

The Right Path to Health

Health Education through Religion

Environmental Health An Islamic Perspective

Dr Muhammad Haytham Al Khayat



WORLD HEALTH ORGANIZATION
Regional Office for the Eastern Mediterranean
Alexandria, Egypt
1997

WHO Library Cataloguing in Publication Data

Al Khayat, Muhammad Haytham
Environmental Health: an Islamic perspective / by
Muhammad Haytham Al Khayat

p. (The right path to health : Health education through religion; 7)

ISBN 92-9021-228-4

1. Environmental Health 2. Islamic education I. Title
II. WHO Regional Office for the Eastern Mediterranean III. Series

[NLM Classification: WA 18]

The World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full. Applications and enquiries should be addressed to the Manager, Health and Biomedical Information Programme, World Health Organization, Regional Office for the Eastern Mediterranean, P.O. Box 1517, Alexandria 21511, Egypt, who will be glad to provide the latest information on any changes made to the text, plans for new editions, and reprints and translations already available.

© World Health Organization 1997

Publications of the World Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. All rights reserved.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The authors alone are responsible for the views expressed in this publication.

Cover design and layout by A. Hassanein, EMRO

Printed in Alexandria, Egypt
by Technotex, 2000 copies

In the Name of God, the Compassionate, the Merciful

Foreword

Hussein A Gezairy, MD, FRCS
Regional Director for the
Eastern Mediterranean Region of
the World Health Organization

In the present era, the environment exercises an influence over the health of individuals and communities unequalled by any other, with the possible exception of the influence of the lifestyle a person adopts and the behavioural habits he or she forms.

It is for this reason that the World Health Organization has, since its foundation, been concerned with the question of health and the environment, and has directed considerable attention to it, starting a special programme devoted to this major health field, with the involvement of a large number of distinguished experts in its various aspects.

It is well-known that the environment which fostered man when he was created on this earth was a hospitable one, tender with him, considerate of his health, and affording him the means to live and prosper. Such benevolent conditions might have continued, as they had for thousands of years, had it not been for the serious change and the dangerously harmful alteration in the structure, texture and composition of this environment which accompanied the rapid civilization and the breathless pace of industrialization witnessed on this earth. It was a change that turned the environment into a source of evil rather than a source of good, a cesspool of disease rather than a resort promoting good health. Soon humanity started to reap what its hands had sown and to pay dearly for the aggression it had committed against this magnanimous and generous environment, upsetting its delicate balance.

For this reason, it is imperative that wise people should call on each other to rescue the noble environment, as a preliminary step to rescuing people themselves from these harmful consequences and saving them from the

outcome of the defilement that can be seen on land and in the sea as a result of their own doings.

It is not a secret that God's message, which aims at guiding people to what is in their best interest in this world and the Hereafter, is the best deterrent to people from destroying their environment and causing serious harm to themselves, to their fellow human beings, and indeed to all forms of life, whether animal, plant, or other.

This latest publication in the series *The Right Path to Health*, a series which has been very well received by all people in this Region, is the text of a lecture delivered by Dr Muhammad Haytham Khayat at the Conference of the Association of Arab Physicians in Europe, held in Frankfurt in 1989.

We decided to publish it in this series in the hope that it will serve as a reminder *to those who desire to celebrate God's praises or to render their thanks to Him*. It is hoped that it will be of some assistance to those who *prohibit corruption on earth*, and that it may contribute to the efforts at maintaining what is left of the sound environment and restoring things that have been subject to deviation, distortion or pollution to their normal course.



Terms used in the Health Education through Religion series

The following notes are intended for readers who do not know Arabic and who do not have an Islamic background.

<i>fatwa</i>	A formal religious legal opinion.
<i>fiqh</i>	Islamic jurisprudence (literally: understanding and acquisition of knowledge).
<i>hadith</i>	Saying(s) or action(s) ascribed to the Prophet ﷺ or act(s) approved by the Prophet ﷺ.
<i>haram</i>	Prohibited, banned, illegal, impermissible, from a religious standpoint. Epithet applied, in general, to actions or things considered sinful to Muslims.
<i>hijra</i>	The emigration of the Prophet Muhammad ﷺ, from Mecca to Medina in AD 622. The event is used as the starting point for the Islamic Calendar.
<i>Prophet</i>	The Prophet Muhammad ﷺ, the Messenger of God. Any reference to the Prophet is usually followed by the symbol ﷺ, meaning “Peace be upon him”.
<i>Quran</i>	The Holy Book of Islam; the highest and most authentic authority in Islam. Quotations from the Quran are normally followed by a reference to the number of the chapter (<i>sura</i>) and the number of the quoted verse (<i>aya</i>). All Quranic texts in this publication are printed in italic.
<i>schools of fiqh</i>	The schools of Islamic thought or jurisprudence, the four most important of which were founded by Malik, Abu Hanifa, Al-Shafie and Ahmad ibn Hanbal.
<i>sharia</i>	The body of Islamic law based on the Quran and the <i>sunna</i> (see below).
<i>sunna</i>	Practices undertaken or approved by the Prophet ﷺ and established as legally binding precedents.

1

Back in 1977 when health experts from all over the world set themselves the goal of “Health for all by the year 2000”, they considered that a great achievement.

And indeed it is!

For it is an expression of **health equity**, which is one of the most important aspects of social justice, or rather *the* most important of all, for the Prophet Muhammad ﷺ said “Next to faith, no-one has ever been given anything better than good health”.¹

Earlier, in 1948 and 1984, two definitions were arrived at to determine precisely what health is. The first spoke of three dimensions of health: the physical, psychological, and social, and a fourth—the spiritual dimension—was added by the second definition. Thus health is defined as, “a state of complete well-being, **physical, psychological, social, and spiritual**, and not merely the absence of disease or infirmity”.

An important aspect of this definition is that it speaks of “a state of complete well-being”, rather than just well-being. In Arabic the root from which the equivalent of well-being, or sound health, is derived denotes abundance. When the root word is ascribed to something it refers to its best, finest, purest and most abundant state.

That is the kind of health we want: human beings in their best, finest and most sublime condition, physically, psychologically, socially, and spiritually.

¹Related by Ibn Majah following Abu Bakr.

Another particularly significant aspect of this definition of health is the fact that it speaks in a positive manner. We are used to people defining well-being as the absence of disease, which is like defining life as the absence of death. With this positive definition, the world goes back to concepts introduced by physicians of the Arab-Islamic civilization. As Ibn Rushd, a well-known physician and Islamic scholar, said some eight hundred years ago:

Health is a state in which an organ performs its normal function, or undergoes its normal reaction.

Or, as Ali ibn Al-Abbas said a thousand years ago:

Health is a state of the body in which functions are run in the normal course.

Or, as Ibn Al-Nafees said seven hundred years ago,

Health is a state of the body in which functions are normal *per se*, while disease is the opposite state.

Thus for them health is the **norm** and the **starting point**, and disease is the condition contrary to health.

This was not the only example of a return to our Arab-Islamic culture and the concepts it formulated in this field.

In speaking of the basic elements of health, our present world has turned back to a concept originally introduced by us, but which with the passage of time, people started to overlook—the concept of “health balance”, which Muslim physicians derived from the words of God, speaking of the balance He has infused into the nature of this universe, with all its systems, including humanity itself.

He has raised the Heaven on high, and He has enforced the balance. That you exceed not the bounds; but observe the balance strictly; and fall not short thereof. (55:7–9)

Thus God draws our attentions to the balance which places everything in order, and He warns that any upsetting of this balance in whatever direction, whether to increase or decrease an item, might destroy it altogether and lead to

the worst possible consequences: *Mankind! Your transgression will rebound on your own selves.* (10:23)

The Muslim physician recognized and fully comprehended that fact and applied it in the field of health, using the term **state of equilibrium** to refer to that “dynamic balance”. Ali Ibn Al-Abbas sums it up very briefly when he says:

Health means that the body is in a state of equilibrium.

And Ibn Sina pointed out the dynamic nature of this balance one thousand years ago when he said:

The state of equilibrium which a human enjoys has a certain range with an upper and lower limit.

So it is a balance swinging between two extremities, which form the limits of equilibrium. It is represented by the various parameters of the body which we know today. These parameters are physiological features that stabilize themselves, i.e. they remain stable within a certain range with maximum and minimum limits. Examples of these are the heart rate, blood pressure, hormone secretion, blood sugar, brain waves and psychological mood.

Since the body is capable of allowing these essential values to go up and down within a certain range and certain limits, this indicates that it has the ability to adjust successfully with all or most of the changes it is exposed to, whether from inside, which means changes in its cells and tissues (or moistures as the ancients used to put it), or from outside, which means changes in the environment in its broadest sense. It does so to maintain the health balance, protecting it against being upset, and adjusting any disorder in it.

This health potential is a basic advantage enjoyed by man, and it is clearly referred to in the *hadith*:

And store up enough health to draw on during your illness.¹

At the individual level, this health potential may mean a good nutritional condition. A person who enjoys such a nutritional reserve is able to face the risks and hazards that threaten him from the cradle to the grave. It may mean a

¹Related by Al-Bukhari following Ibn Omar

good immunity reserve, which provides people with the antibodies they need to fight, without being aware of it, many of the bacteria and alien organisms that invade his body from outside. It may mean a physical fitness which allows him to successfully adjust to outside pressures the body may be exposed to. It may mean a feeling of security or emotional stability which enables him to put up with the psychological stresses that shake the being. It may even mean health education which guides him to follow the healthy lifestyles that spares him many diseases or ailments. The kind reader may agree with me that a health potential is the total sum of all this.

Contemporary scientists use the term “health promotion” for the set of methods employed to reinforce and develop health potential so that a surplus of health can always be maintained. When a health balance is positive, people enjoy the best health and fitness, and when it is negative, they fall prey to diseases and maladies.

A set of factors in the human body and in the environment may tilt the health balance towards a negative reading if they are unfavourable and a positive one if favourable. Ibn Sina called this set “the factors that change or maintain human body conditions”. He listed the following factors:

The air and things related to it; food, water, drinks and related things; vomiting; congestion; sites, housing, and what relate to them; and physical and psychological motion or stillness, including sleep and wakefulness, progress in age, difference in age, race, professions and habits.

To these, Ali ibn Al-Abbas added “sports, massage, bath-taking and sex”. In speaking about these factors, he said:

When these things follow their proper course and are in the right condition required for each body, in quantity, quality, timing, and order, normal conditions are maintained and the body continues to be healthy.

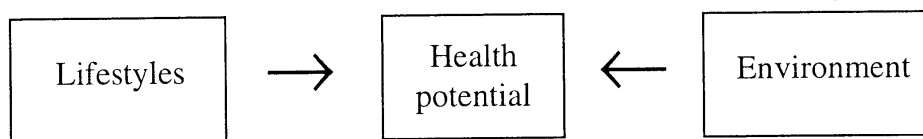
It is evident that these factors can be divided into two groups, and in dividing them, I will modify some of the terms used to make them conform with current usage.

The **first group** is the **environment**. It includes factors that are shared by all members of a community, such as water, the air, food and wastes, and other factors that concern each individual separately, such as housing and profession.

The **second group** is **behaviour related to health**, or let us say “**habits**”, if we want to retain the term used by Ibn Sina and Ibn Al-Abbas. These are the **lifestyles** relating to eating, drinking, sleeping, waking up, playing sports or lack of exercise, stresses or relief, and isolation or sociability (the last five of these are included in the term physical and psychological motion or stillness), as well as sexual behaviour, physical therapy, and finally the development of this behaviour according to growth, age and gender. Ali ibn Al-Abbas said about these lifestyles:

In all matters of health protection, habits should be taken into consideration, as such consideration is a major element of protecting health and treating diseases. When a habit has been followed for so long, it becomes a natural thing.

These two groups of factors have a real influence on health potential. They make it either grow or diminish:



* * *

2



I hope I have been able to draw the reader's attention to the environment and its great importance in maintaining human health.

I would like in this instance to limit the concept of environment to the physical environment alone. Otherwise, a discussion of the cultural, social, and economic environments and their influence on human health would be very long.

God created this earth and made it fit for human life. He provided it first of all with everything necessary for human survival; it features a great variety of living creatures and inanimate beings (both organic and non-organic matter) which are necessary for human beings to survive. *Have We not made the earth an abode for the living and the dead? (77:25–26)*

It contains water, without which there could be no life. *He brought out water from it [i.e. the earth], and brought forth its pastures. (79:31) And then He sends down water from the sky and the earth turns green. (22:63)*

It also contains everything that man needs to live and to survive. *And We provided you in it (the earth) with means of livelihood. (7:10)*

God ...*bestowed His blessing upon the earth and equitably apportioned its means of subsistence for all. (41:10)* One of His splendid names is the Nourisher. He is also the Capable, the Determiner, and the Preserver, who gives everything in the proportion needed to preserve it. What He has determined is an amazing balance that appears in everything in this universe.

*He has enforced the balance. That you exceed not the bounds;
but observe the balance strictly; and fall not short thereof.
(55:7–9)*

We have spread out the Earth and set firm and immovable mountains upon it. We have planted it with everything in due and balanced measure. (15:19)

God has made all the elements of the wide environment and all the natural phenomena of the universe subject to humankind so that we may benefit from it and make use of it. He says: *He has made the sea subject to you. (45:12) He has made the rivers subject to you. (14:32) and says, He has made what the earth contains subject to you. (15:65) He has made the sun and the moon subject to you. (16:12) And He has made all that the skies and earth contain subject to you. (45:13)*

He has made the sun subject to humans, and so it distills for them 400 000 cubic kilometres of water, from which God makes every living thing. It projects innumerable parcels of energy, which are picked up by the chloroplasts in plants and transformed to a form of energy that can be used by human beings. It transmits its various types of radiation in due proportion to produce warmth and to purify, without going so far as to ruin and destroy.

And He has subjected to humans the earth, with all its living creatures: **plants** that capture for humans the energy they need, **animals** that provide food resources for them, **microorganisms** that break up waste and remnants and thus clean the environment of potential hazards, and **organic and non-organic matters** which are necessary ingredients in the structure and the food of living creatures. *Have We not made the earth an abode for the living and the dead? (77:25–26)*

God has subjected to *humans mountains like pegs. (78:7)* Just as the pegs that are used to fix the tents of the bedouin to the ground, so mountains fix for humanity that atmospheric tent, with the ozone layer that surrounds it, to protect it from ruin and destruction. Many other amazing examples of the things subjected to man can be cited.

With the knowledge God bestows upon them, humans have recognized since ancient times that life is dependent on the physical environment, which provides them with the air they breathe, the warmth and light derived from the sun, the water they drink, the nourishment they receive from the animal and plant world, the minerals that form part of their food, and the materials they use to make clothes, build houses, and protect themselves against the mishaps of life.

With these things that God has made subject to them and allowed them to use in accordance with their needs, humans have been able to tap springs, exploit energy resources, choose what plants they like for nourishment; domesticate animals for food, transportation and work, and cooperate with their fellow human beings to develop knowledge and technology in order to exploit better the wealth of the earth and the gifts of heaven.

In doing all these things, humans have been in perfect harmony with the purpose of their existence on this earth to which they feel they belong. *It was He who made you from this earth and settled you in it.* (11:61) The right to survive on this earth belongs to those who can build on it. *The righteous among My servants shall inherit the earth.* (21:105) History has witnessed many of those who *tilled the land and built on it.* (30:9) But with human progress and development, it has gradually begun to witness some of the consequences of the advancing corruption that accompanied the ever-increasing exploitation of the resources of the universe.

I have already referred to the equilibrium or balance that God put into the nature of this universe with its various systems, including humankind, and I concluded from that that a health balance exists and that it controls human life and maintains sound human health. It would be proper to conclude as well that an environmental balance exists, and that it is in no way different from the health balance.

The environment has its own precise **balance** and a dynamic equilibrium that should be maintained in a fair condition.

It also has a **health potential** which guarantees that every disorder is corrected. To enhance this potential is a duty, because if it is fully consumed, the disorder would continue and the balance would gradually diminish.

All of this derives from the unchanging universal law:

*He has enforced the balance. That you exceed not the bounds;
but observe the balance strictly; and fall not short thereof.
(55:7-9)*

If humans are ordered to build, on this earth, and rewarded for it so are they also ordered not to produce in excess anything that may corrupt the environment and not to carelessly overuse the environmental potential which maintains the balance. They themselves will pay for any imbalance which may

result from excess or negligence. Indeed, they have already begun to pay. For *Corruption has become rife on land and in the sea because of what the hands of human beings have wrought. It is so in order for God to give people a taste of what they have done; perhaps they would turn back.* (30:41)

For humans have not been satisfied with moderation in the materials they use in manufacturing and industry, or with economy in the land they plant and exploit. After the industrial revolution they began to make leaps that were almost beyond the wildest imagination. Thus, in this last quarter of the twentieth century, their factories discharge their poisonous vapours and harmful industrial effluent, generate their horrifying structures and artificial materials, and sprinkle their ionized radiation and nuclear terrors. Yet they continue to pant as they run after more and until the words of God, in His infinite wisdom and perfect knowledge, have come true: *Rivalry for worldly gain distracts you until you visit your graves!* (102:1-2)

* * *

3



Let us take some examples of this rivalry in worldly gains.

1. Water

Whereas three litres of water a day per person were sufficient to cover all the needs of a person in the desert, those settled in a city today need 2000 litres a day, which includes what they need for drinking, grooming, washing, cleaning their houses and surroundings, and watering the lawn, as well as a percentage of what is consumed by the irrigation of the farms that produce their food, meeting the needs of factories which manufacture the products they use, the cattle that produce meat and milk which they eat and drink, and so on. Because of that he needs to dig wells, build canals, create water distribution networks, and construct dams and reservoirs.

Civilized people, however, pollute and contaminate water at every stage they use it, at the level of **personal consumption**, with the viruses, bacteria, parasites and other organic waste they throw into it; at the level of **household consumption**, with the detergents and other chemicals, as well as the above-mentioned organisms, they add to it; at the level of **agricultural consumption**, with the pesticides and fertilizers they add, as well as the animal wastes that are often carriers of disease agents; and finally at the level of **industrial consumption**, with the factory wastes that directly pour into it, or with the air pollutants that are absorbed into it.

The list of elements that contaminate water is very long. It is difficult to produce a complete list. The most important are as follows:

a) **Organic waste.** This comes from household rubbish in cities as well as the countryside, and from industrial waste of animal or plant origin. Although rubbish is the most important source of rotting organic waste, industries

contribute an equal amount of such waste, particularly the food and paper industries which pour into water great quantities of plant and animal matter.

The decomposition of organic waste, caused by bacteria, drains the oxygen out of the water, causing serious problems, particularly in its destruction of fish and other aquatic creatures, and generating conditions suitable for septic pollution.

b) **Living factors.** Most important among these are bacteria, viruses and all disease-causing microbes. They are introduced into water with household garbage or with some industrial wastes, particularly those produced by tanning and slaughter houses. While cholera and typhoid bacteria have been effectively controlled in most developed countries, they still form a great threat in many developing regions. More difficult to fight are the viruses which cause enteritis and other infections, thus creating a serious health problem.

c) **Fertilizers.** Fertilizing agents, which invigorate the growth of plants, are also a major water pollutant. Their main polluting constituents are nitrogen and phosphorus, although other constituents may produce slight polluting effects. These elements are discharged into water with rubbish, industrial waste, or with the run-off of fertilized lands and nitrogen-rich soil. Biological treatment of the water to remove waste does not remove these plant-nutrients from it, but rather makes them more useful to water plants, such as moss, algae and the like. Serious problems result from this fertilization, the taste and smell of the water become awful, and the extensive growth of the water plants consumes much oxygen.

d) **Organic synthetic chemicals.** These include detergents and other household cleaning agents, pesticides and industrial chemicals. The most important of these are probably insecticides, like DDT, dieldrin, chlordane, and other agents, which are used to kill agricultural pests but which manage to get into water bodies.

e) **Non-organic chemicals.** The most serious element in this field is mercury contamination, which is the cause of serious problems in running water in many locations. From the water, the contamination is transmitted to water microbes, fish, game birds, and ultimately to humans. This mineral contamination results from mining, industrial activities, irrigation, and oil-field operations. Moreover, great quantities of acid, of all types, are poured into water as one ingredient of industrial waste.

f) **Radioactive elements.** These water polluting elements are products of the nuclear industries, both at the stage of mining and treatment of radioactive metals and the stage of using refined radioactive elements and nuclear reactors in industry, medical diagnosis, and research. Added to that is the atomic fallout that results from various nuclear explosions.

g) **Hot water.** The use of excessive amounts of water in industry is a new type of pollution. The tremendous amounts of water used for cooling in power plants, oil refineries and petrochemical industries are restored to the lakes, streams, or coastal waters from which they were originally derived, raising the water temperature. On the one hand this practice decreases oxygen solubility in water which, in turn, reduces the decomposition of oxygen-consuming pollutants and the food available for fish and other water creatures. On the other hand, the hot water may have a direct effect on these creatures by changing their physical environment, and thus reducing their reproductive rate. The high temperature of the water also speeds up oxygen-consuming reactions.

h) **Oil.** Water can be polluted by the oil spilled by tankers or ships, or as a result of accidents or negligence when crude oil is transported. It is estimated that 1.5 million tonnes of oil are spilled into oceans every year. Oil-polluted water causes considerable havoc to aquatic life and the oil greatly pollutes the food of fish and seafood.

The harmful effects of water contamination on human health have been known for a long time. They are evident in the pollution of drinking water, indoor and coastal swimming waters, and the water used in irrigation and fisheries. Poor sanitation and waste treatment in many developing countries are responsible for the extensive pollution of surface and underground water. To this is added the occasional, above-mentioned spill of dangerous pollutants in river and sea waters, which results in harmful contamination, to which aquatic life, the food chain, and human beings are exposed. Needless to say, the extermination of fish and other types of aquatic life poses a serious health problem, because of the disturbance it causes in the diet of all beings who feed upon water creatures.

2. Air

In all the texts I have read, I have come across no definition of the air more concise and precise than that given by Ibn Sina one thousand years ago:

By air we mean that substance diffused in space. It is a mixture of (1) real air, (2) water vaporous components, (3) rising dry land components borne by smoke and dust, and (4) fire components.

As we know today, the atmosphere consists of a mixture of (1) permanent gases (or let us say real air), namely oxygen and nitrogen; (2) gases with varying concentration (or let us say water vaporous segments), namely water vapour and carbon dioxide; (3) various airborne solid and liquid components (or let us say rising dry land components borne by smoke and dust); and (4) various types of radiation (or let us say fire components), which come from outer space (cosmic rays) and from the sun.

Some of these components in the air deserve some elaboration.

Of gases, particular attention should be given to **carbon dioxide**, which is emitted into air with the exhalation of animals and plants and from burning processes. It is reduced in the air through the process of photosynthesis. The constant activities of human beings have greatly modified the amount of this gas contained in the air, increasing it by 25% during the past century, and it keeps on increasing. This increase is due to fossil fuel burning and the cutting down of forests, trees and grasses, which increase carbon dioxide production and reduce its consumption.

Another gas is **ozone**, which is a three-atom form of oxygen (O_3). It is a peculiar gas. In the lower strata of the atmosphere, it is an irritating element, abrasive to the mucous membranes particularly in the respiratory system, while in the upper strata, it is a protective element by virtue of its high absorption of ultra-violet rays radiated by the sun. It blocks most of the ultra-violet radiation with a wavelength below 310 nanometres, which may destroy living organisms.

Ozone is produced in the upper strata when short-wave sun rays are absorbed by molecular oxygen, but it turns back into molecular oxygen in the same upper strata as a result of the photochemical reactions stimulated by a number of gases particularly nitric oxide (NO), nitric dioxide (NO_2), chlorine

(Cl), and chlorine oxide (ClO). The amounts of nitric stimulants are rising with the increase of gases discharged by the engine exhaust systems of aircraft flying at high altitudes and with the increased use of nitric fertilizers. Similarly, the amounts of chlorine stimulants are rising with the increase in use of chlorine gases, particularly fluorocarbons (CF_2Cl_2 and CFCl_3), which are constant in lower atmospheric strata, but which in the upper strata quickly decompose under the influence of ultra-violet rays, releasing their active chlorine. These fluorocarbons are increasingly used in aerosol sprays and cooling appliances. It has recently been recognized that the exhaustion of upper strata ozone by the above-mentioned methods, results in a greater exposure of all living creatures, including people, to the harmful effects of ultra-violet rays.

Originally, ozone exists in the earth's atmosphere, finding its way there from the upper strata, in non-harmful concentrations (10-30 parts per one billion). However the same nitric stimulants which cause its decomposition in the upper atmosphere, particularly the nitric oxides and hydrocarbons emitted by vehicle exhaust systems, help to produce it in the lower strata, and its harmful effects begin with increased asthma attacks (when it reaches a concentration of 150 parts per billion) and throat irritation (at 300 per million). It is also harmful to plants and slows their growth.

Since we have referred to what Ibn Sina calls "fire components," let us speak of another type of solar radiation, i.e. infra-red rays, which are projected by the sun onto the earth's surface, where it is absorbed and then projected up again. This time most of it is absorbed by the carbon dioxide and water vapour in the atmosphere. Immediately these send the rays back to earth or into outer space. Thus, water vapour and carbon dioxide function as a blanket which maintains the warmth of the earth surface, keeping it thirty-six degrees warmer than it would have been otherwise. This phenomenon is generally known as the greenhouse effect, although the expression is erroneous, because a greenhouse maintains the temperature of the things it covers by preventing transmission of heat through conduction, while the atmospheric blanket prevents heat transmission through radiation.

The burning of coal, petroleum and gas, particularly in cities, increases the amount of carbon dioxide contained in the air, and consequently increases the local air temperature and the temperature of the world in general, upsetting the heat balance maintained by the projection of infra-red rays from the sun and their repeated reflection between the earth and the atmosphere.

This is not all that is related to the change in the proportions of air elements. There is also the problem of the air being polluted by alien elements which are in conflict with its normal composition and upset its balance. Ibn Sina said,

As long as the air is fair and pure, not mixed with an alien substance conflicting with the temperament of the spirit, it has a positive effect on health and maintains it. If it changes, it functions in a contrary manner.

He elaborates on this by saying,

In essence, good air is that which is not mixed with any alien vapours or fumes. It is exposed to the sky, not confined between walls and ceilings, except where the air is afflicted with general contamination. In such a case, open air is more affected than covered or enclosed air.

The pollution of urban air, particularly in major metropolises, is a much more serious problem than the pollution of rural air. Ibn Khaldun referred to this in his *Introduction* 500 years ago:

Air in big cities is polluted by being mixed with foul vapours caused by excess of garbage.

This is a problem that has been growing more and more serious since the Industrial Revolution. Many metropolises and big cities are now exposed to a terrible, suffocating atmosphere. City pollution is still on the increase, especially because of cars and trucks, the exhaust systems of which cause more than 56% of air pollution. Then there is the effect of aeroplanes, trains and steamers in the places where they exist. Next to the means of transport, the most dangerous polluters are the other sites of constant combustion like power plants and heating systems (22%), factories (15%), forest and harvest fires (5%), and the incineration of solid waste (2%).

The most important of the “alien substances conflicting with the temperament of the spirit”, as Ibn Sina put it, are carbon monoxide, suspended particles, sulfur oxides, gaseous hydrocarbons, nitrogen oxides and ozone. The amount of these items which hangs in the air over the United States alone is

estimated to be 194 million metric tonnes. There is a seventh contaminating item, which consists of the dangerous poisons discharged into the air by some specific factories.

As for **carbon monoxide**, the notorious poisonous gas, it is mainly produced by imperfect combustion of carbon fuel, particularly in cars.

The **smog, particles and microorganisms** (SPM) suspended in the air are solid or liquid particles of a size ranging between smoke, soot and smog, which are visible, and organisms that can only be seen with an electronic microscope. These small particles can stay suspended in the air for long periods of time, and can be swept by the wind and carried across long distances. The major sources of SPM are combustion appliances, such as heaters and electric generators, which produce most of the visible particles and a high percentage of the invisible gases, which soon turn into aerosols. To these are added particles of sand, gravel and cement which remain suspended and may be carried far away. More than one billion people inhabit regions where SPM pollution exceeds the limits set by the WHO.

Of **sulfur oxides**, the most important are sulfur dioxide, sulfuric acid, and all other sulfates. They are produced by carbon fuel, most of which is sulfur polluted, but some types of factories produce it as well. Information collected by WHO and the World Environment Programme in 1987 indicate that over six hundred million people live in urban areas where the average sulfur dioxide pollution is above the maximum limit set by WHO.

Gaseous hydrocarbons are not poisonous in themselves, in the amounts in which they exist in the air, but they are major air pollutants due to the role they play in producing ozone and all oxidizers. Most of these gases are products of urban areas, where metal polishing workshops, paint factories, printing houses, gasoline and diesel distribution plants, and cleaning establishments are located.

Nitrogen oxides are formed when nitrogen and oxygen unite at the high temperatures of fuel combustion, and their danger lies in their role in producing ozone.

The harm of **ozone** as a throat irritant and the damage it causes to the respiratory system have already been mentioned, particularly if exposure to it continues, when a cloud of what we call smoke fog, or smog, hovers over the city for several days.

There are finally **toxic substances**—such as asbestos, beryllium, mercury and vinyl chloride—which require special precautions in production, processing and use. To these one can add other items such as arsenic, benzene and certain radionuclides.

This pollution is hazardous to human health. The world still remembers what happened in London in 1952, when lethal smog caused the death of four thousand people; what happened in the industrial town of Donora, West Pennsylvania, when twenty people died and half the population fell sick as a result of a five-day smog. The survivors continued to suffer poor health. In 1953, two hundred people met their death in New York City because of a rise in the percentage of carbon oxides and SPM.

By no means less terrible than these catastrophes are the long-lasting effects of air pollution on large city dwellers, ranging from chronic respiratory ailments, pulmo-emphysema and bronchitis, to the reduced ability of the healthy, whether adults or children, to perform physical exercises, to an increase in the mortality from other diseases such as cancer and heart diseases, to an increase in the incidence of asthma, allergy and respiratory diseases in children. The annual toll of pollution paid by the population of the United States is estimated at fifteen thousand deaths, seven million sick-leave days, and fifteen million days of reduced productivity. *So learn, you who have eyes!* (59:2)

The quality of air inside houses has only recently been considered as a potential health problem, hazardous to many people. The problem is most evident in the houses of millions of rural dwellers in developing countries, where fuel of organic origin or coal is used for domestic purposes. A WHO report estimates that about five hundred million people, mostly women and children, may be exposed to harmful effects resulting from the poisonous fumes and the smoke which are permanently present in their houses. Such problems, however, are not restricted to houses in the countryside or to developing countries. There is ample evidence that the air inside houses everywhere is polluted by many domestic and external factors, causing considerable harm to dwellers. In particular, we should not forget the **smoking pandemic**, and the air pollution caused by cigarette smoke wherever it takes place and the numerous health hazards which affect passive smokers.

3. Chemicals

Chemicals have become an indispensable part of human life, because they help humans in their activities and sustain human development. They protect against, and fight, many diseases, increase agricultural productivity and bring many benefits to communities. But one cannot deny that many of these chemicals may have a bad effect on health if a person is directly exposed to them when they are manufactured, transported, distributed, dispensed, used or disposed of. Moreover, uncontrolled disposal of these chemicals and their waste may pollute the air, water, and the soil and result in food contamination and indirect harmful effects.

It is estimated that seventy thousand chemicals are handled on a day to day basis, and forty-eight thousand of these are handled in commercially significant amounts. The majority of materials used will pollute air, water, food and soil in the form of residue or waste. Every year 700–1000 new chemical substances are introduced into business. Trade in chemicals is now an international business, and it has swept both developed and developing countries. At the same time, only a few countries have the means to undertake studies of these chemicals and their poisonous and infectious aspects.

Things are worse in developing countries, because many decision makers are ignorant of the medical consequences of these chemicals, which are neither used nor disposed of in a proper way and which, either deliberately or unintentionally, are regarded by domestic industries as non-hazardous.

To make things even worse, acute poisoning by such substances, leading to many deaths, occurs in many countries. Globally, poisoning by insecticides alone is estimated at one million cases per annum, and the number is on the increase. Even worse are the large-scale incidents, such as the release of methyl isocyanates in Bhopal, India; pills contaminated with insecticide in Iraq and Pakistan; contaminated cooking oil in Spain; food contaminated with pyrrolidin alkaloids in Afghanistan; and similar incidents.

* * *

4

So, what can we do to rescue this environment as well as ourselves from the imbalance to which both it and we have been subjected?

I would like at this point to quote some reflections written down over fifty years ago by an outstanding scholar, the late Muhammad Ahmad Al-Ghamrawi. He said:

God has known this complex civilization will come into being, that the doors of science will be open before it, that this science will provide it with various kinds of power, and that this power will lead it to various kinds of problems, which will find no satisfactory solutions unless the norms of nature set by God are observed. The human psyche has rules and principles, some of which are known to humanity, but those unknown are greater in number. If humanity is left to itself, its own knowledge and devices, it will not and cannot get out of the pitfalls into which it is bound to fall as a result of its exploration of physical science, which opens up for it the wealth and treasures of the earth without explaining the rightful way of using them. God wanted His favour to humans to be complete, by giving them both power and guidance in how to use it. So He gave men knowledge, but before giving them that knowledge he revealed to them the Book and Wisdom to show them how to protect themselves against evil knowledge and to ensure that they will reap the benefits of knowledge, by using it only up to the limits set by God, who has created humans and the powers He endowed them with through knowledge. While it is a splendid gift from God to humankind that He has given them the mind to explore the treasures of science, it is a greater gift that God has bestowed on

them by revealing to them the religion to protect them against the hazards and evils which they cannot avoid by mind and knowledge alone.

And what does religion tell us?

God draws our attentions to what may occur if humans, indifferent to the various types of balance, go too far in exploiting the environment, which is what we are witnessing today. He says: *If God were to bestow abundance upon His servants, they would behave on the earth with wanton insolence.* (42:27) He also says: *Do not follow the counsel of those who are given to excesses, those who spread corruption on earth instead of setting things to rights.* (26:151–52) And He says: *Had the Truth been in accordance with their desires, certainly heavens and the earth would have been corrupted.* (23:71)

The problem then does not lie in the exploitation of the gifts of the sky and the resources of the earth, for that goes hand in hand with development and prosperity. It rather lies in the outrageous extremism, extravagance and transgression, all of which are synonyms that signify excess and indifference to balance, and all of which lead to upsetting the balance in a way that corrupts the environment and makes it unfit for human life. God warns in several places in the Quran against corruption of the earth. Corrupting the environment is the first thing that springs to mind in this context. God says: *Eat and drink of the sustenance God has provided, and do not corrupt the earth with evil.* (2:60) He also says, *Do not corrupt the earth.* (7:85) In another verse God says: *Do not corrupt the earth with evil.* (29:36) And He also says: *Do not strive for corruption in the land.* (28:77) On many occasions, Prophets have warned their people against corruption of the earth.

God even makes special mention of the type of corruption that involves the uprooting of vegetation and animals. He says: *There are some people whose words about this present life may please you; they even call upon God to witness what is in their hearts; whereas in fact they are the deadliest opponents. As soon as they hold authority, they go over the earth to spread corruption, destroying tilth and progeny. God does not like corruption.* (2:204–205)

This excess in the exploitation of the environment with no check or control is an injustice of the worst type. It is ingratitude for the favours bestowed by God, because gratitude for a favour means that one should maintain and guard

it. God gives the example of a town which ...*was once safe and secure. Its sustenance came to it in abundance from every quarter. But it was ungrateful for God's favours. Therefore, He afflicted it with famine and fear for what it did.* (16:112) Speaking of similar towns, God says: *Such is the scourge of your Lord when he chastises sinful towns. Harrowing and severe is His punishment.* (11:102) *But God was not unjust in treating them.* (29:40) *It was they who used to transgress in the earth and act unjustly ... Mankind, it is against your own souls that your offenses rebound.* (10:23)

God does not stop at warning against corruption; he also points out the right way. He instructs the Prophet ﷺ Say: 'My Lord has commanded you to be just' (7:29), meaning to be fair and moderate in all matters without going into either extreme. The Prophet Muhammad ﷺ made it clear that everything which may cause individual or collective harm is prohibited. He said, "There shall be no infliction of harm on oneself or others".¹

The putting into practice of these general principles by the Prophet ﷺ and his companions has set an example to be followed by successive generations. I will select some marvellous examples in as much as space allows.

The Prophet ﷺ sought to encourage agriculture in order to increase vegetation resources and enhance a benevolent environment. He said: "Whenever a Muslim plants or grows a sapling or a plant, and a human being, a beast, or anything else feeds upon it, it is counted for him as an act of benevolence".²

In his book *Al-kharaj* (Taxes), Yahya ibn Adam quotes Ali, the fourth Caliph, as saying: "Extend help against your desires. Seven (or perhaps he said nine) people in a village may bring it to life, by God's will". A man said to Ali: "I came upon land that was in ruins and its owners had given up on it. I hired some streams and planted it". Ali replied, "Enjoy what you eat! You are a reformer rather than a corrupter, a constructive, rather than destructive, man!"

The Prophet ﷺ was the first to establish environmental reservations, where trees could not be cut down and animals could not be killed. "God's messenger protected the whole of Medina, section by section, where no tree could be

¹ Related by Al-Daraqutni, Ibn Majah and Ahmad.

² Related by Muslim.

uprooted and nothing bigger than what can be used to drive a camel could be cut.”¹ “He did not allow any trees of Medina to be cut down.”² He said about the city that: “its game may not be scared, and none of its trees may be cut, except for a man feeding his camel”.³ He also said: “I forbid the trees between the two lavas of Medina to be cut down and the game to be killed”.⁴ Referring to the Wajj Valley in Taif, he said, “The game and trees of Wajj are forbidden”.⁵

These injunctions were thoroughly understood and acted upon by Muslims. Refer, if you will, to what imam Ibn Hazm says in *Al-muhalla*:

Charity to animals is benevolence and piety, and when a man does not help with animal welfare, he is promoting sin and aggression and disobeying God the Almighty.

A Muslim is even compelled by force to irrigate palm trees if neglecting to do so would cause them to die. The same thing applies to other plants. The evidence in support of this is God's words: *As soon as they hold authority, they go over the earth to spread corruption, destroying tilth and progeny. God does not like corruption.* (2:205)

To keep an animal from the feed or grazing necessary for its survival, and to neglect the irrigation of fruit trees and plants until they perish, is according to God's own words corruption on earth and destruction of tilth and progeny. It is something which God does not like!

The Prophet Muhammad ﷺ used to urge people to clean and not pollute their environment. He said: “To clear the road of all sources of harm is a benefaction”.⁶ **Benefaction, or *sadaqa*, is a term used in Islam to refer to what we call today civilized behaviour or civilized conduct, because as the derivation of the Arabic word suggests, it is the true evidence that an**

¹ Related by Abu Dawood.

² Also related by Abu Dawood.

³ Related by Abu Dawood.

⁴ Related by imam Ahmad.

⁵ Related by imam Ahmad and Abu Dawood.

⁶ Related by Al-Bukhari in *Al-adab al-mufarrad*.

individual belongs to the civilized Muslim community. This is supported by the Prophet's ﷺ statement that “*Sadaqa* is an irrefutable proof”¹.

The Prophet's ﷺ guidance also includes his injunction, “Let no one urinate in stagnant water”.² “The Prophet ﷺ has forbidden anyone to urinate where he bathes.”³ He used to say: “Avoid the two actions that bring peoples curses!” He was asked: “What are these?” “The one who defecates in the road and the shade used by others.”⁴ He also said, “Avoid the three actions that bring people’s curses: defecating in water sources, on roads, and in the shade.”⁵

The great scholar Al-Izz ibn Abd al-Salam summed up the rights of other people to be observed by a rational free adult as “bringing them all types of good and sparing them all kinds of harm...Good is used to mean bringing benefits and preventing evils, and harm is used to mean bringing evils and preventing benefits.”

In Islamic communities there is a major guaranteed method of seeking advantage and combating corruption, which is the promotion of good (*maarouf*) and the censure of abominations (*munkar*). This is an obligation that goes beyond mere education and information availability and involves checking that the information is actually put to practical use.

Every Muslim who knows, for example, that smoking is injurious to health and knows the harmful effects it produces regards it as his duty to inform others about it and make every other member of his community aware of the dangers of smoking. But things do not stop at that. He even considers it his duty when he sees someone smoking to ask him, in a gentle manner, to stop because smoking is harmful to the smoker. He also points out to him that if it is permissible for a person to harm himself, which it is not, it is a greater sin to cause harm to others. The Prophet ﷺ forbade causing harm to individuals and to the community, as he said: “There shall be no infliction of harm on oneself or others”. He also forbade any injury to one's neighbour, any neighbour, whether in residence, public transport, public places, or offices. He said:

¹ Related by Muslim.

² Related by Ibn Majah.

³ Related by Abu Dawood.

⁴ Related by Muslim.

⁵ Related by Abu Dawood.

“Whoever believes in God and the Day of Judgement should not hurt his neighbour”.¹

The same attitude is adopted by every responsible Muslim towards a person who pours the waste of his factory into waters that are for common use or into other areas of the common environment, or indeed towards any person who contributes in any way to the pollution of the environment. Enjoining what is right and good and forbidding what is wrong and evil, which is a fundamental principle of Islam, ensures the vigilance of every member of an Islamic community to make sure that the law is enforced, the common interest is guarded, and every source of corruption is blocked. Islam makes the protection of the environment and censure of its corruption a duty of the righteous society. God says, *Why were there not among the generations before you some upright men preaching against corruption on earth?* (11:116)

* * *

¹ Related by Al-Bukhari and Muslim.

5

I have already referred to the great similarity between a health balance and an environmental balance. I want now to speak about another similarity related to the protection stage.

Health promotion is the basic stage in protecting human health, or let us say, it is primary prevention. It is the first and the most important thing to do. To protect people from falling victim to a disease is to spare them much suffering, and to spare their tissues and organs much damage and undesirable consequences. Furthermore it saves society a heavy bill.

All measures that aim to ensure the early detection of any ailment and the immediate intervention to check it fall under secondary prevention.

There is also tertiary prevention, which includes the procedures followed to minimize the consequences of handicaps and disabilities should they occur, to reduce the suffering resulting from any incurable ailment, and to improve a patient's ability to adjust to living with such incurable impairment. All this is classified as rehabilitation.

It is quite interesting that what we have mentioned concerning health is applicable to the environment to a great extent.

Primary environmental protection is achieved by improving the health balance of the environment, which would reset the scale to its well balanced position. This is what I talked about at length, pointing out the role played by religion and religious communities. This is the kind of protection where the result is guaranteed and the expenses are minimal.

Secondary protection of the environment is through the early detection of any imbalance and immediate intervention to check it. For this reason, scientists have invented many monitoring and surveillance devices for every

element of the environment, at the domestic, national, regional and global levels, in order to discover anything that might upset the balance either way. They have also made various plans to rectify the disorder, and to do so as early as possible. Some of these plans are complex, while others are as simple as the one described by Ibn Sina, who said:

The alteration in water may bring more diseases to a traveller than the alteration of food. This is something that should be taken into consideration, and precautions in regards to water should be made. Among the methods of precaution are allowing the water plenty of time to settle and filtering it several times through pots of porous clay. Boiling the water may purify it and may separate pure water from other elements mixed with it. The best method is distilling it by sublimation.

There is in addition room for tertiary protection, which means rehabilitation.

It would take a long time to talk about the last two ways of protection, and the right place for such a discourse is forums that are highly specialized in every type of pollution.

But the most effective and least expensive protection is the primary: the promotion, protection and maintenance of the environmental health balance, which I hope to have managed to draw attention to in this discourse.

It is God Who says the truth and Who guides to the right path.

* * *