tradition of the ancient sages from before flood." (7)

Some other treatments are attributed to famous kings (such as Hammurabi), or to famous physicians.

"the secret of the king or the physician." (7)

"proved prescription of the hands of the master." (7)

Many drugs, indeed, were tested on slaves before prescribing them to royal family members. For example, a physician Adad-shum-usur reported:

"Concerning the medicine about which the king, my lord wrote me, it is perfectly safe. As the king, my lord has commanded, in all haste we shall give it to those slaves to drink. Afterwards the crown prince may drink it."

Dr. Sigerist comments:

"The interesting statement that drugs were tested on slaves before they were given to members of the royal families reminds us of the fact that 2400 years later, in A.D. 1722, the inoculation of small pox was tested on 7 criminals and 6 orphans before it was practiced on the children of the Princess of Wales." (9)

There is a series of tablets that function as a source of reference for medical therapy. Each tablet is divided into three columns. In one column is the name of the disease; the second column lists the drug; the third column lists the instructions for use of the medication. This group of tablets could have been designed to facilitate finding effective medication for certain diseases and the methodology of using them. This resembles the present-day, PDR (Physician's Desk Reference). Other tablets containing lists of drugs could represent the inventory of a pharmacy. Ten to twelve drugs were enumerated in each paragraph of text, followed by the notation:

"They are on the first shelf, second shelf, and so on." (11)
Finally, there is evidence that a class of preparers of remedies and cosmetics emerged called "patisu," but no details have been found about its documentary appearance and its position in relation to medicine. There is also evidence that in the city of Sippar, during the time of Hammurabi, the retailers of drugs seemed to have installed their trade in a special street designated the "market of pharmacists."

Conclusion

This article is an abbreviated review of medicine in ancient Assyria and Babylonia. Complete coverage of the subject would require several hundred pages, well beyond our present objective. Whenever possible, emphasis has been placed upon the more rational aspects of medical practice rather than the magical or supernatural parts played by clergy. Furthermore, I have attempted to present the subject in terms that the lay person, as well as the medical professional can understand. To this end, some compromises were required.

The reference sources cited in the text, with few exceptions, are all from English language sources or English language translations of excerpts from non-English original books and articles. This has been done for the benefit of the interested reader.

We Assyrians are deeply indebted to the past and present day Assyriologists and archaeologists who have devoted their lives unselfishly to the field of Assyriology. They have uncovered the facts concerning the great contributions of our forefathers to mankind. With all due respect and gratitude to the non-Assyrian Assyriologists, it is imperative that future scientists and scholars have considerable knowledge of the vernacular (modern) as well as the classical Assyrian language. I have submitted this article in the sincere hope that it will stimulate a few young Assyrians to pursue a career in Assyriological Studies.

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