

IBN SĪNĀ ON MATERIA MEDICA

TAZIMUDDIN SIDDIQI

Institute of History of Medicine and Medical Research
Hamdard Nagar
New Delhi 110062

Abū 'Alī al-Ḥusain bin 'Abdullāh ibn Sīnā, popularly known as Shaiḫh al-Ra'īs in the East and Avicenna in the West, was born in 980 A.D. in Afshāna, a village in Bukhāra and died in 1037 A.D. at Hamdan. Within this short life of 57 years, the earlier years of which were spent in his own education, Ibn Sīnā managed to write or compile a surprisingly large number of books and tracts (*Rasā'il*)—from 43 according to his biographer Shaiḫh Abū 'Ubaid 'Abd al-Wahīd al Juzjanī¹ to 276 according to Father A. awati.² The most influential of all these books is his *al-Qānūn fi't-Tibb* whose Latin translation by Gerard of Cremona served as a text-book of medicine in the Universities of St. Louis, Montpellier, Louvain, Leipzig and Tübingen for several centuries. *Al-Qānūn* was issued sixteen times in the last 30 years of the 15th century and 20 times in the 16th century. Whereas in the West *al-Qānūn* continued to be taught till the 18th century, in the East it is still included in the syllabi of colleges for the education of Greco-Arab Medicine.

Al-Qānūn fi't Tibb runs into five volumes or books spreading over some 2000 pages and containing about a million words. The five books are : (1) *General Principles of Medicine* ; (2) *Materia Medica* ; (3) *Particular Therapy* ; (4) *General Therapy* ; and (5) *Formulary*.

Scholars wrote commentaries on *al-Qānūn* and produced its abridged versions which in turn needed further commentaries. The most comprehensive commentaries on the first book of *al-Qānūn* are those by Quṭb al-Dīn and Maḥmūd Amlī. Only two commentaries cover all the five books, one by Ibn Nafīs and the other by Ḥakīm 'Alī Ḥusain Gīlānī, the court-physician of Akbar. Two abridgements of the entire *al-Qānūn*, one *Mūjaz al-Qānūn* by Ibn al-Nafīs Qarshī and the other, *al-Qānūnchā* by Sharf al-Dīn Muhammad bin 'Umar al-Chaghmini, became very popular and are even today included in study courses.

Within one hundred years of Ibn Sīnā's death, *al-Qānūn* was translated into Latin by Gerard of Cremona. A Russian translation of *al-Qānūn* was published at Tashkent between 1954 and 1960. In the Indo-Pakistan subcontinent when Urdu gained ascendancy as a common language and people shifted their attention from Arabic and Persian to Urdu, the necessity of an Urdu translation was keenly felt.

In India, the first Urdu translation of all the five books of *al-Qānūn* was completed by Ḥakīm Ghulam Hasnain Kanthuri and published in 1896 by Matba' Nawal Kishore, Lucknow. Ḥakīm Kabīruddīn translated the first book of *al-Qānūn* in Urdu and published it with the title *Tarjama wa Sharḥ Kulliyāt-i Qānūn* in 1930 from Delhi. In 1945 Hakim Khwaja Ridwan Ahmad also translated the first book of *al-Qānūn* into Urdu. The second edition of this translation was published in 1952 by Shaikh Ghulam 'Ali and Sons, Lahore, Pakistan.

Dr O. Cameron Gruner, M.D., London, translated the first book of *al-Qānūn* into English and Luzac and Company, London, published it in 1930. It covers 612 pages. The title page reads :

A TREATISE
ON
THE CANON OF MEDICINE OF AVICENNA
INCORPORATING A TRANSLATION OF THE FIRST BOOK
BY
O. CAMERON GRUNER, M.D., LONDON

Dr M. H. Shah, F.R.C.P., Karachi, Pakistan, also translated the first book of *al-Qānūn* into English, published by Naveed Clinic, Karachi, Pakistan, 1960. The title page of this translation reads :

GENERAL PRINCIPLES
OF
AVICENNA'S CANON OF MEDICINE
MAZHAR H. SHAH, F.R.C.P.

However, there remains need for a good and correct translation of all the five books of *al-Qānūn* into English direct from Arabic, since the translation of Gruner is based on the Latin translation and that of Shah on the Urdu translation. The Institute of History of Medicine and Medical Research, Hamdard Nagar, New Delhi, has undertaken the arduous task of translating the entire *Qānūn* into English directly from the original Arabic text. A team is working on the project under the supervision of Ḥakīm 'Abdul Hameed, the President of the Institute. The translation of the first two books is undergoing revision which may take some time. Before the translation was undertaken, a critical edition of the *Qānūn* (in Arabic) was prepared with due care and after comparison with old manuscripts and printed editions. This critical edition is being released at the end of this seminar.

This paper is based on the actual translation of the second book of *al-Qānūn* *fi't-Tibb*, which is on *Mufradāt* (simple drugs or *Materia Medica*).

The book begins with a preface in which Ibn Sīnā says :

“By the name of God who is the most gracious and merciful. All praise is due to God ; and peace be on those servants of His, whom He has chosen. After praising God and praying for His Prophet Muhammad and his progeny, I say that this book is the second in the series of books which I have compiled on the science of medicine. The first book which deals with general principles of medicine is already complete. The second is this which deals with simple drugs. I have divided it into two discourses. The first discourse is on natural laws which should be known in connection with simple drugs and the second is on potencies of some specific drugs. The first discourse is divided into six sections. These are : (I) On temperaments of simple drugs ; (II) On temperaments of simple drugs determined by experience ; (III) On temperaments of simple drugs determined by analogy ; (IV) On actions and potencies of drugs ; (V) Certain rules applying to drugs ; and (VI) On collection and storage of drugs.

“In the second discourse I shall describe simple drugs in the manner that one specific thing will be stated in one column—there being different columns for different things. I have divided the schedule or chart (*lawh*) of simple drugs into 16 columns which are :

- (1) This column shall give the name of the drug. Only that name, Greek or Arabic, which is popular among the physicians, shall be given. It shall also be specified whether it is an animal drug, vegetable drug or mineral drug and what part or parts of it are used.
- (2) It shall specify the best variety of the drug.
- (3) It shall give the temperament of the drug and its degrees.
- (4) It shall mention the properties and actions of the drug—whether these be specific or non-specific.
- (5) It shall mention whether a certain drug has some properties to act as a cosmetic.
- (6) In this column properties, actions of drugs in relation to swellings and pustules shall be noted.
- (7) In this column properties and actions of drugs in relation to wounds and ulcers shall be noted.
- (8) This column shall specify those drugs which are useful for diseases of the joints.
- (9) This column shall specify those drugs which are useful for diseases of the head.

- (10) It shall mention drugs used in diseases of the eye.
- (11) It shall notify drugs used in diseases of respiratory organs.
- (12) It shall name the drugs used in alimentary diseases.
- (13) It shall name the drugs used in relation to excretory organs.
- (14) It shall be for drugs used in fevers.
- (15) It shall relate to antidotes.
- (16) It shall notify drugs which may be used as substitutes."

The library of the Institute of History of Medicine and Medical Research, Hamdard Nagar, New Delhi, possesses the following :

- (1) Photostat copy of the Aya Sofia (Istanbul) manuscript of *al-Qānūn* which was transcribed in 618 A.H.
- (2) *Al-Qānūn* printed at Rome in 1593 (A.D.)
- (3) *Al-Qānūn*, Bulaq edition, Cairo, printed in 1294 A.H.
- (4) *Al-Qānūn*, printed at Tehran in 1296 A.H.
- (5) *Al-Qānūn*, printed at Nami Press, Lucknow, India, in 1223 A.H./1906 A.D.

None of the above contains the tables or charts or schedules having the above columns. S. A. 'Ali has correctly observed : "One does not know whether such charts were at all prepared. If they were, they are lost to us. They would have helped much in the understanding of certain parts of *al-Qānūn*."³

After stating the headings of the 16 columns, the book begins with Section I which embodies general principles applying to temperaments of drugs. Temperaments constitute one of the fundamental theories of Greco-Arab Medicine and are included in the *Umur-i tab'īya* (essential constituents of human life), which are seven in number and without which there can be no existence. These are *Arkan* (elements), *Mizaj* (temperaments), *Akhlāt* (humours), *A'da'* (organs), *Af'al* (actions), *Quwā* (faculties), and *Arwāh* (spirit, *pneuma*).

IBN SĪNĀ ON TEMPERAMENTS OF SIMPLE DRUGS

Section I, Book II

Ibn Sīnā states as follows :

"When we say 'This drug is hot', 'this is cold', 'this is humid' or 'this is dry', we mean that these qualities are in respect of or in relation to our bodies..... We do not, however, mean to say that the temperament of a drug is the same as that of a man, for the temperament of man is exclusively his own..... When simple drugs are intermingled and compounded so as

to become one, they acquire a second temperament..... When a part of certain drug reaches an organ, the other ingredients having an affinity with the former would follow it. Thus by their conjunction is produced an effect which penetrates equally into all parts of this organ. There are drugs which have contrary potencies and in which total fusion is not found, *e.g.*, *Chemo-mile* which has both resolving and astringent properties..... Then there are drugs whose potencies can be dispersed through coctin, *e.g.*, cabbage. When it is cooked in water its detergent matter is dissolved in water while the earthy astringent matter remains. The cabbage-water becomes purgative while its remaining substance becomes astringent..... There are certain drugs whose components are separated by washing, like endive and most of the grains Some drugs contain two substances with different temperaments without mixing completely with each other.”

Ibn Sīnā has given reasons for the different behaviours of drugs in relation to temperaments.

Drugs have different degrees of temperament, *e.g.*, hot in the first or second or third or fourth degree. The physicians of Greco-Arab Medicine have determined these degrees by experiment or by analogy.

DETERMINATION OF THE DEGREE OF TEMPERAMENT OF SIMPLE DRUGS THROUGH EXPERIMENT

Section II, Book II

Ibn Sīnā says :

“In order to determine the degree of temperament of a drug by experiment it is necessary that :

- (i) The drug should be free from an extensive alteration or transformation taking place in its substance or combination of something else with it. For example, water though intrinsically cold becomes hot when placed on fire ; or almond, which is intrinsically moderate becomes very hot when rotten.
- (ii) The experiment should be based on simple diseases. If the disease is the result of two causes demanding two different treatments and the experiment of a drug on both of them becomes successful it would be difficult to determine the exact cause of success.
- (iii) The drug should be tried in different cases. If the drug proves to be useful in all these cases it would not be proper to say that the drug has a contradictory temperament—for it might have been useful in the case of a particular disease intrinsically and in the case of another disease

extrinsically. Scammony is an example. Scammony if tried in a cold disease is likely to be useful through its heat. If tried in a hot disease, e.g., tertian fever, it may prove useful through its action of evacuating the bile. In such cases our experiment would not ensure the hotness or coldness of the drug unless we are in a position to distinguish the intrinsic act of the drug from the extrinsic one.

- (iv) The drug should, both in quality and in quantity, be in just proportion to the nature and severity of the disease..... It is, therefore, necessary to try a drug initially in cases of milder diseases and then gradually proceed till the potential of the drug is firmly established.
- (v) The time at which the drug has proved effective should be noted. If the effect appears soon after the administration of the drug, one may conclude that the effect is natural to the drug. On the other hand, if the effect appearing in the beginning is in sharp contrast with that appearing at the last round of the experiment, or the drug remains inactive at the outset to react at the end only, then it would be a doubtful and difficult case. Here it may be assumed that the effect of the drug was only accidental..... Some substances produce their original effect after they have produced their first accidental effect. This generally happens when such substances acquire a foreign power which overrides the physical (original) one. For example, hot water remains hot presently but next day it loses heat (which was merely accidental) and it shall cause coldness in the body.
- (vi) The action of the drug should be watched constantly to find out whether the action is one and the same in all or in most of the cases. If it is not so, the action may be regarded as temporary and accidental.
- (vii) The experiment should be made on human body. If it is made on some other body the result may be diverse for two reasons : (1) the drug which is hot in relation to human body may possibly be cold for a lion or a horse..... For instance, *Revand Chini* (*Rheum emodi*), I think, is cold for the body of a horse though hot for the human body ; (2) a drug may have one property in relation to one body and quite another in regard to another body, for example, *Bish* (aconite) is a poison for human body but not for a starling."

On temperament of drugs Ibn Sīnā says in Book I, Section XV of *al-Qānūn*, (English translation by M. H. Shah, p. 184 onward).

"Medicines (or drugs) have four grades of potency. Grade I drugs are those which, in specified doses, do not produce any appreciable effect on the body, for instance, heat or cold produced by them is not felt at all unless the

drug is taken repeatedly or in large doses. Grade II drugs are those which are a little more potent than Grade I but are neither so potent as to produce any visible disturbance in the functions of the body nor do they *per se* interfere with the normal course of physiological functions except secondarily. It is only when administered repeatedly and in larger doses that they produce any visible damage or disturbance of normal functions. Grade III drugs are those which in specified doses produce *per se* notable disturbance of normal functions of the body but not to the extent of producing disease or death unless taken repeatedly or in larger doses than normal. Grade IV drugs are those which produce damage or destruction (of the body). This action refers to poisonous drugs which act by their characteristic qualities but a substance which is lethal by its specific nature is a true poison. All substances which come in contact with the body and act and react upon it are of three types: (1) those which are altered by the body but do not produce any change in the body; (2) those which are altered by the body and produce changes in it; and (3) those which are not altered by the body but even then produce changes in it. Substances which are altered (metabolized) by the body but do not produce any appreciable change are: (a) nutritive food articles in general which become a part of the body; and (b) non-nutritive substances which are the balanced medicines. Substances which are altered by the body and also produce changes in it are those (i) whose action ceases after digestion and are (a) assimilable as the medicinal foods, and (b) non-assimilable as the actual medicines; and (ii) which continue to act even after digestion until they produce destructive changes in the body. These are poisonous medicines.

Substances which produce changes in the body without changing themselves are the real poisons. All nutritional substances produce heat as their natural consequence because their conversion into blood leads to a natural increase of heat (energy) in the body. This heat is, however, not the same as the heat produced by drugs even before their digestion and alteration just as the body alters the material of medicinal foods, it also alters their qualities. This qualitative change, however, occurs before their regular digestions. In this way some medicinal foods are hot and immediately produce heat in the body, for example garlic, while certain other foods are cold and make the body cold, for example lettuce."

The physicians did not work any mathematical formula or mechanical device to quantify the degrees of the temperament of drugs. However, from their observations and long experience they laid down and adopted some simple tests. For example, Hakim Muhammad Akbar Arzānī says in his book *Mufarraḥ al-Qulūb* as follows:

“As human beings are endowed with different temperaments, drugs also have their own temperament or a combination of temperaments ranging from first to fourth degree. A drug may be of hot, cold, moist, or dry temperament. It may be having a combination; for example, it may be hot and dry, hot and moist, cold and dry, or cold and moist. It may be hot in the first degree and dry in the first degree, and so on. A drug may be moderate, *i.e.* of equable temperament, equable in coldness, heat, moistness and dryness. The physicians started with a human being of sound health and equable temperament as a base. If a drug administered to such a person affected him medically or medicinally but did not create any discernible change in his temperament it was branded as a ‘moderate drug’. If the drug increased body heat, it was rated as a ‘hot drug’. If the drug created some coldness in the body it was declared to be a ‘cold drug’. If a drug created some dryness or moistness it was taken to be a ‘dry’ or ‘moist’ drug. A slight effect which is just discernible would constitute the first degree. A rise from this degree onward will be denoted by the remaining three degrees. The third is an extreme degree, and the fourth mostly fatal or highly injurious. Most poisons have the fourth degree of temperament. With the help of their observations, clinical trials, and experience gained during the treatment of numerous patients of different temperaments, physicians of Greco-Arab medicine have placed the simple drugs (*Mufradāt*) known to them under different degrees and the books on *Materia Medica* point out these degrees under each drug. By consulting these books one can find the temperament (along with its degree) of a drug. This knowledge of the temperament of drugs enables a physician to pick and choose drugs which may suit a person of a specific temperament. Some time, the degree of the temperament of a drug is increased by doubling or trebling the dose. If a drug affects only the *pneuma* it will be in the first degree of temperament (whatever it be: hot, cold, dry, or moist). If a drug affects the *pneuma* and humours, the temperament of the drug would be of the second degree, and if it affects the *pneuma*, humours, and fluids, the temperament will be of the third degree. If it affects these three as well as the organs, the temperament will be of the fourth degree. Forms of compound medicines such as coarse powder, fine powder, extracts, and syrups have their own specific characteristics and the intensity or otherwise of drugs depends on these forms also.”

DETERMINATION OF THE TEMPERAMENTS OF DRUGS THROUGH ANALOGY

Section III, Book II

While discussing the various modes and methods for the determination of the temperaments of drugs through analogy, Ibn Sīnā says :

“The determination of the temperaments of simple drugs through analogy is based on : (i) transformation of a drug, (ii) smell of the drug, (iii) taste of the drug, and (iv) colour of the drug.

“*Transformation of a drug* : The first method is to determine which one, out of the things that are equal to each other in respect of the constitution of the substance, such as porosity and density, swiftly inclines towards heat. The one which acts so is hot and its contrary is cold. However, when one of the drugs is intense in rarefaction and the other in density, the former would be more sensitive to an effect because of the weakness of its substance, though both may be equal in heat and coldness..... A drug which is apt to congeal more swiftly, though its substance may be like that of some other drug, would be colder and a drug which is more inflammatory, though its substance may be like that of the former, would be hotter..... Out of the drugs that are liable to coagulate, being equal to each other in substance, the most liable to coagulate would be the coldest.”

Smells, tastes and colours of simple drugs, Section III, Book II

Ibn Sīnā says :

“Strong and pungent smells can exist with a hot substance only. Tastes which are salty, sweet, bitter or pungent must necessarily be of hot substances. The tastes which are astringent, sour or acrid can never stand but with cold substances..... while colour of dense bodies which have got some sort of humidity would always be found with cold substances. If this colour belongs to dry and husky bodies then they must stand with hot substances. As for black colour, in both cases mentioned above, the condition would be contrary since cold whitens the moist and blackens the dry whereas heat blackens the moist and whitens the dry. But there are other reasons which contradict this contention. The bodies of drugs are composed of different elements. One of these elements may possibly be having a temperament which endowed it with a particular kind of taste, colour or smell in sharp contrast with the taste, colour or smell claimed by other elements having different temperaments, or the temperament may not at all be impressed with any taste, colour or smell..... When one substance combines with another substance which has no colour at all, and both are equal in quantity and quality, the resultant quality would be moderate. If the colourless element is more powerful than the coloured one, the quality opposing the quality of the white one would be more effective. As such, the temperament of the substance would be hot, though whiteness demands it to be cold, provided both of them (white and coloured) are quantitatively equal to each other..... Among the perceptible qualities there are some which

are influenced by the opposite qualities which mix up with them. As long as these qualities remain genuine and perceptible, the opposite qualities are not perceived (on account of their meagre quantity), though they are dominant on account of their quality. This happens in tastes, not always but mostly. Smells come next to tastes, and colours to which the above rule could be applied come, more reliably, in the last. One of the reasons why tastes override smells is that they are felt just when they meet the faculty of perception. As such, they are the best of all constituents of a drug to communicate a quality while colours and smells show their effects even when they have no meeting with the constituents of the drug for it is possible that some vapour arising from the refined parts of the drug comes to be felt; whereas no vapour arises from the heavy parts of that drug. A colour which is perceptible may possibly be the colour of the dominating exterior and not of the hidden part of the drug. Sometime odours indicate taste, *e.g.*, sweet or sour, pungent or bitter odour. All such odours follow tastes. This shows that tastes are more correct in communicating quality and then come odours and colours..... The physicians have worked out nine simple tastes. These are actually eight—the ninth is absolutely tasteless such as water. A taste can never be passive. The eight tastes are: (1) Sweetness, (2) Bitterness, (3) Pungency, (4) Saltiness, (5) Sourness, (6) Acridity, (7) Astringency, and (8) Greasiness

“The physicians have said that a substance which bears certain taste would be either dense and earthy or tenuous or moderate. In temperament it would be either hot or cold or moderate. If the substance is dense and hot it would be bitter; if it is cold and earthy it would be acrid; if it is moderate and earthy it would be sweet. Similarly, if the substance is tenuous and hot it would be pungent; if the substance is tenuous and cold it would be sour; if the substance is moderate it would be neither pungent nor sour. If the substance is moderate in density and tenuity and is hot it would be salty; if cold—astrigent..... Pungent is hotter, then bitter and salty, respectively..... So far as a salty substance is concerned, it appears to be bitter but the bitterness is broken by cold moisture as is evidenced by its construction..... Borax and bitter salt are hotter than the edible salt..... Ordinarily, an acrid substance is coldest; the astringent and sour come next. This explains the fact that fruits are, initially, acrid and cold but when they reduce wateriness and airiness to become a little more moderate through the heat of the sun, they tend to become sour. Green grapes offer the example. Later, the taste inclines towards a bit of astringency in negation of acridity and ultimately the taste shifts to sweetness when the ripening heat operates fully. A taste generally shifts from acridity to sweetness

without the medium of sourness, *e.g.*, clove. Nevertheless, though sour is less cold than acrid it is mostly more cooling because of its tenuity and penetration..... The actions of tastes are :

Bitterness : Cleansing, coarsening and astringency.

Acridity : Astingency if weak and squeezing if strong.

Astringency : Astringency, thickening, hardening and retention.

Greasiness : Soothing, adhesion and a little maturating.

Pungency : Dissolving, diluting and putrefaction.

Saltiness : Cleansing, washing, desiccation, resistance, putrefaction.

Sourness : Cooling and diluting.

“Sometime two tastes combine in one substance, for example, bitterness and astringency combine in *Hadad* (ophthalmic barberry) ; bitterness combines with saltiness in Cassia bark. Boiled honey contains both pungency and sweetness ; brinjal has bitterness, pungency and astringency ; endive has some bitterness with insipidity..... When two tastes combine together, they in most cases strengthen the taste..... Sometime such a combination proves helpful and sometime adverse for the quality of the substance. It is helpful when tenuity combines with sourness and has adverse effect such as when density joins the whey. Certain tastes are impure in the beginning but with the passage of time they attain purity. Some tastes are pure initially but later by the effect of time become sour and bitter, *e.g.*, honey. The passage of time enhances the bitterness and pungency of the taste. When acridity combines itself with bitterness it acquires the property of cleansing and is useful for healing wounds..... Every substance having this quality is useful for stomach and liver but absolute bitterness and absolute pungency are harmful for viscera. However, acridity and bitterness, provided they have an addition of astringency, strengthen the viscera since bitterness has cleansing and astringency property. An astringent-cum-bitter substance, provided the bitterness is not excessive, may serve as a purgative for biles and wateriness. If the astringency exceeds bitterness this substance cannot expel viscous phlegm. Sweet substances with little astringency, being tasteful and acting as tonics, are desirable for viscera and useful in coarseness of lungs..... Desiccant substances having some sweetness resist irritation.

“Odours have a relationship with heat or cold. Generally the tenuous vapours of air enable the odour to reach the faculty of smell. It also happens that air itself is transformed into odour without dissolving the substance of the odour..... All odours which are more inclined to sweetness are hot, while those emerging from sour, mouldy or moist substances are cold..... Most of the perfumes are hot.”

DETERMINATION OF PROPERTIES AND ACTIONS OF DRUGS

Section IV, Book II

What Ibn Sīnā has said on determination of properties and actions of drugs may be summed up as under :

Simple drugs have general actions or particular actions or actions resembling general actions. General actions are actions whose unefulness or harmfulness is general and the entire body reacts to them directly..... They are primary or secondary. Primary actions are four in number : cooling, heating, moistening, and desiccating. Secondary actions are the same as primary actions provided they are measurable and can be specified as 'much' or 'less'. These are various forms of heating or cooling with the addition that they are measurable and comparable..... Actions which do not strictly conform to general actions but resemble them are like causing diarrhoea, promoting discharge and perspiration.....

According to their actions Ibn Sīnā has divided drugs into five groups. The first comprises 22 actions, the second and third six each, the fourth eight, and the fifth seven.

Group (1) = 22 actions as follows :

- (1) Attenuant (*Mulattif*) : These drugs, through their moderate heat, attenuate the humour, such as hyssop and thyme.
- (2) Calorific (*Musakhhkin*) : These drugs generate heat in the organs of the body.
- (3) Resolvent (*Muḥallil*) : These drugs are, by the intensity of their heat, capable of dispersing the humour, *e.g.*, Castoreum.
- (4) Detergent (*Jali*) : These drugs are capable of moving viscous and congealed fluid from the pores of the surface of an organ and finally remove it, *e.g.*, *Mā' al-'Asal* (honey-water). Generally every bitter drug is detergent.
- (5) Roughening (*Mukhashshin*) : These drugs make the surface of an organ uneven by elevating or lowering it, *e.g.*, Melilot.
- (6) Deobstruent (*Mufatteḥ*) : Such drugs agitate the matter which lies deposited in the cavity and opens the passage, *e.g.*, parsley.
- (7) Relaxant (*Murkhi*) : These soften the texture which has dense pores. Through their heat and fluidity the pores widen and thus facilitate the expulsion of the superfluous matter deposited therein, *e.g.*, dill and linseed used in plasters.
- (8) Coctive (*Mundij*) : These drugs maturate the humour because of their moderate calorific property. They also possess an astringent property which restrains the humour till it is ripe or mature and do not dissolve it rapidly.

- (9) Digestive (*Hādim*): Such drugs help in the digestion of food.
- (10) Carminative (*Kathir al-Riyah*): These drugs dissolve the consistency of gases by their heat and desiccation. The gas is dissolved and removed.
- (11) Erosive (*Muqatṭe'*): Because of their tenuity they penetrate between the surface of an organ and the viscous humour clung to it and separate the latter.
- (12) Absorbent (*Jāzib*): These, because of their tenuity and heat, stir the fluids and move them towards the place where they have been applied (in the form of poultice or plaster). A strong absorbent drug is very useful in sciatica and when used in the form of a plaster.
- (13) Irritant (*Laz'*): These drugs are so penetrative and tenous that they split a compact matter into numerous particles which are similar in shape but differ in quantities.
- (14) Rubefacient (*Muḥammir*): Such drugs heat an organ so intensely that blood is attracted towards this organ which becomes red from outside.
- (15) Pruritic (*Muḥakkik*): These, because of their intense heat and property of absorption, cause irritation and help the humour to move towards the pores but do not ulcerate. They are generally assisted in their function by their imperceptible or hard and very tiny thorns, e.g., wild celery.
- (16) Ulcerative (*Muqarreh*): This class of drugs annihilates and dissolves the fluids contained in parts of the skin and attracts the harmful matter towards it causing an ulcer, e.g., marking nut.
- (17) Caustic (*Muḥric*): These drugs dissolve tenuous humour in organs leaving behind ashiness, e.g., Euphorbium.
- (18) Corrosive (*Akkal*): They are so strongly solvent and ulcerative that they cut away or reduce the flesh, e.g., Copper acetate.
- (19) Putrefactive (*Mu'affin*): They corrupt the temperament of the *pneuma* and fluids of an organ to such an extent that they cease to remain parts of that organ but not to the extent that the organ be corroded.
- (20) Lithotriptic (*Mufattit*): These drugs strike against the petrified humour or substance (e.g. kidney-stone), crush and reduce it into small pieces. Silicate of lime is an example.
- (21) Cauterizing or caustic or pyrotic (*Kavi*): These burn and harden the skin which then blocks the flow of liquid humour. Such drugs as copperas and vitriol are used to prevent the blood from oozing out of the veins.
- (22) Peeler (*Qashir*): Such drugs by their strong cleansing property cleanse parts of the decayed skin, e.g. all such drugs which are useful in vitiligo and freckles.

Group (2) = 6 actions as follows :

- (1) Cooling (*Mubarrid*) : These drugs have a cooling effect.
- (2) Tonic (*Muqavvi*) : This class of drugs moderates the disposition and temperament of an organ to such an extent that it (the organ) refuses to receive the superfluous matter moving towards it.
- (3) Repellent, deterrent or repurcussive (*Radi'*) : These are the opposite of absorbent drugs and, by their property of cooling, create some coldness in an organ, make it dense, narrow down its pores, break its heat, condense or coagulate the fluid flowing towards it, and thus prevent it (the fluid) from reaching the organ.
- (4) Inspissant (*Mughalliz*) : These thicken the consistency of fluid by their property of condensing or coagulating.
- (5) Immaturative (*Mufajjij*) : In properties, these are contrary to digestive or maturative drugs. By their coldness they render the action of innate or extraneous heat on foods and humours ineffective to such an extent that foods are left undigested and humours immature.
- (6) Anaesthetic (*Mukhaddir*) : By their coldness these drugs dissolve the *pneuma* of an organ to the extent that its motive and sensory power acquires a cold temperament and its substance becomes dense. They dissolve the temperament of an organ to the degree that it (the organ) does not respond to the effects of psychic faculty. Opium and Indian hemp are examples.

Group (3) = 6 actions as follows :

- (1) Moistening (*Murattib*) : These moisten the humours or organs.
- (2) Flatulent (*Munaffikh*) : These drugs have foreign or dense humours. When innate heat acts on them they produce gases or winds such as kidney-beans. All flatulent drugs and substances produce headache and are harmful to the eye. Some of the drugs and substances whose humour is transformed into winds in the first digestion, produce flatulence in the stomach and this flatulence is dissolved when it reaches the intestines. But the drugs or substances whose reaction is completed in the stomach itself produce a flatulence which subsists.
- (3) Abluent (*Ghassāl*) : These drugs serve as cleansers. They perform this function not by their active but reactive power which is helped by motion. When a rarefied substance flows over a part of the body the superfluous matter is removed. Barley water and pure water are the examples.
- (4) Lubricant (*Muzliq*) : These drugs soften the matter confined in the body and push it from its place by their repulsive power, e.g., Bukhara plums.

- (5) Smoothing (*Mumallis*): These are viscous drugs which while spreading over the surface of a dry organ smoothen it. The outward of that organ becomes smooth and the dryness is concealed or some fluid spreads over it.
- (6) Feculent for wounds (*Muassikh al-Quruh*): These are moist drugs and pollute the wounds. On meeting a wound they increase its fluid and stop the drying and healing process.

Group (4) = 8 actions as follows :

- (1) Desiccant (*Mujaffif*): These drugs, by their properties of dissolving and rarefying, destroy (dry up) fluids.
- (2) Constricting or squeezing (*Asir*): This class of drugs makes use of its astringency and condensing qualities in forcing the thin fluid which has collected in the interstices of an organ to separate and then removes it.
- (3) Astringent (*Qābid*): This class of drugs creates density in the parts and state of an organ and closes the channels.
- (4) Obstruent (*Musaddid*): These drugs have denseness or dryness or are agglutinant and when used are retained in the openings forming obstructions.
- (5) Agglutinant (*Mugharri*): These are dry drugs having some viscous fluid also. They adhere to the openings (in the body), shut them up and stop the flow of the matter or substance. When viscous and lubricant drugs are heated they become agglutinant or obstruent.
- (6) Healing (*Munadmil*): These drugs thicken or dry up the fluid collected between two layers of a wound to the extent that the fluid becomes agglutinant and viscous and both the ends of the wound adhere to each other.
- (7) Flesh-growing (*Mumbit al-lahm*): These drugs convert the blood congested on the face of a wound into flesh by moderating the temperament of the blood and thickening it through desiccation.
- (8) Cicatrizing (*Khātim*): These desiccant drugs dry up the surface of a wound and form slough. This slough provides protection against injuries till natural skin grows.

Group (5) = 7 actions as follows :

- (1) Fatal (*Muhlik*): These drugs excessively corrupt temperament, e.g., opium.
- (2) Poisonous (*Samm*): These drugs corrupt the temperament not because of their antagonistic action but by their specific inherent property, e.g., aconite.
- (3) Antidotes (*Tiryāq*): Antidotes preserve the *pneuma*, maintain its vitality and soundness, enabling it to remove the harms of poisons.

- (4) Bezoar (*Fadzahar*): Bezoar also preserves the *pneuma*, maintains its vitality and enables it to remove the harm of poisons. (The name antidote, *Tiryāq*, is more appropriate for manufactured medicines and bezoar for simple natural drugs..... Natural herbs may be termed as antidotes while the mineral drugs as bezoar. No marked difference exists between an antidote and bezoar.)
- (5) Purgative (*Mushil*): These drugs cause purgation.
- (6) Diuretic (*Mudirr*): These drugs increase the secretion and flow of urine.
- (7) Diaphoretic (*Mu'arriq*): Such drugs produce or increase perspiration.

Thus drugs *vis-a-vis* their actions may be divided into five groups and a total of 49 actions.

After describing the five groups of drugs Ibn Sīnā has given some important hints on simple drugs. These may be summarized as under :

- (a) All resolvent drugs having the quality of astringency are moderate drugs which are very useful for the flabbiness of joints, convulsions and phlegmatic swellings.
- (b) When astringency and dissolution combine in a drug, dryness becomes intense.
- (c) Purgative and diuretic drugs are often self-contradictory in their action. In most cases a diuretic drug desiccates sediments (faeces) and the purgative reduces urine.
- (d) Drugs which have the quality of heating as well as astringency are beneficial for hot swellings since they stop them from moving further. They cause retention by their astringency and dissolution by their quality of heating.
- (e) Drugs which have antidotic properties and are cold generally prove very useful for hectic fever.
- (f) Drugs which have antidotic properties but are hot are useful in the coldness of heart.
- (g) Drugs which are purgative but also have astringency (*e.g.*, *Colchicum luteum*) are beneficial for rheumatism.

CERTAIN RULES APPLYING TO DRUGS EXTRINSIC PROPERTIES OF DRUGS

Section V, Book II

Ibn Sīnā has discussed the extrinsic properties of drugs extensively. According to him, properties of some drugs may be conditioned by the processes to which

they are subjected, *e.g.*, cooking, boiling, grinding, burning, washing, placing them close to other drugs, *etc.* Then there are drugs whose properties may be changed when they are mixed with some other drugs. These discussions may be summed up as follows :

1. *Cooking or boiling :*

- (a) Some drugs are so dense that their properties do not come out on cooking (or boiling) unless the cooking (or boiling) is very hard, *e.g.*, root of Caper, birthwort, Long zedoary.
- (b) Some drugs are so immoderate in temperament that for them only a moderate cooking (or boiling) is sufficient. If they are cooked (or boiled) hard their properties dissolve and evaporate, *e.g.*, diuretic seeds.
- (c) There are drugs which do not require even a moderate cooking (or boiling). If cooked (or boiled) hard, their properties dissolve and the residue has no properties, *e.g.*, *Epithem*.

2. *Grinding :*

Some drugs lose their properties on grinding. Scammony may be cited as an example. The grinding of such drugs should be very mild. It is better to dissolve them in liquids rather than grind..... Drugs when ground excessively lose their properties. However, it is not necessary in all cases. A drug reduced to minute particles may have a quick infusion into an organ ; the particles, because of their smallness, become more penetrating as Galen has said that once he got the ingredients of *Jawarish Kamuni* (an electuary, the principal ingredient being cummin seeds) ground very fine and the medicine, though purgative, gave the effect of a diuretic. Thus what is necessary is that tenuous drugs should not be ground excessively while drugs which are dense in their substance and slow in movement should be ground excessively, chiefly when the purpose is to make them penetrate into remote parts of the body *e.g.* coral, pearls, hematite.

3. *Burning :*

Some drugs are burnt to reduce or enhance their potency. Hot drugs when burnt reduce their heat. On the other hand drugs which are dense but neither hot nor intense in their property enhance their intensity when burnt, *e.g.*, lime. Drugs are burnt for five reasons : (a) to reduce their intensity (*e.g.*, copperas and vitriol), (b) to attenuate their dense substance (*e.g.*, lime), (c) to prepare them for grinding (*e.g.*, crab and hart's horn), (d) to save time needed in cutting silk pods though it is better to cut them in small bits, and (e) to eliminate corruption of their bodies (*e.g.* in case of scorpion).

4. *Washing* :

Washing cools down the intense heat of some drugs. It also breaks a drug into small bits and cleanses it thoroughly. In some cases it eliminates the unwanted property of a drug. Such washing removes from the Armenian bole and lapis lazuli their property of producing nausea.

5. *Congelation* :

Congelation renders the tenuous property of drugs ineffective and increases coldness in those whose substance is already cold.

6. *Storage of some drugs in close proximity with other drugs* :

Storage of some drugs in close proximity with other drugs may develop in them new qualities. Many cold drugs become hot in effect when kept with asafoetida, castoreum or musk. Similarly, some hot drugs become cold in effect when kept with camphor and sandalwood. One should abstain from keeping different drugs in close proximity to one another.

7. *Admixture* :

Admixture enhances the effects of some drugs but destroys those of some others. Sometimes it serves as a corrective for drugs and removes their harmful effects. Sometimes admixture is adopted to make some drugs more penetrative or serve as vehicle. For example, saffron is mixed with rose, camphor, or coral to make it more penetrating (effective) for the heart. Sometimes drugs are admixed for a contrary purpose. For example, radish seeds are mixed with penetrative rarefying drugs so that they may be retained inside the body till the objective of their use is achieved. Drugs which lose their properties on admixture are those which have a common action but contrary or near contrary properties. If on mixing two drugs, one excels the other, one action would be performed. But if one does not excel the other actions of both will be held back. Violet and myrobalan both act as purgatives, the former with the help of its property of laxity and the latter with its property of squeezing the matter and making it dense. If they are made to act jointly, the action of one would nullify the action of the other.

COLLECTION AND STORAGE OF SIMPLE DRUGS

Section VI, Book II

On collection and storage of simple drugs Ibn Sīnā has provided important guidelines in Section VI of the second book of his *al-Qānūn*. These briefly are as follows.

Among drugs some are mineral, some vegetable, and some animal. Among the mineral drugs the best are those which are extracted from well-known mines and

are free from adulteration. The vegetable drugs include roots, seeds, branches, leaves, flowers, fruits, gums, and all vegetables.

Roots—Should be extracted when the trees or plants shed their leaves.

Seeds—Should be taken when their substance has condensed and their rawness and wateriness have disappeared.

Branches—Should be taken when they have attained perfection and have not started drying or warping.

Leaves—Should be plucked when they have reached their full size. They must be maintaining their form and should not have changed their colours. The leaves which have fallen should not be taken.

Flowers—Should be plucked when they are in full bloom but have not dried up or fallen down.

Fruits—Only such fruits should be taken as are fully mature but have not dropped down from trees.

Gums—Should be collected when they have hardened but not so much that their scrubbing becomes difficult.

Drugs growing wild are stronger than those cultivated..... Drugs growing on hills or mountains are stronger than those growing in plains..... Drugs collected from forests or places accessible to sun-rays are better than those from other places... Those collected at appropriate time are better than those collected at inappropriate time..... Drugs which have a deep colour, distinct taste and smell are stronger. These guidelines should be observed as far as possible, depending upon the prevailing circumstances..... Herbs as well as gums become weak after three years.

Substitution : The potency or strength of a drug depends upon its excellence. If it is difficult to get a fresh drug of full strength, the older and less strong may be taken twice of the former, as a substitute, whatever the class of the drug.

Animal drugs : These should be chosen from animals which are adult, are of complete body and proper build..... Animals which have died of some disease should be discarded.

TABLES IN THE SECOND CHAPTER OF BOOK II

Ibn Sīnā has devoted the Second Chapter of Book II of his *al-Qānūn* to tables (12 in number) of drugs. At the outset he says, "Now we intend to describe the specific colour of each table dealing with related diseases. The first four tables are quite clear. However, the subsequent ones need details....."

The twelve tables are found in the manuscripts and printed editions of Book II of *al-Qānūn* available while preparing this paper. But in none of them are found

names of the drugs concerned nor any colours. All that is stated in these long tables, which it would be more appropriate to call "lists", is a mere narration or citation of actions. This is borne out by a brief version of each table. From these tables one cannot know the actual drugs which may be related to a class; for example, what are the drugs which may be useful for abdominal swellings (Table 3) or which induce sleep (Table 6)? It is necessary to reconstruct the tables after scanning and collecting together the actions and properties from the descriptions of all simple drugs Ibn Sīnā has dealt with in this Second Book of *al-Qānūn* and then correlate them with each class. Though time-consuming, it will be a helpful study.

Brief version of each of the 12 Tables

Table 1 :

It is on general actions and properties of drugs.

Table 2 :

Some of the lines read as under :

Drugs which produce or remove turbidity and roughness, drugs which produce or remove leucoderma or vitiligo, drugs which remove tattoo marks, drugs which remove warts, drugs which pull out the teeth, drugs which slim the body, *etc.*

Table 3 :

It relates to swellings and pimples and runs as follows :

Drugs which are useful for hot swellings, for cold swellings, for abdominal swellings, for abscesses, for urticaria, for blisters and so on and then drugs which produce hot swellings and other swellings, *etc.*

Table 4 :

It is on wounds and ulcers and runs as follows :

Drugs which are helpful in malignant ulcers, in septic ulcers, in fistula, in scabies, drugs which fill up wounds, which grow flesh, which remove unwanted flesh, which produce slough, *etc.*

Table 5 :

It is on joints and runs as under :

Drugs which are helpful in sprains, in bruises, in neuralgia, in cold diseases of nerves, in convulsion or spasms, in paralysis, in tremors, or which are harmful for nerves, which produce neuralgia, *etc.*

Table 6 :

It is on 'Head' (used in a wider sense including ears, nose, throat, mouth, *etc.*).
Some of the lines are :

- Drugs which are harmful in hot headache.
- Drugs which are harmful in cold headache.
- Drugs which are harmful in migraine.
- Drugs which are harmful in weakness of the brain.
- Drugs which cause headache.
- Drugs which cause heaviness in the head.
- Drugs which cleanse the brain.
- Drugs which remove obstructions from the brain.
- Drugs which are helpful in apoplexy.
- Drugs which induce sleep.
- Drugs which are useful in giddiness.
- Drugs which are useful in mania.
- Drugs which are helpful in deafness.
- Drugs which are helpful in ear-aches, *etc.*

Table 7 :

It is on ocular organs. Some of the lines are :

- Drugs which are helpful in hot conjunctivitis.
- Drugs which are helpful in chronic conjunctivitis.
- Drugs which are helpful in removing blood spots from eyes.
- Drugs which are helpful in protrusion of eyes.
- Drugs which are helpful in thickness of cornea.
- Drugs which produce tears.
- Drugs which improve eye-sight.
- Drugs which stop falling of eye-lashes.
- Drugs which are helpful in cataract, *etc.*

Table 8 :

It is on respiratory organs and chest.

Some of the lines read as under :

- Drugs which strengthen the respiratory organs.
- Drugs which harm the respiratory organs.

- Drugs which are helpful in suffocating affections.
- Drugs which are helpful in asthma.
- Drugs which remove dryness from the chest.
- Drugs which produce dryness in the chest.
- Drugs which remove roughness of the voice.
- Drugs which produce roughness in the voice.
- Drugs which are helpful in cough.
- Drugs which strengthen the heart.
- Drugs which improve memory.
- Drugs which are helpful in syncope.
- Drugs which are helpful in palpitation, *etc.*

Table 9 :

It is on alimentary organs. Some of the lines read as under :

- Drugs which strengthen the stomach.
- Drugs which weaken the stomach.
- Drugs which improve digestion.
- Drugs which deteriorate digestion.
- Drugs which are helpful in nausea.
- Drugs which produce nausea.
- Drugs which are helpful in eructation.
- Drugs which produce eructation.
- Drugs which are helpful in ulcers of the stomach.
- Drugs which give relief in flatulence.
- Drugs which produce flatulence.
- Drugs which tone up the liver.
- Drugs which harm the liver.
- Drugs which are helpful in jaundice.
- Drugs which produce jaundice, *etc.*

Table 10 :

It is on excretory organs. Some of the lines are :

- Drugs which expel bile.
- Drugs which remove constipation.
- Drugs which cause constipation.

- Drugs which are helpful in diarrhoea.
- Drugs which improve the action of intestines.
- Drugs which slow down the action of intestines.
- Drugs which are helpful in gripes.
- Drugs which produce gripes.
- Drugs which are helpful in dysentery.
- Drugs which are helpful in colic.
- Drugs which are helpful in intestinal swellings.
- Drugs which are helpful in intestinal pains.
- Drugs which are diuretic, *etc.*

Table 11 :

It is on fevers. Some of the lines are as follows :

- Drugs which are helpful in hot fevers.
- Drugs which are helpful in chronic fevers.
- Drugs which are helpful in irregular fevers.
- Drugs which are helpful in tertian fever.
- Drugs which are helpful in quartan fever.
- Drugs which are helpful in epidemic fevers.
- Drugs which are helpful in hectic fever.
- Drugs which are helpful in ephemeral fevers, *etc.*

Table 12 :

It is on poisons and antidotes. Some of the lines are :

- Drugs which act as antidote to aconite.
- Drugs which act as antidote to arsenic.
- Drugs which act as antidote to opium.
- Drugs which act as antidote to impure oxide of lead.
- Drugs which act as antidote to poisonous mushrooms.
- Drugs which act as antidote to snake-bite.
- Drugs which act as antidote to stinging by scorpion.
- Drugs which act as antidote to a bite by mad dog, *etc.*

Ibn Sīnā has given an account of 780 simple drugs and substances. As stated by him, he had noted information on each drug in 16 columns. This column-wise division has not been found. However, in the running text pertaining to individual

drugs most of the headings of the columns are found and under relevant headings information has been provided. The headings, to which Ibn Sīnā has referred are:

1. Name of the drug and general description.
2. Choice, *i.e.* how to select the best drug.
3. Temperament.
4. Actions and properties.
5. Whether the drug may be used in cosmetics.
6. Whether the drug is useful for swellings and pustules.
7. Whether the drug is useful for ulcers, wounds and abscesses.
8. Whether the drug is useful for diseases of joints and nerves.
9. Whether the drug is useful for head, ears, mouth, *etc.*
10. Whether the drug is useful for ocular diseases.
11. Whether the drug is useful for diseases of the respiratory organs.
12. Whether the drug is useful for diseases of the alimentary organs.
13. Whether the drug is useful for diseases of the excretory organs.
14. Whether the drug is useful for fevers.
15. Whether the drug has antidotic properties.
16. Whether some other drug (or drugs) can serve as substitute if this specific drug is not available.

Only such headings, out of these sixteen, as are relevant to a drug have been incorporated in the text covering that drug. Important drugs have been dealt with elaborately. Those not of much consequence have been dispensed with in one paragraph or even in a few lines. The drugs have been arranged alphabetically. The account of a few drugs is given in the following by way of illustration.

Arabic Name	Common English Name	Botanical Name
<i>Aas</i>	<i>Myrtle</i>	<i>Myrtus communis</i> Linn. — <i>A vegetative drug</i>

General description : *Aas* is a well-known tree. It has bitterness with astringency and (some) sweetness. It has some coldness because of its astringency. The small shoots of its root are most potent. These shoots, cut in pieces by scissors, are to be used with an acrid drink. It has an earthy and some rarefied substance. The shoots appear on the stem, have the colour of the stem, and resemble the palm of the hand in form. The oil (of myrtle) has all those properties which we shall describe.

Choice : The blackish myrtle is more potent, particularly its variety which has round leaves, and the wild one is the most potent. The fruit of blackish myrtle is less potent than that of whitish one. The flower of the whitish one is the best and so is the extract of its fruit. However, this extract when old becomes weak and gathers fungus. It is necessary to make tablets (of the extract).

Temperament : It has a slight hotness though coldness is dominant. Its astringency excels its coldness. Presumably, the coldness is of the first degree and the dryness, of the second.

Actions and properties : It stops diarrhoea, perspiration, bleeding of all kinds, and any other flow towards the organs. It strengthens the body and absorbs fluids gathered under the skin if (its oil) is used for massage in the bath. Its decoction when poured over a (broken) bone sets it.

A charred (piece of its wood) serves as a substitute for copper sulphate in removing evil smell of the body. If used in a drink, or in a plaster of *Epithem*, it helps in (stopping) all kinds of bleeding. Similar is the property of the pulp (of its wood) or fruits. It has little nutrition. No syrup equals that of myrtle in relieving pain of the lungs, and cough.

Cosmetics : Its oil, extract, or decoction strengthens the roots of the hair, prevents it from falling, lengthens, and darkens it. The decoction of its fruit mixed with olive oil stops perspiration and acts as a corrective in intestinal abrasions. Its dry leaves remove stench of the armpits and groins. Its ash is a substitute for copper sulphate and helps in the removal of freckles and vitiligo.

Inflammations and pimples : When used with olive oil, it gives relief in hot inflammations, erysipelas, herpes, pimples, urticaria, wounds of the palms, and burns. Similar is the action of its syrup or of the plaster made from its leaves along with wine and olive oil, or of its oil or of the ointments made from its oil. The sprinkling of its powder is useful for whitlow. A *gayruti* (a form of ointment) made from it also possesses this property. Its fruits cooked with wine and turned into a plaster cure the wounds on the palms and feet, and burns, and prevents blistering. A *gayruti* made from its ashes has similar action.

Joints : A plaster of its fruits which are cooked with wine is helpful in the flaccidity of joints. Its (powder) when sprinkled over broken bones which resist joining proves beneficial.

Head : It stops epistaxis, removes dandruff, and dries up wounds of the head and ears. Its juice when dropped on the (wounds) dries the pus. Its syrup is useful for spongy gums. Its leaves cooked with wine and turned into a plaster relieve severe headache. Its syrup when sipped before taking *Nabiz* (a kind of wine) prevents intoxication.

Ocular organs : It gives relief in conjunctivitis and protrusion of eyes. When cooked with barley flour and applied, it cures inflammation of the eyes. Its ashes are included in medicines meant for pterygium.

Respiratory organs and chest : It strengthens the heart and removes palpitation. Its fruit is useful in cough. Myrtle causes constipation because of its astringency. The fruit is useful for haemoptysis.

Alimentary organs : Myrtle, especially the pulp of its fruits, strengthens the stomach and its seeds stop the flow of superfluous matter towards the stomach.

Excretory organs : The extract of its fruits is diuretic and is useful in urethritis and burning in the bladder. It is also highly useful in checking excessive menses. Its juice is constipating and stops biliary and melanotic diarrhoea. When mixed with sesame oil and applied as a linament, it squeezes the phlegm and purges it out. The decoction of its fruits is useful in leucorrhoea. Its plaster is good for piles and inflammation of testicles. Its decoction is useful in prolapsus uteri.

Poisons : Myrtle is useful for the bite of tarantula. Its fruit, when used with wine, has a similar property. It is also useful for the bite of scorpion.

Substitutes : Extract of myrtle is the substitute for myrtle seeds.

Arabic Name	Common English Name	Botanical Name
<i>Utruj</i>	<i>Citron</i>	<i>Citrus medica</i> Linn. — <i>A vegetative drug</i>

General description : *Utruj* is a well-known drug. The oil expelled from its rinds is strong in property while that from its buds is weak in all respects.

Temperament : The rind of *Utruj* is hot in the first degree and dry in the last of the second degree. The pulp is hot in the first degree with some moistness. Some physicians hold it to be cold and moist in the first degree, inclining more towards coldness. Its sourness is cold and dry in the third degree. The seeds are hot in the first degree and desiccant in the third degree.

Actions and properties : The pulp is flatulent, leaves soothe flatulence, the buds are more tenuous, the sourness is astringent and removes yellow bile, the seeds and rinds are dissolvent. The rinds when placed in clothes keep the moths away. Its fragrance serves as a counter-agent against the evil effects of air.

Cosmetics : The sourness of *Utruj* cleanses the complexion and removes the freckles. The rinds, if burnt and applied, do good in leucoderma. The decoction imparts a good smell to the body. *Utruj* fattens the body. Its crust when retained in the mouth gives a good odour.

Swellings and pimples : The juice of *Utruj*, if applied as a linament, is useful against ringworms.

Joints : The oil, especially when obtained from the rinds, is useful in atony of the nerves and in paralysis, but the juice is harmful to the nerves.

Head : It is useful in facial paralysis. The decoction produces a good odour in the body.

Ocular organs : Collyrium made with its juice helps in removing yellowness from the eyes (in jaundice).

Respiratory organs and chest : The juice has a soothing effect in hot palpitation and the *murabba* (the fruit preserved in sugar) is useful for the throat and lungs. The pulp cooled in vinegar and administered in the quantity of $\frac{1}{2}$ *uskurja* (a weight) kills the leech which has slipped down the throat and drives it out.

Alimentary organs : The pulp is harmful for the stomach, causes flatulence and is slow to digest. Hence, it is necessary to use it in the form of *murabba*, preferably made in honey and used over a sufficiently long period. The leaves strengthen the stomach and viscera. The buds and rinds used in foods, in the manner as the spices are used, help digestion. However, the rind itself is not digestible because of its hardness. The decoction of (rinds) gives a soothing effect in vomiting. The juice is useful for jaundice and bilious vomiting and is an appetizer. It is advisable to use *Utruj* singly (without combining it with other things) and not to use it immediately before or after the meals

Excretory organs : The pulp produces colic. The juice produces stasis of the stomach but is useful for biliary diarrhoea. The seeds are useful in piles and are purgative. Extract of *Utruj* calms down sexual incitement in women.

Poisons : Two *dirhams* (a weight) of seeds of *Utruj* converted into linament or a drink with wine and hot water counteract all poisons especially that of the scorpion. The rind has, more or less, a similar property. The extract of the rind, used as a drink or plaster, is useful for snake-bite.

Arabic Name	Common English Name	Botanical Name
<i>Idkhir</i>	<i>Bag rushes</i>	<i>Andropogon schoenanthus</i> Linn.
		—A vegetative drug

General description : One is the Arabian variety which is fragrant and another is *Ajamī* (marshy) which is found in a small quantity. Again, one variety is thin and hard, while the other is thick but loose and odourless. According to Dioscorides *Idkhir* is of two kinds : (1) which bears no fruit, and (2) which bears black fruits.

Choice : The best is the Arabian variety which is red and fragrant. Its buds, which are reddish, turn blue on maturity and cause irritation when placed on the tongue.

Temperament : The *Ajamī* variety has the property of cooling. Ibn Juraiḥ holds all the varieties to be of cold temperament and the root highly constipating. The flowers have some hotness compared to which their astringency is less. It seems that the Arabian variety is hot and dry in the second degree.

Actions and properties : *Idkhir* is astringent. It is for this reason that flowers of *Idkhir* are found useful in bleeding. The oil is dissolvent and astringent. The roots are more powerful and cause constipation. *Idkhir* maturates and lubricates matter, opens the orifices, has soothing effect in pains of internal organs, especially of the womb, and dissolves the gases.

Ulcers and wounds : The oil of *Idkhir* is helpful in itches, also of animals.

Swellings and pimples : The decoction or plaster of *Idkhir* is useful for hot swellings, hardness of internal organs and cold swellings of the viscera.

Joints : Four *mithqals* (a weight) of *Idkhir* used with pepper is useful for split of muscles and convulsions. The oil removes fatigue.

Head : *Idkhir*, especially its *Ajamī* variety, produces heaviness in the head, the thin variety produces headache and the thick variety induces sleep. The seeds are anaesthetic. All the varieties strengthen the gums and their fluidity. The flowers cleanse the brain.

Respiratory organs and chest : It is useful for the pain of lungs. The flowers are helpful in haemoptysis.

Alimentary organs : The root strengthens the stomach, stimulates appetite and gives relief in nausea, especially when one *mithqāl* with equal quantity of pepper is used. The flowers provide relief in gastralgia and swellings of the stomach and liver.

Excretory organs : *Idkhir* is useful for pains of the uterus. Sitting in its decoction is helpful in hot inflammations of the uterus and similar are the effects when the drug is used in the form of drops or fumigation, or its juice is administered by enema. *Idkhir*, especially its *Ajamī* variety, is diuretic, lithontriptic and constipating, stops excess of menstruation. The flowers are useful in nephralgia and in the inflammations of the anus. One *mithqāl* of the root taken with pepper helps in dropsy.

Poisons : The plaster made of fresh leaves of the thick variety growing just above the roots is useful for the bites of insects.

Arabic Name	Common English Name	Botanical Name
<i>Asfanakh</i>	<i>Spinach</i>	<i>Spinachia oleracea</i> <i>Beta maritima</i> —A vegetable

Nature : It is a well-known (food stuff).

Temperament : It is cold and humid in the last of the first degree.

Actions and properties : It is a laxative. As a food it is much better than the goosefoot. We say that it is detergent and abluent and wipes out yellow bile. When the stomach is averse to spinach leaves, only their juice is taken and administered.

Respiratory organs and chest : It is useful for hot (diseases of) chest and lungs, when taken internally or externally.

Joints : It is useful in sanguineous backaches.

Excretory organs : It is a laxative for stomach.

Arabic Name	Common English Name	Botanical Name
<i>Afsantin</i>	<i>Absinth, Wormwood</i>	<i>Artemisia siversiana</i> <i>Artemisia absinthium</i> —A vegetative drug

General description : It is a grass resembling, in its blades, the *Sa'tar* (common thyme). It is bitter, astringent and pungent. According to Hunain *Afsantin* is of many varieties ; one is *Khurāsānī* (from Khurasan), another is *Mashiriqī* (from the East), yet another is *Lakam* (from Lakam), one more is *Sūsī* or *Tarsūsī* (from Sūs or Tarsūs). Besides the ancient physicians, others say that *Afsantin* has five varieties—*al-Tarsūsī*, *Sūsī*, *Nabṭī*, *Khurāsānī* and the *Rūmī*. The *Nabṭī* variety has a good smell. All the varieties have an earthy substance and it is because of this that they cause constipation. However, it has an attenuant substance also which acts as a purgative and deobstruent.

Afsantin is also said to be a kind of *Shih* (Wormwood), and hence some physicians have given to it (*i.e.* to *Afsantin*) the name *al-Shih al-Rūmī*. The extract of *Afsantin* is stronger than its blades and in potency is equal to *Afrasiun* (Black horehound).

Choice : The *Sūsī* and the *Tarsūsī* are the best varieties, especially when they are ash-coloured and when rubbed give a smell resembling that of aloe-wood.

Temperament : *Afsantin* is hot in the first and dry in the second degree. The extract is hotter. Some physicians say that *Afsantin* is dry in the second degree and their statement is more reliable.

Actions and properties : It is astringent and deobstruent, the astringency being stronger than its bitterness and it is due to this factor that while it is in the stomach it does not expel the phlegm and gives no relief from it (the phlegm). It has some dissolving property also. The *Nabṭī* variety has more astringency but is less hot. One of the properties of *Afsantin* is that it protects clothes from moths and insects, prevents the ink from fading and saves the paper from being damaged by moths and insects.

Cosmetics : It improves the complexion, is useful for alopecia, alopecia furfuracea, removes the violet-coloured patches which may appear beneath the eyes, etc.

Swellings and pimples : It is useful for urticaria when applied after mixing it with flour.

Wounds and ulcers : If applied as a plaster or taken orally, it helps in the removal of internal hardness.

Head : It produces dryness in the head. Its extract causes headache and I think it is harmful for the stomach. The vapours arising from its decoction when inhaled soothe the earache. It acts as a barrier against intoxication if used before drinking wines ; is helpful in internal diphtheria if applied on the palate with *Natron* (sodium nitrate) ; is helpful in parotitis, earache and otorrhoea and also helps in coma if administered with honey.

Ocular organs : *Afsantin*, especially its *Nabṭī* variety, is useful for chronic conjunctivitis when applied as a paste beneath the eyes. Its plaster prepared with the addition of *Ma'bukhtaj* (strong wine) is useful for throbbing in the eyes and their inflammations. It is also useful for phlyctenular conjunctivitis.

Respiratory organs and chest : Syrup made from *Afsantin* is useful for stasis under the epigastrium.

Alimentary organs : It restores appetite and shows extraordinary effects when used in the form of decoction or extract for ten days. Its syrup strengthens the stomach, and is useful in dropsy and jaundice. A plaster made of *Afsantin*, fig, *Natron* (sodium nitrate), and oil of *Iris florentina* is useful for diseases of the spleen. *Afsantin*, when cooked along with lentil and rice and eaten, kills the worms. Its extract is unsuitable for the stomach, though the *Nabṭī* variety is an exception. *Afsantin*, when used along with *Sambul* (nard), helps in gastralgia. It is also used as a plaster on liver, stomach and the hips.

A *qayruti* (an ointment) made of *Afsantin* and henna oil is useful for the pain of the liver and hips while that (the *qayruti*) made of *Afsantin* and rose oil or rose petals is useful for the pain of the stomach. These *qayruties* are also useful for the hardness of liver, hips and stomach.

Excretory organs : It acts as a strong diuretic or emmenagogue, especially when used as pessary with hydromel, and as a purgative for the yellow bile. However, it does not help in removing the phlegm or the things blocked in the intestines. A *Naqu* of 5-7 *dirhams* of *Afsantin*, i.e. 5-7 *dirhams* of *Afsantin* soaked in water, left over for the night, strained and then administered or a decoction of the same quantity for a quantity of two *dirhams* of *Afsantin* as such gives relief in piles and ruptures of the anus. *Afsantin* when boiled either alone or with rice and administered with honey kills the worms and expels them with a slight purgation. Similar is the action when it is boiled with lentil and used. Syrup of *Afsantin* is useful for all these diseases as well as for removing the aqueous bilious humour from the vessels freeing the flow in them.

Fevers : *Afsantin*, especially its extract, is useful for chronic fevers much in the same way as the extract of *Ghafith* (Agrimony) is.

Poisons : *Afsantin* acts as an antidote for bites of sea-dragon, scorpion, myogale (mole) and for the poisonous effect of the hemlock seeds and helps in the choking of the throat caused by eating a poisonous herb, especially when used with vinegar. Powder of *Afsantin* when sprinkled keeps the bugs away. The mice do not nibble (spoil) books when they have been written with an ink containing water of *Afsantin*.

Substitutes : *Judah* (maiden-hair) or *Shāh-i Armānī* (Armenian wormwood) are the substitutes. *Asarun* (Indian valerina) with *Halilaj* (Chebulic myrobalan) in quantity half of the former (*Asarun*) is the substitute for strengthening the stomach.

Arabic Name	Common English Name	Zoological Name
<i>Arnab Bahri</i>	<i>Sea rabbit</i>	<i>Lepus marians</i> —An animal drug

General description : It is a shell animal, reddish in colour, with its central part resembling the colour of the leaves of saltwort.

Cosmetics : The blood of *Arnab bahri* is hot in temperament and is useful in freckles and vitiligo. Its head when burnt and applied removes alopecia and helps in the growth of hair. The burnt head when mixed with the fat of bear is very useful in alopecia furfuracea. However, the plaster made of *Arnab bahri* alone (without combining other things) removes the hair.

Ocular organs : When used as a plaster or collyrium it clears the sight.

Poisons : It is included among the poisonous drugs as it ulcerates the lungs.

Arabic Name	Common English Name	Scientific Name
<i>Ithmid</i>	<i>Antimony sulphide</i>	<i>Stibium antimonium</i> —A mineral drug

Nature : In potency *Ithmid* is equal to that of burnt lead.

Choice : The best one is that which is free from extraneous matter or any other filthy things. It is highly brittle.

Temperament : It is cold in the first and dry in the second degree.

Actions and properties : It is astringent, and desiccant without irritation, stops haemorrhage.

Ulcers and wounds : It is useful for ulcers, heals them and removes superfluous flesh. It does not ulcerate a burnt part of the body when applied with fresh fat. If that part is already ulcerated it heals it when applied with wax and white lead.

Head : It stops cerebral rhinorrhagia, especially when the latter emanates from the meninges.

Ocular organs : It protects the eyes and removes the filth from their wounds.

Excretory organs : When used as a pessary it stops bleeding of the uterus.

Substitutes : Burnt lead is a substitute.

REFERENCES

- ¹ Gohlmann, William E., *The Life of Ibn Sīnā*, New York, 1974.
- ² Anawati, Georges C., *Mu'allafat Ibn Sīnā*, Cairo, 1950.
- ³ Ali, S. A., Problems in Translating al-Qanun fi'l Tibb, paper presented at the Symposium on the History and Philosophy of Science, Kuala Lumpur, June, 1981.