THE MIRACLES OF SMELL AND TASTE

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INTRODUCTION

Can you remember all the pleasant aromas you have ever smelled over the course of your life? A great many will come to mind: those emitted in spring by roses, carnations, lilac, jasmine, lavender, grass and other plants; those wafted abroad by orange, mandarin and lemon trees; the bewitching scents of certain perfumes; the delightful smells of assorted spices; the rich aromas of fresh or fried bread, tomatoes, eggs, olives, tea, coffee or milk when you come to breakfast in the morning and; the smell of meat sizzling on a barbecue, or a bar of fresh, clean soap . . .

In addition, now recall all the delightful tastes you have ever experienced. Those of various foods, desserts, meats, fish, vegetables, soups, salads, cakes, pies, fruits, beverages, jams, ice creams, candies and the like . . . and especially when you were hungry!

Everyone has lasting, permanent memories of tastes and smells. Even thinking about some of them for merely a moment is enough to awaken a sense of excitement. No doubt, each and every one of these delights is an incomparable blessing worth your consideration.

In the Qur'an, God makes the following statement about the blessings He has created:

If you tried to number God's blessings, you could never count them. God
is Ever-Forgiving, Most Merciful. (Surat an-Nahl: 18)

In addition to these blessings listed here, God has also created the senses of smell and taste within our bodies to let us perceive and take pleasure from them all, and has placed these systems at our service as a manifestation of His boundless compassion. It is only through these systems, of such importance to us, that you can experience the wealth of the worlds of odors and flavors. Were it not for them, such concepts such as sweetness and pungency would have no meaning for you.

To understand their importance, imagine if you could not perceive the smells and tastes of what you eat and drink. You would be unable to enjoy the scent and flavor of a strawberry, for example, and would even be unaware of what a strawberry is really like.

You have been using your senses of smell and taste ever since you first came into the world, and can now perceive tens of thousands of scents and flavors with no difficulty. That is because you possess magnificent systems that make this possible. Your senses of smell and taste work faultlessly and tirelessly on your behalf, throughout your entire lifetime. What is more, you have paid nothing for

them, have received no specialized training and make no effort at all in order to make use of them.

Of course, these facts we are discussing call for prolonged reflection. In the light of them, all men and women of reason and good conscience need to ask themselves the following question: How did the smell and taste mechanisms they possess come into being?

Medical and biological textbooks on the subject tell us that we owe our perceptions of smell and taste to our noses, tongues and brains. It is true, of course that we perceive flavors and odors by means of these organs. Yet another point here is ignored, whether consciously or otherwise. The question that's generally overlooked and that really needs to be answered is this: To whom do we owe the existence of our noses, tongues and brains?

Most people think that it is sufficient to know that they smell with their noses and taste with their tongues, and are not concerned with the intricate details. Yet this is a serious mistake to make. Taste and smell are inseparable, essential elements of everyone's life, and it is terribly heedless for anyone aware of that to ignore the significant details that these senses present.

No doubt we owe these wonderful blessings, as we do absolutely everything else, to God, the Lord of the worlds. When we examine the systems of taste and smell, you can see how these flawless mechanisms constitute astonishing proofs of creation. The aim of this book is to set out the proofs of creation in these systems, to help you consider God's limitless might and knowledge, and properly comprehend the innumerable blessings bestowed on us by our Lord. At the same time, we will yet again demonstrate the irrational and illogical nature of the theory of evolution, which maintains that all these marvelous systems are merely the product of chance.

The flawlessness in God's creation is described with these terms in the Qur'an:

He is God—the Creator, the Maker, the Giver of Form. To Him belong the Most Beautiful Names. Everything in the heavens and earth glorifies Him. He is the Almighty, the All-Wise. (Surat al-Hashr: 24)

THE CREATION
IN THE OLFACTORY SYSTEM

It is quite easy for you to describe those things you see or hear. Yet generally, we have considerable difficulty in putting any name to a smell. We try to describe it by comparing it to some other smell; and tend to describe the feelings those aromas awaken in us. We refer to those smells we like as “nice” or pleasant, and to those we do not as “bad” or unpleasant, because a great many smells we encounter in our daily lives do not have actual names.

What we refer to as a smell is actually a reaction to chemical particles—in other words, molecules—given off by an object. The origin of the smell of freshly ground coffee that you find so delightful is actually the floating airborne molecules emanating from it. The more of these are given off, the stronger the aroma. The reason why a baking cake smells so much more strongly than a stale one is because the cake in the oven is emitting so many more scent particles. Scent molecules begin moving in the air more freely under the effect of heat, and are able to disperse over a wide area. But be aware that delicate balances have been specially arranged for human life. There are materials such as stone, iron and glass around you that you cannot smell, because these substances do not vaporize at room temperature. But assume for a moment that everything in your room suddenly began giving off aromas: Can you imagine how disturbing and even life-changing that would be?

Another interesting fact is that although water vaporizes at room temperature and even below, it has no odor. This special feature in water is most important, since it means that there is no difference between the scent of a dried rose and one that has been freshly watered and still has droplets on its petals. In other words, the rose’s natural perfume is unimpaired. Furthermore, the water vapor, or moisture, in the air actually strengthens the effect of any existing smell. For instance, water molecules that vaporize after a downpour of rain raise scent particles up into the air and assist in spreading the scent of flowers all around.

No one knows how many varieties of odors there are in nature. Bearing in mind the existence of millions of molecules, we may safely say that the variety of scents is enormous. Studies have been carried out to place these aromas into various categories. But due to the extraordinary variety of smells, no satisfactory classification has ever been achieved. [1]

The microscopic variation between molecules gives any one smell its particular characteristics. **(Figure 1)** For example, the feature that differentiates a cooked, fresh egg from a rotten one lies in the structures of the particles the two

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[1] P.M. Wise, M.J. Olsson, W.S. Cain, "Quantification of Odor Quality", *Chemical Senses 25*, New York: Oxford University Press, 2000, pp. 429-443.

eggs give off. Differences in the chemical structures between various molecules are based, in turn, on very delicate variations.[2] Indeed, the addition or subtraction of a single carbon atom can turn an attractive smell into a repellent one!

The design in every point in the universe can immediately be seen in the structures of scent molecules. The unique aromas of cocoa, lavender or strawberry are the results of the molecules that give rise to these smells, and to the specially arranged bonds among them. Every molecule has been planned in light of a specific purpose, in the exactly the form it needs to be. There is no doubt that this magnificent design belongs to God, **Who created everything and determined it most exactly.** (Surat al-Furqan: 2)

Engineering in the Nose

When the olfactory, or scent-perceiving, organ is mentioned, the nose immediately comes to mind. However, very few are aware that as little as 5% of the nose is actually involved in the perception of scents.[3] Gordon Shepherd, professor of neuroscience at Yale University emphasized the truth of this when he wrote, “we think that we smell with our noses, [but] this is a little like saying that we hear with our ear lobes.” [4]

The following pages shall examine that part of the nose concerned with scent perception. First, however, we should make a brief reference to the other 95%, which undertakes two major responsibilities on behalf of your respiratory system. The first of these is to warm and moisturize the air you inhale. The mucus layer covering the interior surface of the nose releases water vapor to moisture the air that enters. The large numbers of capillary vessels immediately beneath the mucus layer also warm the passing air, adapting it to the sensitive structure of the lungs. The mechanism in question resembles the air conditioning system that regulates the levels of temperature and humidity in buildings.

The second important function of the nose is to halt dust particles, bacteria and germs, thus acting as a screen to diseases that might otherwise reach the lungs. This is how this splendid security system functions: Harmful particles that enter with the air are trapped by the mucus layer. Then tiny hairs known as cilia go into action. **(Figure 2)** They propel mucus containing harmful substances at a speed of 1 centimeter (0.4 inches) per minute toward the pharynx, where it is either expelled by coughing or else destroyed by gastric acids.

These processes, here described in general terms, are in fact so exceedingly complex that the details of the mechanism by which millions of micro-hairs operate as a single entity has still not been fully understood. The mucus layer, mucus-producing cells and micro-hairs comprise a perfect chemical purification plant that works so flawlessly that it immediately identifies what is essential to the body and what is dangerous to it, and takes the necessary actions.

One truth is very apparent here: The air-conditioning, security and purification mechanisms in the nose are all examples of perfect engineering. It cannot possibly be imagined that circulatory, respiratory and digestive system

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[?] P. Whitfield, D.M. Stoddard, *Hearing, Taste, and Smell; Pathways of Perception*, New York: Torstar Books, Inc., 1984.
(http://www.macalester.edu/~psych/whathap/UBNRP/Smell/nasal.html) *The Olfactory System: Anatomy and Physiology*, Macalester College, 2001.

[4] Maya Pines, "Finding the Odorant Receptors", *Howard Hughes Medical Institute*, 2001, http://www.hhmi.org/senses/d/d120.htm.

cells agreed to cooperate among themselves and draw up plans like engineers. It is also impossible for the systems in question to have come about as the result of coincidences and to produce the aesthetically pleasing human face. It is revealed in verses that God created everything, from the Earth to the skies, with its perfection of design:

. . . **Everything in the heavens and Earth belongs to Him. Everything is obedient to Him, the Originator of the heavens and Earth. When He decides on something, He just says to it, 'Be!' And it is. (Surat al-Baqara: 116- 7)**

The Nose's Chemical Analysis Facility

You breathe an average of 23,040 times each day.[5] During this constantly repeated process, your nose adapts air for the lungs in the most appropriate manner. In doing so, it performs another very important task: It detects and monitors odors**. (Figure 3)**

The total population of a sniff is a billion trillion molecules, nearly all of them normally in the mix we call air.[6] The scent particles, far too small to be seen with the naked eye, are contained within this enormous quantity of molecules. After you have breathed in, special turbinate bones in the nose direct a portion of that air to the scent-perceiving region. In this way, scent molecules arrive at a region in the upper part of the nasal cavity, some 7 centimeters (2.756 inches) inside and above the nostrils. **(Figure 4)** When you lift a flower to your nose and smell its perfume, a great number of molecules reach the scent-perception region.

Most people are unaware that they possess such an extraordinary chemical-analysis facility that lies within the scent-perception region, works non-stop to analyze odors in the surrounding area. As you go about your daily life, making no special effort to perceive smells, this facility is in action nonetheless. Even when you sleep at night, it perceives potentially harmful smells such as smoke and warns you. This facility is so utterly perfect that it is able to determine more than 10,000 different odors[7], functioning with a perfect accuracy and sensitivity.

The small scent molecules that form the basis of aromas come in different shapes and sizes.[8] The breathtaking scents in a garden, the attractive aromas of a delicious meal, or the repellent stench of rotting fruit all arise from different molecules. The chemical plant in your nose is easily able to identify all these different molecules, and can even immediately distinguish molecules with the same atomic formulae. For example, the minute difference between the molecules L-carvone and D-carvone stems from their atoms having different sequences. Despite this exceedingly close similarity, a human nose can easily distinguish

between the two, telling us that the former suggests cumin and the latter, spearmint.[9]

Another property of the nose that amazes scientists is its immaculate sensitivity. The minimum concentration of a substance required for us to recognize its particular smell is known as the *smell threshold*. The analysis mechanism in our noses in unbelievably sensitive; some scents in the air can be perceived at concentrations of less than one part in a trillion! Research has shown, for example, that the threshold for perception of butyric acid is a 10 billion fold dilution of the pure substance.[10]

The more molecules are investigated, the more marvels of the scent perception system are revealed. What we perceive as any single aroma is actually an effect caused by large numbers of different molecules. For instance, the "ordinary" smell of white bread actually consists of around 70 different scent molecules. It is estimated that the smell of coffee results from a combination of at least 150 different chemical substances.[11] A top-quality perfume may contain 500 ingredients.[12] The analysis mechanism in your nose identifies these chemical substances at very low concentrations, without your being aware of it. All these processes that take place between your detecting a smell and concluding that it belongs to coffee brewing, take place in much less than a second. Bearing all this in mind, the superior creation in the scent perception mechanism can doubtless be better appreciated.

God reveals in one verse that:

And in your creation and all the creatures He has spread about there are Signs for people with certainty. (Surat al-Jathiyya: 4)

A Call to Reflection

As you sat watching television, were someone to tell you that the broadcast came, not from any television station, but as the result of electromagnetic waves forming at random in the air and that the television had not been produced in a factory but had come into being spontaneously over the years from the atoms and molecules in your home, what would you think?

You would probably imagine that person was joking. Certainly you would not take his words seriously. When you realized that they were actually serious in making that claim, you would conclude they had lost their reason. That is because in that example, we are dealing with a technological design: A television set is a device specially manufactured with the aim of receiving televised broadcasts. In short, both the television and the broadcasts—and every aspect of the relationship between the two—have been planned down to the finest detail. In this complex system, there is absolutely no room for chance.

Yet evolutionists maintain something even more irrational. The view of Darwin and his evolutionist followers may be summarized as follows: According to their logic, the scent perception mechanism—far more highly advanced than television broadcast technology and which is still not yet fully understood—and the flawless harmony between the countless scent molecules and the nose, came into being as the result of so-called coincidences. **(Figure 5)**To put it another way, atoms randomly combined to form molecules that make up the different aromas on Earth and at the same time, those same molecules spontaneously brought the nose into being, the organ which is capable of identifying them all separately and of interpreting what it perceives. There is allegedly no plan, design or intellect involved here. According to evolutionists, everything happened over billions of years by means of unconscious, uncontrolled and random events that, all combining together, eventually gave rise to any number of perfectly flawless systems.

Anyone with a little reason and common sense can immediately see the flaws in this evolutionist logic. The subjects described in later chapters of this book will fully reveal the errors that evolutionists make regarding these matters. No doubt the structure in the nose has been specially created to perceive odors, and is a yet another sign of the omniscience of God, its Creator. Every detail you will learn throughout these pages represents a proof of this flawless design and perfect creation.

Indeed, in the Qur’an God has revealed this harmony and flawlessness that can be seen everywhere on Earth:

He Who created the seven heavens in layers. You will not find any flaw in the creation of the All-Merciful. Look again—do you see any gaps? Then look again and again. Your sight will return to you dazzled and exhausted! (Surat al-Mulk: 3-4)

Theories of Scent Perception

You wake up in the morning to delightful aromas emanating from the kitchen. Even as you think to yourself, *How good that smells*, you are unaware of all the processes going on inside your nose. But just what is happening in your nasal cells at that moment?

Scientists have been trying to answer this question for many years, but have still failed to fully unravel how the scent- perception cells recognize particles in the air. What they do know goes no further than theory. Indeed, less is known about scent perception than about our other senses.[13]

At present, one of the most widely accepted theories, first proposed by R.W. Moncrieff, is known as the *steric theory*, according to which, scent particles come in different shapes and sizes, and combine with receptors unique to them in the olfactory region. The relationship between the receptors and the scent particles is comparable to that between a lock and a key. In the same way that a lock can be opened only by a particular key, so scent receptors go into action as a result of the effect of certain molecules only.

John E. Amoore developed this theory further, and determined seven main smells, which he termed ether, camphor, musk, flower, mint, sharp and rotten. He then proposed that all scents consist of combinations of these seven "building block" odors. [14]

Another scientist, Luca Turin, proposed the *vibration theory of olfaction*, maintaining that scent receptors in the nose work like a spectroscope, a device used to measure vibration frequencies, and that they identify molecular vibrations. According to Turin, receptors in the nose are apparently designed to be compatible with the vibration frequencies of scent molecules. This resembles the way in which special cells in the retina of the eye are created to be compatible with specific wavelengths of light. Turin thinks that at the basis of scent perception, there is a complex mechanism based on electron transfer.[15]

Other theories include J.T. Davies and F.H. Taylor's *diffusion pore* theory, G. M. Dyson's *molecular vibration* theory and B. Rosenberg's *piezo effect* theory.[16]

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[13] "Research Uncovers Details Of How Sense Of Smell Works," *Science Daily Magazine*, 1998, http://www.sciencedaily.com/releases/1998/01/980112064707.htm

[14] John E. Amoore, *Molecular Basis of Odor*, Springfield: C.C. Thomas, Pub., 1970. http://www.leffingwell.com/olfact4.htm

[15] Luca Turin, "A Spectroscopic mechanism for primary olfactory reception," *Chemical Senses 21*, 1996, pp. 773-791. http://www.leffingwell.com/olfact4.htm

In short, we still do not know how the communication between scent molecules and scent receptors takes place. In other words, the perceptive processes that take place in the receptor cells in our noses have not yet been fully unraveled.

Obviously, however, there is, considerable speculation, and in the following pages, we will devote more space to one view that has gained wider acceptance in comparison to the others.

Laboratories equipped with the very latest devices permit all kinds of scientific research to be carried out. Yet that we still do not understand how our sense of smell works once again shows the perfection of the system in question and the overall creation of human beings. As science unravels the details in the human sensory systems, it lays out the facts for all to see. The sensory organs are the work of a flawless design, and have been created with a delicate equilibrium calculated to be ideal for healthy human life. Another observation that emerges is how thoroughly mistaken is the theory of evolution, which maintains that *life is the work of chance*.

Marvels in the Scent-Perception System

Your senses provide you with enormous amounts of information about the outside world. We may not always be aware that our senses play a vitally important role in our perception of what's going on around us. When you close your eyes and smell dinner cooking in the kitchen, you can unfailingly identify what is on the menu. By scent alone, you can tell whether or not the dinner is cooked, or whether something in the refrigerator has spoiled. We can also identify a great many environments, such as hospitals, restaurants, markets, schools or our own homes, from their odors alone.

Your capacity to detect smells is much greater than you imagine. Some researchers even say that it would be a mistake to reduce this capacity to a numerical figure, since our sense of smell is able to distinguish between countless different odors.[17] Let us now look more closely at the marvels of creation that make up this supremely competent and highly accomplished system.

The Unbelievable Motion in Mucus

Two olfactory regions (*Regio olfactoria*) are located in the roof of the two nasal cavities of the human nose, just below and between the eyes. **(Figure 6)** The region occupies 2.5 square centimeters (0.39 square inches) and is covered in mucus secretions. Mucus is a sticky fluid secreted by *Bowman's glands*. The mucus layer covering the olfactory region is about 0.06 millimeter (0.023 of an inch) thick.[18] If this layer were even slightly thicker, your capacity to perceive

smells would decline considerably. The reason why your ability to perceive smell decreases when you catch a cold is because mucus production is increased. If the thickness of the mucus were any less, then your body's immune system will be weakened and the olfactory micro-hairs in the mucus layers could easily be damaged.

The basic functions of mucus have been known for some time. Among other things, it prevents drying inside the nose and constitutes a defense against foreign chemical substances. But only recently was it realized that mucus has a most organized structure and constitutes a most ideal environment.[19] Indeed, it is a very rich mixture of proteins, enzymes, mucopolysaccharides, immunoglobulins and lipids.

The first stage in olfactory perception begins in the mucus layer. In order for scent particles contact the receptors in the micro-hairs, they must first pass through this stratum. At this stage, special connection proteins in the mucus layer combine with scent particles and serve them literally as guides.[20] These proteins are still the subject of research. They are thought to assist scent particles and receptors to come together and also prevent excessive numbers of scent molecules from reaching the receptors.[21] What is certain is that the proteins recognize thousands of different scent particles, establish communication with them and regulate the molecular traffic in the mucus layer—reaffirming the fact of an astonishing creation.

Imagine yourself wandering in a garden filled with lovely-smelling flowers and holding them up to your nose to smell them, one by one. In order for new scent particles to reach the receptors in your nose, the old molecules need to be disposed of, or it will be impossible for you to detect the smell of the second flower after smelling the first. Such an eventuality could have unwelcome consequences, but it is prevented by certain enzymes within the mucus.[22]

To describe it in simplified terms, after a specific—but quite brief—length of time, the enzymes in question alter the structures of the scent particles and convert them to a state where they no longer stimulate the receptors. Later, these neutralized molecules are sent to the stomach together with the mucus that traps them, and are thus eliminated. Note that it is not expert biochemical engineers and scientists who accomplish this, but enzymes with no mind or consciousness. In addition, the enzymes in the mucus achieve this by constantly making new "decisions." Naturally, enzymes cannot manage such complicated tasks all by themselves. All this takes place through the limitless knowledge and magnificent creation of God.

In conclusion, there is an astonishing activity in the depths of the mucus layer that manages the scent-perceiving region in your nose. Countless processes, of which you are unaware and cannot see with the naked eye, proceed with perfect planning and timing.

Wonderful Messengers: Scent Cells

Scent receptors are actually nerve cells whose main function is to carry to the olfactory bulb the messages triggered by scent molecules. Views in the scientific world differ as to their numbers. Some researchers put the figure at 10 million[23], and others at around 50 million.[24] Millions of scent cells in the olfactory region—which is no larger than the smallest postage stamp—are arranged in an astonishing regularity. If you possessed all technical means and were asked to place millions of cells in exactly the right locations, could you do it? Such a task would of course be impossible. After all their years of research, scientists have been unable even to determine the exact number of cells, let alone set out millions of them, showing that this task is of course impossible.

Within the scent cell itself, there is also a striking division of labor. As the well-known researcher Stuart Firestein points out: “The olfactory system accomplishes its sensory tasks with biological mechanisms that are common to many signaling systems.”[25] This special design quickly manifests itself in drawings prepared from electron microscopy images. **(Figure 7)** The olfactory cell consists of three main sections, the cell body in the middle, the micro-hairs known as cilia at one end, and a protrusion known as the *axon* at the other. **(Figure 8)** The cell body is where many complex activities take place, the cilia where contact is made with scent molecules, and the axon where electrical signals are transmitted.

The number of micro-hairs at the end of the cell ranges between 10 and 30, and their lengths between 0.1 and 0.15 millimeters (0.0039 to 0.006 inch).[26] The difference between these scent hairs and similar ones in other regions of the nose is that the former move and possess scent receptors. **(Figure 9)** In contrast to the other cilia in the body, the olfactory micro-hairs are entirely independent structures. They assume the role of a skeleton for the receptors. Close inspection shows the most productive design for the micro-hairs, with a wide area for contact between scent molecules and receptors being squeezed into a very small region. In addition, latest research has revealed that each olfactory cell contains just one of a thousand different types of scent receptor,[27] as we’ll consider later, in greater detail.

Though the term *cilia* or *micro-hairs* may suggest very simple structures, the fact is that these terms describe only the shape of the structures in question. In fact, olfactory micro-hairs possess an incomparable and extraordinary communications technology. Scent molecules that dissolve in the mucus combine with special receptors on the scent micro-hairs. The relationship between the scent molecule and the receptor resembles that between a lock and key. As a result of molecular details that have not yet been fully clarified, a signal is formed within the scent-receptor cell. At this stage, a great many proteins and enzymes unfailingly discharge the responsibilities placed upon them.

The process by which scent-receptors turn the characteristics of scent molecules into electrical signals is rather complicated. At present, only two of the

communication networks in the scent-receptor cells are known. In the very simplest of terms, the communication can be summarized as follows:

Let us first examine the communication established by means of cAMP (adenosine 3',5'-cyclic monophosphate). **(Figure 10)** When scent molecules combine with the receptors, a rapid sequence of processes begins within the scent receptor cell. First, the G-old protein is brought to an active state and sets the enzyme AC into action. AC accelerates the transformation of ATP in the cell into cAMP—a messenger bound to the channel that joins the cilia to the cell membrane.

This results in the channels opening up and calcium ions entering the cilia. Entry of the calcium ions causes the chloride channels to open, and chloride ions leave the cilia. In this way, a cell with an initial negative charge becomes without charge and an electrical signal forms as a result of this series of chemical reactions, moving along the cell axon to reach the olfactory bulb.

Some scent molecules do not affect the level of cAMP, but instead raise the concentration of IP3 (inositol 1,4,5-Triphosphate), which initiates the process that releases the electrical signal in the cell. The stages of the chain reaction of this cellular communication line have not yet been fully understood.[28] However, the communication within these minute cells is clearly the product of an astonishing design.

While all this is taking place at one end of the olfactory cells, astonishing processes are occurring in the axons at the other end. The axon carries the signal emerging in the cell to the olfactory bulb in the anterior region of the brain. **(Figure 11)** In order to reach the bulb, neuronal cells form axons that are bundled in groups of 10-100 to penetrate the ethmoidal cribriform plate,[29] whose porous structure allows the olfactory nerves to pass through it. The design in this part of the skull is just one factor that enables you to perceive odors. Otherwise it would be impossible for the nerves to establish communications with one another, and thus to transmit olfactory signal. If all the necessary elements comprising the olfactory system were present, but nerves' passage through the bone was impeded, then you would be unable to smell. No doubt, every detail in this system is wholly indispensable.

To summarize these facts in a single sentence: The flawless communication in the olfactory cell is the result of special design, and that design is just one of the countless proofs of the splendor in creation.

A Matchless Communication Center: The Olfactory Bulb

The olfactory bulb is located in the anterior region of the brain, immediately above the olfactory region and the skull. **(Figure 12)** There are two bulbs,

corresponding to the two olfactory regions, each about the size of a pea. Despite their small size, however, they may be compared to a giant communications center in terms of the tasks they perform. All the signals from the scent receptors are first collected in this center. Millions of units of data are re-ordered and then sent for interpretation by means of special scent nerves to the scent cortex, hippocampus, amygdala and hypothalamus in the brain. **(Figure 13)** The olfactory bulb, which is tiny is where flawless coordination between the millions of olfactory cells takes place. Examine the communication in the bulb in a little more detail, and you can see why this coordination center is so incomparable.

The scent-receptor cells bring the signals to the bulb. The mitral cells, which number around 50,000 in an adult human, carry the messages they receive from the bulb to the brain. Communication between the two groups is effected by communication units known as *glomerules* in the bulb. Remember, this spherical communication unit is just 0.1 millimeter (0.004 inch) in diameter.[30] There are around 2,000 glomerules in a single olfactory bulb. Every glomerulus contains up to 25,000 scent receptor cell axons, and up to 25 mitral cell dendrites.[31]

When we consider these figures as a whole, the most astonishing numbers emerge: Messages from millions of scent cells are transmitted to tens of thousands of mitral cells. **(Figure 14)** Millions of units of information are thus exchanged between cells in intervals as short as a few thousandths of a second, and in a flawless manner. (No space is devoted to the marvels of communications in the neurons here. For more detail on this subject see, Harun Yahya, *The Miracle of Hormones*, New Delhi: Goodword Books) In addition, the information from every receptor is collected in the bulb, rearranged and organized to further increase scent sensitivity—in other words, a more perfect result is obtained than existed before.[32]

For an analogy of this error-free communication, assume that specific information is carried along million telephone lines, and that at a switchboard, the number of these lines is suddenly reduced to a thousand. In such an event, it is impossible that there will be no loss of the original information or errors in its transmission. It is not possible to prevent it, even using advanced technology. However, scent cells continue to perform the same function, in a flawless manner, throughout your life. The message transportation in the bulb is the product of an amazing creation.

Recent research has revealed a great many marvels of design in the olfactory bulb. The connections established by olfactory cells with the communication units in the bulb take place with an enormous order and regularity. The glomerulus to which every scent receptor cell will transmit is predetermined, so that signals from the same kind of receptor meet at a particular glomerulus. Each one of the millions of olfactory cells, from different areas of the olfactory region, come to one of some two thousand glomerules.[33] **(Figure 15)** The common view of the researchers who discovered this is that data from the different receptors is installed in an exceedingly organized manner.[34] Each one out

of millions of cells finds exactly the right one out of two thousand alternatives—which once again shatters all the claims of evolutionists who try to ascribe complexity to sheer chance.

Other cells in the olfactory bulb are *periglomerular* and *granular* cells, which go into action when the flow of messages needs to be halted, and are thought to play a preventive role.[35] So complex are the control mechanisms here that the system is still not yet fully understood.

Imagine the telephone network in a large city with millions of inhabitants. Could such a network, to which millions of phones are interconnected, have come into being by itself? Could the centers or switchboards, to which the phones are linked, have come into existence by chance? Even if all the raw materials were collected together in a field and one waited for millions of years, would it be possible for the flawless communications network in question to form spontaneously—as evolutionists claim?

The answers are evident. No matter how long you wait, not a single phone will emerge, let alone a whole urban telephone network. That is because a telephone network is the product of design and engineering, and must be planned and arranged with delicate measurements and calculations. Any other explanation is mere nonsense. In the same way, it is utterly nonsensical to try to account for the olfactory bulb's complex structure in terms of coincidences.

That not the slightest confusion is allowed to arise during communications in the olfactory bulb is an astonishing evidence of creation. It is God, the Lord of the worlds, Who brought this immaculate system into being, with all its many details, as a blessing for human beings. Nothing remains to be said about those who maintain the opposite, who ascribe the perfect design in this system to blind, uncontrolled coincidences, because the fact of creation, and all the evidence, is plain for all to see. Anyone who makes such claims must have an atrophied conscience, have lost the use of logic and reason, and be preconditioned not to accept the facts.

It is revealed in the Qur'an that the faithful addressed people with that same mindset in these terms:

. . . **Do you then disbelieve in Him Who created you from dust, then from a drop of sperm, and then formed you as a man? He is, however, God, my Lord, and I will not associate anyone with my Lord. (Surat al-Kahf: 37-38)**

The Olfactory Alphabet

In the 1990s, researchers established that there are around 1,000 different olfactory receptors in our noses.[36] This astonished scientists, because the variety

of receptors in the scent-perception system was many times greater than that in the visual, hearing and taste systems. Moreover, another question was added to the already long list of those to which the answers were unknown: How can we detect more than 10,000 different scents with only 1,000 different receptors?

In 1999, American and Japanese scientists researching this question obtained significant findings about the olfactory system's functioning. According to the results of that research, a scent receptor is able to establish bonds with various scent molecules, which sends a number of scent receptors into action.[37] Continued studies revealed the presence of a very special mechanism in the olfactory system. In the words of Linda B. Buck, one of the researchers in question, this mechanism was a special "alphabet."[38]

As you know, the words and sentences we use consist of letters. For example, the English language alphabet we use to communicate contains 26 letters, which mean nothing on their own. A significant meaning emerges only when they are combined in a specific sequence.

Similarly, an alphabet consisting of receptors is used in the olfactory system. To put it another way, 1,000 different receptors represent 1,000 different "letters." There is no specific receptor responding to every smell in our olfactory region; instead, different scent molecules stimulate specific receptors, which then set specific glomerules in the olfactory bulb into action. This forms a special combination, or code, for the scent. For example, scent A activates communication units 23, 246, 456, and 799 in the olfactory bulb, while scent B does the same for numbers 382, 573, 684, 812 and 1245. These two different codes are then perceived as different smells in the brain's scent cortex. A quick mathematical calculation shows that this mechanism we possess can identify millions of different aromas.[39]

The reason why the sentence "*The kitchen smells of vanilla*" has meaning is that the letters in our alphabet are set out in a particular sequence. Similarly, an aroma from the kitchen expressing "vanilla" takes place by means of receptors and glomerules being stimulated in a particular manner.

The brain's scent perception region analyzes the signals from different receptors en masse. The smell which we define as one single perception occurs as the product of 1,000 different receptors. In other words, every receptor is actually part of a mosaic, and a perceptible scent emerges only once all the components of the mosaic have been assembled.

Professor John C. Leffingwell compares the way that receptors give rise to perceptions of smell in the brain to the way that letters in particular combinations form words, notes form works of music, or a binary code gives rise to computer programs.[40] Like every new scientific finding, of course, this discovery represents a major disappointment for evolutionists. It is impossible for a play of Shakespeare's to emerge by chance from letters, or for a work by Mozart to arise from an assembly of notes. It is also impossible for smells to emerge by chance from the

olfactory system's "alphabet," which is incomparably more complex. Even the word *impossible* fails to do justice to its scale.

Therefore, even if evolutionists believe that scent receptors formed by chance, that still does not release them from the quandary in which they find themselves, because these receptors are controlled by some 1,000 genes.[41]To express it even more clearly, scent receptors are produced in the light of a pattern previously encoded in the genes. And scent-receptor genes are distributed throughout all the chromosomes, apart from chromosome 20 and the Y chromosome.[42] **(Figure 16)** It is impossible for the genetic coding for a single scent receptor form spontaneously, or as the result of chance. If all the rational, conscious humans who lived prior to the 20th century, and were therefore ignorant of how a computer works, were collected together, they could still never write an ordinary computer program. That being so, can one really expect blind, unconscious atoms to write the genetic codes for receptors to perceive the aromas of flowers, fruits and countless chemical substances?

Absolutely not! Scent receptors and perception systems, olfactory cells, and the genes that control them cannot exist in the absence of a Creator Who made them. That Creator is God, **"The Lord of the heavens and the Earth and everything between them." (Surat ash-Shu'ara': 24)**

The Miraculous Connection in the Olfactory Nerves

One very important property distinguishes olfactory nerve cells from other neurons. Although the hundred billion or so neurons in the brain cannot be replaced as long as we live, the millions of scent receptor cells in the nose live for an average of 45 days. Those that die at the end of that period are replaced by others.[43] The site where new olfactory cells arise is among the basal cells in the olfactory region. Basal cells work literally like a scent-cell factory, constantly and regularly producing new ones.

Under some circumstances, when a heavy blow is received to the head—in a traffic accident, for instance—olfactory cells may be compressed in the ethmoid bone, one of those making up the skull. If the damage is not too great, new cells take over, thus preventing any loss of scent perception. This re-acquisition of the sense of smell has been observed in a great many cases.[44]

How do the new cells unfailingly know where to install themselves? How do they reach their objectives in the olfactory region? How are new receptors able to maintain the communication established by their predecessors with scent molecules, with no loss or error occurring? How is communication between the receptors and the olfactory bulb re-established, with no deficiency or error?

The world of science keenly awaits answers to these and similar questions.[45] What is known at present is the existence of astonishing mechanisms among the

cells, the details of which are not known. Even though roughly a million olfactory cells are completely replaced every 45 days, you still perceive the smell of a rose as belonging to a rose. Were any error in the exchange of duties in the olfactory cells to take place, then you would identify a great many scents wrongly, or else be totally unaware of them and be unable to rectify any confusion that would arise. Your olfactory system would constantly mislead you and give rise to serious difficulties. Yet nothing of the sort ever happens. New nerve cells faultlessly take over the functions of the old ones.

Another rather astonishing point is how those new olfactory nerves unerringly find their way to the olfactory bulb. There are no signposts in the nose or brain, and new cells can hardly ask directions. Yet the connections within the olfactory nerves are constantly renewed throughout your life, in such a way as to leave no room for error. This cannot be explained in terms of probability calculations. To claim that the bonds among millions of olfactory nerves came into being by chance is like asserting that the cables constituting the telephone system of a major city were unerringly laid out by the wind, lightning and random coincidences.

No doubt, these are all proofs of the flawless creation and matchless artistry of our Almighty Lord. Every part of the olfactory system, every cell, every molecule and every atom, all behave in the manner inspired in them by Omniscient and Almighty God, ever since the day they were first created. God instructs them how to behave at every moment, right down to the finest detail. This truth is revealed in a verse of the Qur'an:

It is God Who created the seven heavens and of the Earth the same number, the Command descending down through all of them, so that you might know that God has power over all things and that God encompasses all things in His knowledge. (Surat at-Talaq: 12)

MECHANISMS WITHIN THE SYSTEM

Chemical substances are often imagined to be perceived only through the senses of smell and taste. Yet this is not the case, because there are also at least two known systems: pain receptor nerves and the *vomeronasal* organ.

Throughout the nasal cavity, including the olfactory region, are dispersed the ends of pain-receptor nerves that react to stimuli that lead to feelings of pressure, pain, heat and cold. For example, these nerves transmit to the brain signals that cause the sharp, burning sensation of ammonia. Were it not for the pain receptors in your nose, you could not detect various gasses that are harmful to your health. Thanks to the design in question, however, unfortunate consequences that might result in injury, or even death, are avoided.

In comparison with scent receptors, these nerves are less sensitive and are thought to play an important complementary role in scent perception.[46] Menthol is known to produce a cooling sensation in normal concentrations, but a hot one at high concentrations. The special design at the ends of the pain-receptor cells allows us to perceive this difference.

Some scent particles produce no effect in the olfactory region. These special chemical signals are known as *pheromones*. A special organ in the nose has been created to detect pheromones. Known as the vomeronasal organ (VNO), this structure is of a tube- shaped, about 1 millimeter (0.04 inch) in length, and located in the inner part of the nose, just above the cartilage dividing the two nostrils. **(Figure 17)** It is a different sensory organ whose chief function is to receive the messages carried by pheromones, convert them into a form the brain can understand, and then forward them by means of special nerves directly to the relevant brain regions. **(Figure 18)** This organ's functions are not yet fully understood, and are the subject of debate among scientists.[47]

But it has already emerged that the VNO is of vital importance to some insects and animals. For example, the social, reproductive and hunting of snakes with damaged VNOs becomes impaired. Rats with no sexual experience and whose VNOs were surgically removed were unable to mate, although their other organs functioned perfectly.[48]

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[46] G. Ohloff, *Scent and Fragrances*, Berlin, Heidelberg: Springer-Verlag, , 1994, p.6.: http://www.leffingwell.com/olfaction.htm

[47] A.I. Spielman, J.G. Brand, andW. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000.

[48] Michael Meredith, *The Vomeronasal Organ*, Florida State University, 2001, http://www.neuro.fsu.edu/research/vomer.htm.

We know for certain that there are unknown mechanisms in the olfactory region in our noses. For example, consider the relationship between color and odor sensitivity. This region is light yellow in human beings but brown in dogs. The color element is thought to influence scent detection capacity, although the link between them is not understood.[49]

Every new piece of scientific research lets us become better acquainted with the marvels of creation. Maybe as-yet-unknown perfect systems in our noses will be brought to light. These will be a new means of giving thanks in the manner that we should to God, the Lord of boundless affection and compassion Who created them.

Adaptation Mechanisms

As you sit reading these lines, you have practically no awareness of the presence of the clothes you wear, despite their close contact with your skin.

You feel clothes when you first put them on, but that feeling soon disappears, because receptors in your skin stop sending messages to the brain. Were it not for this marvelous system, everyday actions such as wearing clothes would become intolerable. You would also be unable to perceive other signals because your clothes distracted you, and your life would become very difficult indeed.

A similar process applies with the sense of smell. When you enter a restaurant, you immediately perceive the cooking aromas. A short while later, however, you become unaware of them. Yet there has been no reduction in the level of those heavy smells. You have simply grown accustomed to them. A special mechanism known as adaptation causes this change in sensitivity, although the aroma itself does not change in the least.

To grasp the importance of this mechanism, consider the cooks who work in a restaurant kitchen full of dense odors. If their sensitivity to the ambient smells did not decrease, their situation would be exceedingly uncomfortable. And their scent receptors, kept constantly busy, might be unable to detect any dangers—a gas leak, for example.

Frank Zufall, known for his research in this field, states that scent adaptation contains mechanisms[50] that are so complex that the processes at the molecular level are still not fully understood. There are thought to be at least three different scent-adaptation mechanisms in the scent receptor cells. In addition, there must also be centers in the brain to monitor the sense organs that either transmit or halt this information.

In that case, how did the scent-receptor and brain cells, themselves consisting of atoms like carbon, nitrogen and oxygen, come to develop an adaptation system, whose details are still unknown? How do they know when, and when not, to go into action? How do they act in the very best manner on your behalf, without your becoming involved in any way?

The answers are clear: This adaptation system in scent perception is one of the innumerable examples of the superior design flawless planning and perfect order to be seen everywhere in the universe. There is absolutely no doubt that such a marvelous order leaves no room for chance. Every component of these flawless systems in our bodies is far too perfect to be accounted for in terms of coincidence.

As it is revealed in the Qur'an, **"He directs the whole affair from heaven to Earth . . . ." (Surat as-Sajda: 5)**

Scent Memory

The sense of smell is closely bound up with memory. The reason you recognize most smells around you with no feelings of unfamiliarity is that every kind of smell is archived with a special code in your scent memory. The moment you encounter an aroma smell, it is identified by application to that archive. A smell you encounter for the first time, which you have never experienced, is interpreted by being compared to other scents. If we did not possess such a memory, smells would be impossible to describe.

Smells also remind us of various events that we experienced in the past. A familiar perfume scented as we walk along the street reminds us of another woman who wears it. The smell of something cooking can evoke a memory of a meal that took place years before. The same aroma can awaken pleasant feelings in one person, but unpleasant emotions in another.

Where, then, are the memories of various scents—and the emotions they evoke perceived anew—preserved over the years? Where is the data bank stored, with its very large capacity for information on thousands of different aromas? The answers are not yet known for certain. But information regarding smells is believed to be collected in the brain's hippocampus and amygdala.[51] **(Figure 19)**

Results of research on this subject are clear: Your memory serves as a data bank of aromas throughout your life, so long as you suffer no serious illness or accident. Furthermore, it has an active structure rather than a stable one, and renews itself constantly in the light of new experiences.[52] Information about a substance you smell for the first time is recorded in memory, making it easy for you to recognize it when you next come across it. Note that cells made up of proteins constitute your olfactory memory, establishing an extensive archive and expanding it as new smells are encountered. As a small comparison, your computer cannot spontaneously update itself. It will remain as it is until you load new programs onto it. Neither did the archival property of the scent memory cells come into being spontaneously. God created them, and their superior design is one of the countless proofs of His mercy and the way that His knowledge enfolds all things. (Surah Ghafir: 7)

One important feature distinguishes olfactory memory from visual and audio memory: Information about smell has a much greater permanence.[53] That is why so many memories are evoked when you perceive a smell originating from a flower, a herb or even from a person. Research has shown that every individual's own scent is unique, just like a fingerprint.[54] (The only exception is with identical twins.) When specially trained dogs follow a suspect, they track the traces of odor of that person's skin , and can distinguish that suspect by means of his unique scent.

Indeed, the report in the Qur'an describing how the father of the Prophet Joseph (peace be unto him) recognized his son's scent years later may be pointing to that very fact. His father recognized the smell as being the same scent that the Prophet Joseph (pbuh) had in his childhood, even after the passage of a great many years:

And when the caravan went on its way, their father said, "I can smell Joseph's scent! You probably think I have become senile." (Surah Yusuf: 94)

The Role of the Sense of Smell in Taste Perception

The smell of freshly baked bread, the aroma of pies from a cafeteria, or the smell of freshly ground coffee is all delightful. So attractive are these aromas that they encourage one to taste those foodstuffs. Indeed, in some circumstances, the saliva glands go into action and secrete the saliva necessary to be able to taste. Since your perception of scents is a thousand times sharper than your ability to taste, odors play an important role in the "taste" of foods.[55] Yet the relationship between our senses of smell and taste goes even further.

How do you tell blackcurrant jam from strawberry?

If you think the answer is obvious, and that you just have to taste them, you are mistaken, because *tasting* alone is not enough to tell the difference between the two. If you had no sense of smell, you would describe the taste of both as "sweet," but not be able to describe their different features.[56]

The reason is that we need our sense of smell to be able to perceive the taste of anything we eat, and cannot fully appreciate the flavor of anything without smelling it. What makes something pleasant to eat is the combination of both its taste and aroma. Researchers emphasize this by saying that taste is 75% smell.[57]

As we know, appetizing smells encourage people to eat and drink. Indeed, people who lose their sense of smell have no great desire for food.[58] Remember times when you had a cold or the flu? Your meals had no flavor at such times

because scent molecules failed to reach the scent preceptors—for which reason your sense of smell was temporarily lost.

To make this easier to understand, blindfold friends and block up their nostrils, and then ask them to place first, a slice of potato and next, a slice of apple on their tongues. Your friends will be unable to tell which is which, because both cause a mild sweet sensation. It is possible for your friends to give the right answer only if they start chewing, because that will release scent particles that float up through the back of the mouth to reach the scent region in the nose. Potato and apple will then become apparent.

Noteworthy too is that the mouth and nose are ideally positioned in the human body, in very close proximity to one another. An air passage connects the scent perception zone in the nose to the oral cavity. Were it not for that connection and that proximity, or if the scent receptors were located in another part of the body, what would happen?

Any alteration to the current state of affairs would mean a major loss of taste perception, because the mouth, nose and scent perceptors have been created in exactly the right form and locations.

Indeed, it is revealed in the Qur'an that God created human beings within a particular order:

O man! What has deluded you in respect of your Noble Lord? He Who created you and formed you and proportioned you and assembled you in whatever way He willed. (Surat al-Infitar: 6-8)

To summarize, the concept we define as "flavor" is a combination of taste and smell. Therefore, if we had no sense of smell, our sense of taste would have little purpose. In order to perceive flavors, we need the scent receptors in the nose just as much as taste preceptors on the tongue.

No doubt the cooperation between the organs and senses for taste and smell results from a special design. It is perfectly commonplace for conscious humans to agree to work towards some common objective. But similar cooperation among billions of cells devoid of any intelligence of consciousness can be explained in only one way: it is God, the Lord of the worlds, Who placed them at the service of humans and Who keeps them under His control at all moments.

WHAT ODORS AND THE OLFACTORY SYSTEM SUGGEST

You encounter different smells at every moment of our lives, such that it might even be said that we live in a world of aromas, surrounded by smells from flowers, trees, foodstuffs, animals, industrial products, bacterial decay, and other human beings.

When we look at this world, made up of thousands of kinds of aromas, a rather striking equilibrium and harmony emerges: We like the smells of substances beneficial to us, and are repelled by those of harmful substances.

The smells of foodstuffs useful to the body awaken a feeling of pleasure in us, and lead us to feel hunger for them. The smell of food cooking when we are hungry encourages us to eat, and along with taking pleasure from eating, we nourish our bodies at the same time. When our bodies are busy digesting, on the other hand, and we feel no need to eat any more, then the smell of food will not seem so attractive.

Those smells we describe as unpleasant, on the other hand, are generally substances harmful to us. We can easily identify poisonous chemicals by their smell. The unbearable stench given off by rotten fruit or meat—unpleasant odors that arise as a result of bacterial activity—warn us to stay away from them.

It’s beyond dispute that this reaction to scents is of vital importance to human health. As a general rule, dangerous or harmful substances can immediately be distinguished by their noxious smells. Parsley, for example, bears a close physical resemblance to the poisonous plant hemlock, yet their smells are completely different. Parsley has a pleasant smell of its own, whereas hemlock’s is very repellent. Were it not for this system, we might eat hemlock assuming it was parsley, or drink a harmful chemical concoction thinking it was fruit juice. We would live our whole lives in the danger of being poisoned and, as a precaution, would have to carry around lists of what was harmful or not.

The delicate balances seen everywhere in the universe also manifest themselves in the olfactory system. The scent-perception capacity of every living thing has been regulated in the light of the environment in which it exists and to best meet its needs. Consider human beings. If our scent-perception capability were less than it is, we might not be able to recognize dangerous situations. If our capacity were as keen as a dog’s, however, then we would constantly be distracted and ill at ease, bombarded by too many stimuli.

The balances in question can also be seen in the structures of scent molecules. For example we do not like a concentrated aroma that we normally like in lower concentrations. Even though the aroma of flowers in a garden is most attractive, a concentrated essence made from those same plants is not. This indicates that these have been created in the ideal proportions for human beings.

It is clear that every detail to do with smell has been specially created for human life and is a blessing from God.

To understand the scale of that blessing, imagine that the system was the exact opposite of what it actually is. A great many foodstuffs of vital importance to us might possess unpleasant or even revolting smells. Imagine if water smelled like gasoline, bread like rotting meat, or cheese like rotten fruit. No matter how hungry or thirsty you might be, it would be a real torment to eat or drink these substances. Even eating a favorite meal would become unbearable because of its disgusting smells.

To the heedless, the odors we've lived with since birth might appear to be natural and spontaneously occurring. But if you reflect on the details set out above, you will comprehend the manifest truth: It is God, the Compassionate and Merciful, Who creates the foods and plants we need, together with their attractive smells. Our Lord, the infinitely Pure and Provident, has created our sense perception in line with our comfort, as is the case with all the systems in our bodies.

With His compassion and affection, He has caused us to like beneficial things and abhor harmful ones as unpleasant. Our duty is to reflect on the fact that God has created and blessed us with the pleasant scents we perceive, and to give thanks. Those who behave in such a way will, if God so wishes, attain the Heaven where they will encounter the true originals of such blessings. Those who deny God's blessings and are ungrateful will, on the other hand, find a mixture of pus and blood, thorns and boiling water specially prepared for them in Hell. These are divine promises revealed in the Qur'an, and are absolutely sure to come to pass.

What Odors Stemming from the Human Body Bring to Mind

Unless they take precautionary measures, if people go hungry for even a short period of time, unpleasant odors can arise from their bodies when they walk at a fast pace, climb stairs, or move about during their daily lives. Even if they do not move about much, every part from their hair to their feet will soon become dirty and lead to unpleasant smells unless they bathe and groom themselves. Just as there is a specific purpose behind the creation of everything in the universe, so there is considerable in wisdom in the odors that arise from the human body.

If God so wished, He could have created our scent-perception system in such a way that we would not notice unpleasant smells, or else have created all aromas to seem attractive to human beings. In that case, what is His wisdom behind the creation of unpleasant odors?

No doubt that they signal a weakness and a deficiency for human beings. Deficiencies of this sort in people's bodies are a means whereby they can reflect that they have been created to be imperfect, and that only God is free from all

imperfection. They will better comprehend His greatness and their need of Him. No matter how well people may groom themselves, soon they will feel the need to clean themselves yet again. When bacteria too small to be seen with the naked eye go into action, unpleasant odors will again begin to form. This reminds us that the world is transient and flawed, but that the Hereafter is endless and perfect. It brings to mind the fact that there is no reparation for being taken in by this world's deceptions. It is a means of conceiving of Heaven, humanity's eternal home, where there are no unpleasant smells, and believers will be recreated. It also helps to remind us, by comparison, how unbearable will be the stenches specially prepared in Hell for the deniers.

Bad smells also remind us that human beings have no physical superiority about which to become proud or arrogant. Humans are helpless, and no matter how they may strive to eliminate that helplessness, they will never succeed. Even the most attractive actress, the most successful businessman, and the most intelligent scientist is faced by the exact same helplessness.

Roses, which emerge from the muddy earth and have no protection against wind, rain and dust, smell ineffably delightful. Sweet-smelling plants require no special cleaning, despite their remaining outside under all kinds of weather, because God has created them in an astonishing way, with a special creation. Indeed, when describing something that is beautiful, clean and well cared for, we often compare it to a flower. It is clear, therefore, how meaningless it is for anyone to be proud and arrogant.

In conclusion, for thinking people, even bad smells represent life-long lessons and reminders, like all the other proofs of creation in the millions of details in the universe. All you need is to reflect deeply upon them. In one verse, God reveals:

In the creation of the heavens and Earth, and the alternation of the night and day, and the ships which sail the seas to people's benefit, and the water which God sends down from the sky—by which He brings the earth to life when it was dead and scatters about in it creatures of every kind—and the varying direction of the winds, and the clouds subservient between heaven and Earth, there are Signs for people who use their intellect. (Surat al-Baqara: 164)

Good Health in Scents

Aromas obtained from plant essences or oils have been used for therapeutic purposes for thousands of years. This technique is based on the fact that different scents produce different effects in people. Today, experiments performed using electroencephalography (EEG), which identify electrical signals inside the brain, have shown that certain odors can have desired effects on the brain.[59] Smelling certain aromas sets into action some unidentified systems in the brain. As a result,

developments affecting heartbeat, blood pressure, respiration, the memory, stress levels and certain hormones all take place.[60]

But how do plants know which aromas will benefit human health? How can they establish the most highly advanced laboratories to produce health-giving aromas inside their own tissues? How do they create aromatic scent molecules, capable of containing up to 500 different chemical substances and with exceedingly complex structures?[61] How are they able to squeeze their pleasant aromas into the limits of a scent-perception system—which they are not acquainted with and whose functions they are unaware of—can perceive? How do they determine the ideal concentrations for human beings?

When the question is examined from the other side, we encounter these questions: How is the human sense of smell able to distinguish among the individual aromas of thousands of plants? How do scent-receptor cells without the slightest knowledge recognize molecules the first time they encounter them? How can unconscious proteins, cells and nerves establish extraordinarily complex systems among themselves to perceive dizzying aromas from the world of plants?

The answers are so plain as to leave no room for doubt: It is God, the Lord of the worlds, Who created the mechanisms that produce the flowers' attractive aromas in great harmony, and Who created the scent-perception system that detects them, and Who gave plants their health-giving properties.

It is revealed in the Qur'an that sweet-smelling plants are a blessing:

He laid out the earth for all living creatures. In it are fruits and date-palms with covered spathes, and grains on leafy stems and fragrant herbs. So which of your Lord's blessings do you both then deny? (Surat ar-Rahman: 10-13)

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[60] "Aromatherapy," *M. Encarta Encyclopedia 2001*, 2001 Deluxe Edition CD

[61] *Ibid.*

How people should behave in the face of the blessings they are given is revealed in another verse:

Say: “It is He Who brought you into being and gave you hearing, sight and hearts. What little thanks you show!” (Surat al-Mulk: 23)

ANIMALS' SENSE OF SMELL

Humans and animals differ in the way they use their noses. Living things in the animal world generally use their scent perception to search for food, hunt, communicate amongst themselves, find their way, and to locate their mates and offspring. Birds, mammals, reptiles, fish, insects and other animals have been equipped with the olfactory systems most appropriate for the environments in which they live.

How did these living things all come by their scent-perception systems? To think that animals themselves constructed the perfect scent-perception systems in their own bodies—or that these perfect systems came into being by chance—is clearly irrational and illogical. Neither living things themselves nor chance can bring together such marvelous systems. Even under the advanced technology of the 21st century and despite all of scientists', researchers' and engineers' best efforts, nothing resembling these marvelous systems can be produced. As for how these living things came by their olfactory systems, there is only one logical reply: Creation.

It is revealed in the Qur'an that we need to learn from the creation of animals: **There is instruction for you in cattle . . . . (Surat an-Nahl: 66)**

And there is certainly a lesson for you in your livestock . . . . (Surat al-Muminun: 21)

Dogs: Olfactory Experts

The scents perceived by someone walking along the street and their dogs are hardly the same. Dogs obtain a great deal of detailed information about their surroundings from smells of which their owner is quite unaware. They collect information by analyzing scents left by other dogs and the individual scents of nearby human beings. They are able to analyze even the slightest smells in the air.

Dogs' noses are extraordinarily sensitive: Some breeds' scent sensitivity is up to a million times that of human beings'.[62] A few statistics will help dramatize this special design. In the human nose, the scent region is 5 square centimeters (0.775 of a square inch), but as much as 150 square centimeter (23.25 square in) in dogs.[63] And in the canine nose, there are many times more scent receptors. A fox terrier, for example, has 147 million, and a German shepherd, 225 million.[64]

Thanks to these properties, dogs are able to perform tasks way beyond human beings' most advanced technological devices. These animals' superior attributes are used in finding narcotics, contraband, missing people, explosives,

criminals and the victims of catastrophes. For example, the bloodhound, a breed with an exceptionally well developed sense of smell, can follow tracks of which there are absolutely no visible traces. They can follow a track for as much as four days[65] and follow the tracks left by a human for 80 kilometers (49.7 miles).[66]

Strikingly, dogs do not make mistakes, despite the countless number of scents in their world. They are easily able to distinguish the particular smell they are looking for. Experiments have shown that a trained dog is able to locate what was expected of it from among items covered with highly pungent skunk scent.[67]

The Schlieren photography technique revealed that dogs used a different method of inhalation: a dog smelling something twitches its nose when exhaling, and the air heads directly towards the two clefts on either side. Thanks to this special design, the dog's exhaled air flows in a different direction, and the air in its breath is thus prevented from combining with the scent.[68]

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[65] "Domestic Dog," *M. Encarta Encyclopedia 2000*, Deluxe Edition CD

[66] "Bloodhound," *M. Encarta Encyclopedia 2000*, Deluxe Edition CD

[67] L. Wilson Davis, *Go Find! Training Your Dog To Track*, New York: Howell Book House, 1974.

[2] Chastrette, "Trends in structure–odor relationships", SAR QSAR Environ. Res. 6, 1997, pp. 215-254.

[5] Diane Ackerman, *A Natural History of Senses*, New York: Vintage Books, 1995, p.6.

[6] Philip Morrison, "The Silicon Gourmet," *Scientific American*, April 1997, p.92.

[7] Stuart J. Firestein, "Olfactory Receptor Neurons," *Encyclopedia of Life Sciences*, December 2000, http://www.els.net.

[8] Heinz Breer, "Olfaction," *Encyclopedia of Life Sciences*, August 1999, http://www.els.net.

[9] *Ibid.*

[10] *Ibid.*

[11]Britannica CD 2000 Deluxe Edition, *Chemoreception: Process of Olfaction*.

[12] Diane Ackerman, *Op. cit.*, p.46.

[16] Tim Jacob, "Olfaction," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html.

[17] G. Ohloff, *Scent and Fragrances*, Springer-Verlag, Berlin Heidelberg, 1994, p.6.

Researchers are still trying to develop new devices by unraveling the complex analysis performed in the canine nose and brain.[69] There is presently a great need in the day for such devices, especially for detecting bombs, mines and various dangerous substances. However, the devices that have been produced so far come nowhere near matching the scent sensitivity of dogs.

Scent Perception in Fish

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[18] John C. Leffingwell, *Op. cit.*, http://www.leffingwell.com/olfaction.htm.

[19] P. Whitfield, D.M. Stoddard, *Hearing, Taste, and Smell: Pathways of Perception*, New York: Torstar Books, Inc., 1984. (http://www.macalester.edu/~psych/whathap/UBNRP/Smell/nasal.html) *The Olfactory System: Anatomy and Physiology*, Macalester College, 2001.

[20] http://chemse.oxfordjournals.org/cgi/content/abstract/15/2/217
[21] John C. Leffingwell, *Olfaction-Page 2: The Odorant Binding Proteins*, 2001, http://www.leffingwell.com/olfact2.htm.

[22] A. Chess, I. Simon, H. Cedar, and R. Axel, "Allelic inactivation regulates olfactory receptor gene expression," *Cell* 78, 1994, pp. 823-834.

[23]Stuart J. Firestein, *Op.cit.*, http://www.els.net.

[24]John C. Leffingwell, "Olfaction", 2001, http://www.leffingwell.com/olfaction.htm.

[25]Stuart J. Firestein, *Op.cit.*, http://www.els.net.

[26] Eric Chudler, "*Brain Facts and Figures*," 2001, http://faculty.washington.edu/chudler/facts.html.

[27] B. Malnic, J. Hirono, T. Sato, an L. Buck, "Combinatorial receptor codes for odors," *Cell* 96, 5 March 1999, pp. 713-723.

[28] Heinz Breer, *Op.cit.*, http://www.els.net.

[29] John C. Leffingwell, *Op.cit.*, http://www.leffingwell.com/olfaction.htm.

[30] Kensaku Mori, Hiroshi Nagao, Yoshihiro Yoshihara, "The Olfactory Bulb: Coding and Processing of Odor Molecule Information," *Science* 286, 22 October 1999, pp. 711-715.

[31] Tim Jacob, *Olfaction*, 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html.

Scent perception is important to just about all fish species.[70] The scent perceiving region is located on the rear surface of their noses. They find food by following scent molecules dissolved in the water. In addition, their sense of smell warns them of danger: Fish that detect the smell of an injured fish immediately go on the alert.

A shark possesses nostrils much like those of human beings, but it uses them only for smelling. When swimming, it analyses the molecules that enter its nostrils. Approximately one-third of its brain is devoted to smell.[71] The scent

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[32] *Ibid.*

[33] P. Mombaerts, F. Wang, C. Dulac, S.K. Chao, A. Nemes, M. Mendelsohn, J. Edmondson, R. Axel, "Visualizing an olfactory sensory map," *Cell* 87, 15 November 1996, pp.675-686.

[34] "Sensing Smell," *Howard Hughes Medical Institute Annual Report*, 1999, http://www.hhmi.org/annual99/a243.html.

[35]

[?] Tim Jacob, "*Olfaction*," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html.

[36] Linda B. Buck, Richard Axel. "A novel multigene family may encode odorant receptors: A molecular basis for odor recognition," *Cell* 65, 1991, pp.175-187; R. Axel, "The Molecular Logic of Smell," *Scientific American*, October 1995, pp.154-159.

[37] B. Malnic, J. Hirono, T. Sato, and L. Buck, "Combinatorial receptor codes for odors," *Cell* 96, 5 March 1999, pp.713-723.

[38] "Researchers Discover How Mammals Distinguish Different Odors," *Howard Hughes Medical Institute News*, 1999, http://www.hhmi.org/news/buck.html.

[39] "The Sense Of Smell," 3 April 2000, http://www.edc.com/~jkimball/BiologyPages/O/Olfaction.html.

[40] John C. Leffingwell, "*Olfaction-Page 5: Recent Events in Olfactory Understanding*," 2002, http://www.leffingwell.com/olfact5.htm.

[41] Richard Axel, "The Molecular Logic of Smell," *Scientific American*, October 1995, pp.154-159.

[42] "A database of human olfactory receptor genes," The Human Olfactory Receptor Data Exploratorium, 2001, http://bioinformatics.weizmann.ac.il/HORDE/humanGenes/.

[43] Heinz Breer, "Olfaction," *Encyclopedia of Life Sciences*, August 1999, http://www.els.net.

[44]

[?] Stuart J. Firestein, "Olfactory Receptor Neurons," *Encyclopedia of Life Sciences*, December 2000, http://www.els.net.

perception mechanism in sharks is totally unique to them, enabling them to follow a smell to its point of origin. They can detect the scent of a drop of blood in the sea or the very tiniest amounts of chemical substances from other creatures. For example, they can detect the smell of ten drops of tuna odor in a swimming pool full of water.[72]

Eels are also exceedingly sensitive to odors. An eel can detect the smell of a thimbleful of a chemical substance poured into a large lake.[73]

Salmon are one of those fish whose senses of smell have been most intensively researched.

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[45] Wei Wu, Kit Wong, Jin-Hui Chen, Zhi-Hong Jiang, Sophie Dupuis, Jane Y. Wu, and Yi Rao, "Directional guidance of neuronal migration in the olfactory system by the protein Slit," *Nature* 400, 22 July 1999, pp.331-336.

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? Tim Jacob, "Olfaction," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html.

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? Frank Zufall and Trese Leinders-Zufall, "The Cellular and Molecular Basis of Odor Adaptation," *Chemical Senses* 25, Oxford University Press, 2000, pp.473-481.

[51] R.S. Herz, T. Engen, "Odor memory: review and analysis," *Psychonomic Bulletin and Review 3*, 1996, no. 3, pp.300-313. http://www.macalester.edu/~psych/whatap/UBNRP/Smell/memory.html

[52] Tim Jacob, "*Olfaction*," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html.

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? R.S. Herz and T. Engen, "Odor memory: review and analysis," *Psychonomic Bulletin and Review* 3, 1996, no. 3, pp.300-313.

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? Tim Jacob, "Olfaction," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html

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? Selçuk Alsan, "Yemeklerin Tadı, Kokusu," *Bilim ve Teknik* (The Smell and Taste of Foods, *Science and Technique*)February 1999, pp.98-99.

[56] *Disorders of Smell*, Macalester College, 2001, http://www.macalester.edu/~psych/whathap/UBNRP/Smell/disorders.html.

[57] Tim Jacob, "*Olfaction*," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfact1.html.

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? "*Nutrition and Appetite*," Monell Chemical Senses Center, 1998, http://www.monell.org/researchoverview_h.htm

The Compass in the Salmon's Nose

The word *migration* generally reminds one of the way birds change location on a semi-annual basis. Yet there are other creatures that migrate on land and sea, as well as just in the air. Young salmon hatch from their eggs in rivers at the end of winter. Some species migrate to the open waters and the sea immediately after hatching, others do so after feeding for a few weeks, and still others after spending a few years in the river. Salmon that have spent a few years in the oceans and reached reproductive maturity now engage in a journey that astonishes human beings.

On this journey, the salmon's objective is to return to the stream where it hatched, and lay its own eggs there. This journey is very much harder than the first one, because the salmon must swim up against the powerful flowing current and leap up over cliffs and waterfalls. Every salmon travels hundreds or even thousands of miles to reach the river or branch where it hatched.[74] Red salmon travel more than 1,609 kilometers (1,000 miles) in the sea and rivers.[75] King

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[59]Tim Jacob, "*Olfaction*," 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/olfEEG.html.

[62] Norma Bennett Woolf, "The nose knows: Canine scents and sensibilities," 2001, http://www.canismajor.com/dog/nose.html.

[63] Eric Chudler, "Amazing Animal Senses," 2001, http://faculty.washington.edu/chudler/amaze.html

[64] "K9 Olfactory System—Theory of Scent," Eden & Ney Associates Inc., 2000, http://www.policek9.com/Trainers_Digest/theory/body_theory.html

[68] Mark Schrope, "Sniffing danger," *New Scientist*, 26 August 2000.

[69] Joanne Cavanaugh Simpson, "Building better sniffers," *Johns Hopkins Magazine*, November 1999.

[70] "Fish: Olfaction,"*Britannica CD 2000* Deluxe Edition CD

[71] "Shark,"*M. Encarta Encyclopedia 2001* Deluxe Edition CD

[72] "Shark Attack!, The Hunt, Smell," *NOVA Online*, 2001, http://www.pbs.org/wgbh/nova/sharkattack/hotsciencesharks/sensesmell.html

[73] "Super Senses," *World Magazine*, National Geographic Society, June 2000.

salmon and dog salmon swim for more than 3,218 kilometers (2,000 miles) in the Yukon River.[76] Atlantic salmon repeat this migration every year, while other species performing it only once.

In making this long and wearying journey, the salmon has no navigational aids such as map or compass to help it find its way. Even though it has no training, it has no difficulty in finding the mouth of the river it swam down in its youth, and from many river branches, unerringly selects the one that will lead it back to where it was born. The salmon achieves these seemingly impossible tasks because it possesses a perfect scent perception system that functions as a directional locater.

These abilities of salmon were first revealed by experiments carried out in the 1970s. Allan Scholz of Eastern Washington University exposed salmon to one of two odorant chemicals, then tagged the fish and released them. Two years later, when the time came for these salmon to spawn, he scented one of the nearby river branches with one of the scents and another branch with the other scent. The salmon were observed to return to whichever branch contained the scent they had been exposed to when young.[77]

The salmon possesses a dual-nostril nose. Water enters through one nostril and exits through the other. These holes have been so designed as to open and close in synchronization with the fish's breathing. In this way, the salmon can immediately analyze scent molecules dissolved in the water. It perceives the characteristic scent of every individual tributary, which odor stems from plants, animals and soil, and completes its journey by comparing these with the scent memory it recorded on its journey to the sea when young.[78] In short, the fish's sense of smell serves to guide it on its journey of thousands of kilometers (miles).

No doubt the sensitivity of the salmon's sense of smell is one of the countless proofs of the splendor in God's creation. In one verse, God reveals:

Among His Signs is the creation of the heavens and Earth and all the creatures He has spread about in them. And He has the power to gather them together whenever He wills. (Surat ash-Shura: 29)

Scent Perception in Birds

Up until around 30 years ago, the general scientific view was that birds could smell almost nothing at all. But it later emerged that this was not the case. Research showed that birds did perceive smell, despite having a seemingly small olfactory bulb in their brain. Birds use their sense of smell while searching for food, selecting nesting materials and even when flying over featureless land with which they are unfamiliar.[79] Following are the results of various studies by bird and scent experts.

Some species of vulture determine their prey by the smell it emits. Vultures have even been observed to fly repeatedly over areas where there are leaks in gas pipelines. The reason for this behavior is not hard to guess. Vultures detect the smell of a chemical additive in gas, which closely resembles that of dead carrion.

Different species of pigeon possess different-sized scent perception regions and olfactory bulbs. Laboratory experiments have also shown that every bird displays a specific reaction to smells. Homing pigeons, which can return to their roosts even after being released from a long distance away, use their sense of smell as well as sight. It has been proven many times that if pigeons' sense of smell is obstructed by blocking their nostrils, they fail to return home. Pigeons are thought to use mainly visual indicators when near their roosts, and scents borne by the wind when they are in unfamiliar territory. (In addition, pigeons may also find their way by sensing the Earth's magnetic field.)

When building their nests, European starlings select by means of smell plants that will minimize the occurrence of harmful micro-organisms and parasites.

The sources of food of birds living near the South Pole frequently change location. There are also very few visual indicators to help pinpoint them. For birds living in this region, finding their prey with eyesight is like searching for a needle in a haystack. However, polar birds have been created with a special sense of smell that allows them to locate their prey under the harsh conditions of the South Pole by following its scent.[80]

Experts say that further research and experiments must be carried out in order to understand the details of the avian sense of smell. No doubt new scientific studies will reveal still more marvels in birds' sense of smell. The divine signs in birds are revealed in these words in the Qur'an:

Do they not see the birds suspended in mid-air up in the sky? Nothing holds them there except God. There are certainly Signs in that for people who believe. (Surat an-Nahl: 79)

Mosquitoes: Hunters by Smell

Could you find the origin of a scent 64 kilometers (39.8 miles) away by using only your sense of smell? Of course not! It's impossible for you to detect a scent from so far away. Yet mosquitoes detect smells at an analogous distance, which would be out of the question for you.[81]

This fact was discovered by Professor Jerry Butler of Florida University. As is well known, for her eggs to develop, the female mosquito needs blood as well as certain chemical substances including cholesterol and Vitamin B that she cannot manufacture herself. These she obtains from human beings or animals. Professor Butler's studies revealed that the female mosquito does not select at random the

prey whose blood she will suck. She prefers creatures that will meet her needs in the best possible way and in particular, uses her sense of smell to locate them. According to Butler, mosquitoes' sense of smell is so specialized that they can identify the minute amounts of chemicals that the human body gives off into the air.[82]

Smells originating from the human body, carbon dioxide given off during exhalation and other scents are constantly disseminated into the air. The female mosquito is equipped to detect them, and finds her prey by zigzagging among the scent molecules, then locating the location of a surface artery, using a heat detector with pinpoint accuracy.

The way that an insect 1 centimeter (0.4 inch) in length smells her prey from many meters (feet) away and also analyses that scent, is a most striking phenomenon. The mosquito's highly developed olfactory sense is just one of the magnificent pieces of equipment in its body—and an important fact of creation that once again allows humans to realize the flawless nature of God's creation. The sense of smell in the mosquito, which many people regard as an unremarkable insect, is just one of the countless proofs of creation.

It is revealed in the Qur'an, as follows:

God is not ashamed to make an example of a gnat or of an even smaller thing. As for those who believe, they know it is the truth from their Lord. But as for those who disbelieve, they say, "What does God mean by this example?" He misguides many by it and guides many by it. But He only misguides the deviators. (Surat al-Baqara: 26)

There is only one explanation for the perfect sense of smell possessed by the mosquito, its superior flight mechanism and its other systems. This insect, encountered every day in warm weather but so often underestimated, is full of miracles of design and is by itself a major proof of creation.

In Surah Al-Hajj, God reveals:

O humanity! An example has been made, so listen to it carefully. Those whom you call upon besides God are not even able to create a single fly, even if they were to join together to do it. And if a fly steals something from them, they cannot get it back. How feeble are both the seeker and the sought! (Surat al-Hajj: 73)

Moths' Astonishing Ability

Moths are insects that live on every continent, apart from the Polar Regions and the oceans, and there are thought to be up to a million different species.[83] The two antennae on the head of this tiny creature serve as its olfactory organs. Each

antenna is covered in hundreds of minute hairs, with scent-receptor cells on each hair. This special design of its antennae makes the moth quite expert in detecting smells.[84]

Moths use their scent perception to determine what has nutritional value and what may be harmful. In addition, when mating time comes, the female emits a special pheromone, which the male detects and locates the female by flying directly towards its source. At this point, there is one matter that requires consideration. The male often flies for several kilometers (miles) to locate the female. Male silk moths, for example, can perceive the female's pheromone from 20 kilometers (12 miles) away, or even further.[85] No doubt the sensitivity of this tiny creature's olfactory organs is truly stunning.

But how is a male moth able to locate the female of its own species from among the thousands of different species of moths in its region? The moth's sensitive sense perception helps answer that question. To cite one example: the male of *Helicoverpa zea*, a species of moth that lives in North America, can distinguish the source of two different pheromones less than 1 millimeter (0.04 inch) apart.[86]

Researchers have performed various experiments by installing minute receptors on moths' antennae—in other words, on their olfactory organs.[87] As the male moth flew towards a pheromone inside a tunnel, electrical signals transmitted by its antennae to its brain were recorded. It was observed that as soon as the moth encountered a cloud of pheromones, the signals from its antennae changed.

C. Giovanni Galizia of the University of Berlin states that the moth's scent-perception system may be most ideally suited to detecting smells in powerful winds.[88] This perfect system in an animal just a few millimeters (inches) in size is an evident miracle of Creation.

How Bees Communicate by Smell

Pheromones are one of the methods by which bees communicate among themselves. The tens of thousands of bees in a colony use these chemical signals to communicate with one another. (Ants communicate in a similar way.) Bees recognize other members of their own colony by their distinctive scent. If a bee from another hive seeks to enter, it is immediately identified by its scent and ejected. Having consumed the last of a flower's nectar, the bee marks it with a special scent— which other bees can then detect and thus avoid wasting their time and energy.

Every bee possesses an olfactory system to detect the messages borne by pheromones. Their scent receptors are located in the antennae. Sathees Chandra, a researcher into bees, states that when it comes to scent detection, bees are very capable.[89] Bees need nectar in order to make honey. For that reason they visit a great number of plants and soon learn which provide the most nectar.[90]

Bearing this in mind, scientists concluded that bees must have special mechanisms that allow them to identify plant scents.[91] Thanks to this mechanism, they *filter* the information they receive from plants and determine which will offer them the most nectar. There is only one explanation for the conscious and rational behavior of these tiny insects' detecting scents. Like all living things in the universe, bees were brought into being by the will of God, and behave according to His inspiration.

This is revealed in these terms in the Qur'an:

Your Lord revealed to the bees: "Build dwellings in the mountains and the trees, and also in the structures which men erect. Then eat from every kind of fruit and travel the paths of your Lord, which have been made easy for you to follow." From inside them comes a drink of varying colors, containing healing for humanity. There is certainly a Sign in that for people who reflect. (Surat an-Nahl: 68-69)

EVOLUTIONISTS CANNOT ACCOUNT FOR THE ORIGIN OF THE SENSE OF SMELL

The theory of evolution was first proposed in the mid-1800s. Every since then, the theory has had only one aim: to suggest that science confirms its own claims. Tales about the slow stages by which similar creatures allegedly evolved from one another were all developed on the basis of this illusory groundwork. This "scientific" propaganda was expressed so persistently and so often that not only circles far removed from scientific circles, but also people who studied it began to attach to it an element of veracity. That is why what you may encounter in evolutionary tales is not scientific evidence, but imaginary scenarios decked out in scientific terminology.

There are some subjects, however, about which evolutionists find it difficult even to come up with scenarios. They have no hope of explaining how the soul, the brain's perceptive ability, memory and the senses came into being in stages. That is because they are faced with the existence of metaphysical elements explicable only in terms of Creation, rather than a physical world about which they can make conjectures.

In evolutionist publications, therefore, the longest explanation on such subjects that you are likely to encounter read along the lines of "*The brain emerged over time and began perceiving*," or "*The nose emerged over time and began to smell*." You can never find any evidence or findings to confirm these assertions. Evolutionists, too, are well aware that they have no explanation to offer on the subject. They therefore emphasize points around which they can easily speculate, using the power of their imaginations, and never actually raise questions that they cannot explain in evolutionary terms.

Indeed, the extraordinary harmony between the smell system and the components that comprise that system, which we have examined so far, is one of those subjects that Darwinists are incapable of explaining—because in this magnificent olfactory system is exhibited the flawless creative Force of an infinite might. This matchless Creator is God, the Lord of the worlds. All the scientific research performed on the subject, all the evidence revealed, makes clear the truth of this perfection, despite the system's complexity.

Evolutionists are also well aware of this. They aim, however, to deny the absolute existence of God despite the facts they see so clearly. Indeed, there is no other explanation for the illusory tales they come up with through falsehood and fraud, for which reason they have used the theory of evolution to deny the facts. However, their theory, with no scientific content, is unable to explain how existing mechanisms came into being. This chapter shall examine the answers to the groundless claims to which evolutionists cling as offered by science.

Evolutionist Scenarios Regarding Scent Perception

In texts prepared by evolutionist researchers, the mechanism of the scent perception system is generally described in detail, following which it is maintained that this is "an evolutionary development." The common view among evolutionists is along the lines that the ability to perceive scents is an entirely primitive one that appeared before the other senses. Organs and senses emerged as the need for them arose, and developed in accord with those needs. These claims, devoid of any foundation whatsoever, are expressed in these terms in evolutionist publications*:*

"Every each random affect in the outer world causes a certain change in organisms. (...) Every each cause leads to an effect and the consequence necessarily includes a piece of information related to its cause. One can not help to see and feel amazed at how the evolution, with its adaptation and discovery ability that is even hard to imagine, can employ this simple logical relation in biological reality for increasing the chances of its products' survival. [92]

Expressions of this kind, lacking in any evidence, findings, or experimental or scientific evidence, have no significance other than seeking to justify claims based on chance. The way that they regard the sense of smell as the first sense and a *primitive* one, reflects this logic. The sole justification for this claim is that the other senses, such as sight or hearing, seem to possess more detailed systems and thus support the evolutionist progression of "from the simple to the more complex." Proponents of Darwinism express the view in question in the following terms:

The sense of smell is a primal sense for humans as well as animals. From an evolutionary standpoint it is one of the most ancient of senses. [93]

The olfactory system is often described as the most "primitive" sensory system. Because of its early phylogenetic development and its connections to older, subconscious portions of the brain.[94]

Sense of smell is evolutionarily older than sight or hearing.[95]

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[92] Hoimar Von Ditfurth, *Im Anfang War Der Wasserstoff 3* (In the Beginning was Hydrogen 3), 2nd edition, February 1997, Alan Publishing, p.134.

[93] John C. Leffingwell, "*Olfaction*," 2001, http://www.leffingwell.com/olfaction.htm.

[94] Marjorie A. Murray, "*Our Chemical Senses: 1. Olfaction*," 2001, http://faculty.washington.edu/chudler/chems.html.

At this point, it will be useful to remember that those who issued these statements are experts with a detailed knowledge of all the olfactory system's mechanisms. They cannot be unaware of the system's complexity and perfection. Nonetheless, they still have no hesitation at using the word "*primitive*" to refer to such a magnificent structure. That's because a structure's being primitive makes more tenable any claims of its forming by chance. They are unable to explain how any complex system could have come into being accidentally, but suppose that defending random developments for a simple structure will somehow seem more convincing.

So on what scientific evidence do evolutionists base such a definitive judgment? How did the "primitive" sense of smell develop on what they refer to as the conditions on "the primitive Earth"? If you delve into this question, the response you find will run something like this:

In the ancient oceans on the primordial Earth, 3 billion years ago, a single-celled organism starting its daily life gave off organic chemical substances. These substances, unknowingly released by this tiny entity, left behind them traces, which were picked up by a predator. This predator crept up, attacked, and swallowed its luckless quarry. And in this way, the sense of smell set out on its long evolutionary process. Professor of Biology John T. Caprio of Louisiana State University states that initially, the sense of smell developed in order to identify amino acid-like chemical substances soluble in water. The ability to determine molecules floating in the air is an adaptation of that original mechanism.[96]

If the quotation above had begun "*Once upon a time...",* no doubt nobody would raise any objection to it. However, the paragraph appeared in an evolutionist publication, claiming to be scientific. This once again gives us an idea of the methods evolutionists employ in making their claims, and the kind of perspective they possess.

It will be appropriate to undermine these claims, advanced in the name of science despite all their illogicality. In brief, what Caprio, an evolutionist researcher, wants to say is that single-celled organisms unknowingly released chemical substances; that predators detected these and hunted them. In addition to being exceptionally illogical, his conjecture fails to answer how the sense of smell came into existence. Absolutely no information is provided about the sensory systems that enabled predators to detect their single-celled prey. No explanation is offered of how the sensory systems came into being that permitted single-celled organisms to detect their enemies' scents and thus survive. Neither are we told what "evolutionary" mechanisms entered the equation during the construction of this extraordinarily complex mechanism.

Evolutionists hesitate to go into detail, because their explanations are based on a single mechanism: chance.

Chance Cannot Bring into Being Any Structure in a Living Thing

No matter what detail on Earth you examine, you encounter the presence of a sublime Intellect. This makes crystal clear one very important truth: Our omniscient Lord created everything on Earth. Darwinists, on the other hand, claim that only coincidences possess any creative force—that uncontrolled, random events of their own gave rise to complex life, with its exceptionally delicate balances.

The “creative force” which Darwinists resort to in accounting for the origin of smell is, again, chance. A living thing felt the need to detect smells, for which reason the necessary organ developed—by chance—and proteins with specific molecular sequences formed in the structure of this organ —coincidentally—, and scent molecules with the same molecular formulae also arose. While the enormously complex nerves, able to provide perception from the nose to the brain, were also forming by chance, electrical signals were beginning to transmit those perceptions—again by chance.

In fact, it’s impossible for even one of the countless necessary phenomena to have taken place by chance, let alone a regular sequence of such coincidences. Nevertheless, an uncontrolled intervention apparently gave the system something new, and propelled it towards perfection. Evolutionists are forced to maintain that these chance events functioned perfectly, because any single error in any one component of a complex system will mean everything returning back to the beginning, and the system will be useless. Therefore, according to evolution, even though all events are uncontrolled and random, they still function perfectly.

The “random phenomena” in question are actually random mutations—structural changes in a living organism’s genes resulting from external effects such as radiation. These changes constitute a grave danger if they are uncontrolled. Indeed, modern-day science has proved that mutations inevitably arise from an adverse effect on a living thing’s molecular structure. Ninety-nine percent of mutations are harmful, while the remaining 1% are neutral. Therefore, mutations are simply defects and impairments that occur in a living organism’s perfect design. Their effects are no different than that those of an earthquake striking a city constructed with enormous regularity and design. Yet a living organism possesses a structure much more complex and flawless than even the largest city.

This being so, mutations cannot endow a living thing with anything new. Modern-day scientists admit as much, stating that mutations can have no evolutionary effect. Michael George Pitman, a professor of plant physiology, has this to say:

Do we, therefore, ever see mutations going about the business of producing new structures for selection to work on? No nascent organ has ever been observed emerging, though their origin in pre-functional form is basic to evolutionary

theory. Some should be visible today, occurring in organisms at various stages up to integration of a functional new system, but we don't see them: There is no sign at all of this kind of radical novelty. Neither observation nor controlled experiments has shown natural selection manipulating mutations so as to produce a new gene, hormone, enzyme system, or organ.[97]

Even Sir Julian Sorell Huxley, a prominent neo-Darwinist who first added the concept of mutation to Darwin's claims regarding natural selection, admitted that mutations had no effect:

Obviously, such a process [species change through mutations] has played no part whatever in evolution.[98]

Despite this evident truth, however, evolutionists still use mutations to account for the imaginary formation of all kinds of structures and functions. Despite mutations' inevitably damaging effects, evolutionists claim that structures have *simple* properties so as to make their claims sound convincing. Again, that is why evolutionists insist on referring to the sense of smell as "primitive," imagining that it's easier to explain a primitive system arising as the result of chance. Yet this is a meaningless assumption. Even a primitive system still displays order, which coincidences cannot produce. In addition, not a single detail in this glorious universe created by God can be described as *primitive*.

In contrast to evolutionists' claims, the olfactory system described in the preceding chapters is a most complex, containing exceptionally delicate balances and flawless mechanisms and structure. In fact, research into the sense of smell reveals an evident conclusion: There is no such thing as a *primitive sense*. On the contrary, all findings reveal the existence of a most complex structure. For decades, thousands of scientists have sought to explain the olfactory mechanism, yet it is still understood only in general terms. The information about the details of the system consists of just supposition and theories.

One expert on this subject, Professor Linda B. Buck a Nobel Prize winner in 2004, makes this comment:

Smell is perhaps the most exquisitely sensitive and complex of all the senses, and it has also been the most perplexing for scientists to decipher.[99]

Heinz Breer of Stuttgart-Hohenheim University won the *Leibnitz Preis*, the most important science prize of Germany, for his work on the sense of smell. Professor Breer describes its importance in these terms:

Olfaction, the ability to recognize and discriminate myriad airborne molecules with great accuracy and sensitivity, is one of the most remarkable but least understood senses.[100]

Evolutionists' efforts to portray such a complex mechanism as primitive are actually a way of denying the obvious truth they are faced with. They, too, witness that the olfactory mechanism's superior creation clearly belongs to Omniscient and Almighty God. The fact that God creates within a certain order and measure, and that creation belongs to Him alone, is revealed in the Qur'an:

He to Whom the kingdom of the heavens and the Earth belongs. He does not have a son and He has no partner in the Kingdom. He created everything and determined it most exactly. But they have adopted gods apart from Him which do not create anything but are themselves created. They have no power to harm or help themselves. They have no power over death or life or resurrection. (Surat al-Furqan: 2-3)

Demolished Evolutionist Myths

While maintaining that the olfactory mechanism developed gradually, evolutionists also claim that during the so-called human evolutionary process, the importance of smell declined in comparison with that of other senses. This claim is another distortion resorted to by evolutionists in order to suggest that there was a gradual development among the five senses. According to this claim, a living thing *evolving* over the course of time possesses senses that are increasingly advanced. However, they are unable to present any scientific evidence for this claim, and instead seek to adorn it with imaginary scenarios and scientific terminology.

First of all, the materials most frequently employed in purely conjectural evolutionist scenarios on the subject of so-called human evolution, clearly, are reconstructions—models, drawings and paintings based on the skulls of now-extinct apes that lived in the past. Evolutionists endow these skulls with various facial features, seeking to give the impression that "ape-men" once lived. They may impose a human face on an ape's skull but leave a few simian details. The secret of making an ape resembling a human being is to give the desired shape to the soft tissues superimposed on the skull. That's because your facial bones have little determining effect on the soft tissues that make up the mouth, nose and eyelids. Using such a method, therefore, an ape's face can easily be made to resemble a human's. It is for that reason that evolutionist sources are all full of half-man, half-ape drawings and pictures of models produced for that purpose.[101]

You may have noticed that in these imagined, prejudiced reconstructions, the nose is generally flat and wide. In the fictitious passage from ape to man, the nose —deliberately portrayed as large and flat—needs to assume a human appearance over the course of time. For that reason, evolutionists conclude that the nose gradually shrank, losing much of its functionality. They openly deny all the complex and superior features of this splendid organ.

In fact, this contradiction indicates the dilemma in which evolutionists find themselves. For one thing, this claim entirely contradicts evolutionists' imaginary procession "from the primitive to the advanced." Evolution towards the advanced is reversed, and in some way, a retreat from perfection to the primitive was effected. In other words, chance thought that our other senses were more important and decided that various properties belonging to the nose were unnecessary. Believing in the evolutionists' account means believing this illogical claim.

In addition, the claim that the nose's complexity decreased over time has no scientific evidence at all behind it. In recent years, it has been realized just how irrational and unscientific this claim clearly is. All 21st-century scientific studies and research have revealed that the sense-perception system is of an extraordinary complexity, and evolutionists have therefore suffered a major disappointment. Also, it is increasingly evident that new scientific advances will continue to shatter evolutionists' dreams.

Statements From an Expert

The sense of smell—which evolutionists seek to portray as primitive compared to the other senses and which they claim can easily be accounted for in terms of chance—is actually a mechanism about which much is still unknown, and many of its complex details are still a mystery. Research and statements by present-day scientists on this subject make this crystal-clear. One who can be cited on this subject is the scientist Stuart Firestein of Columbia University, known for his research into the sense of smell and regarded as an authority in the field. In his articles Professor Firestein expresses the highly developed and complex nature of the sense of smell.

Some of the Professor Firestein's statement reads as follows:

We use the vertebrate olfactory receptor neuron as a model for investigating general principles and mechanisms of signal transduction—receptor-ligand interactions, modulation by second messengers, ion channel gating, and the long term mechanisms of adaptation and desensitization. The olfactory neuron is uniquely suited for these studies since it is designed specifically for the detection and discrimination of a wide variety of small organic molecules, *i.e.* odors.

The most recent work in the lab utilizes Adenovirus vectors to drive over-expression of cloned odor receptors in olfactory neurons. Because odor receptors make up the largest family of G-protein coupled receptors (also including many neurotransmitter ands hormone receptors) they are excellent receptors to try and understand the relation between amino acid sequence and ligand binding affinities. We are able to over express particular receptors as well as receptor clones with targeted mutations and then screen these for specific ligand

sensitivities. These data are then included in computer models of the protein receptor to understand precisely why one receptor is able to recognize the odor of say, roses, while another is specific for pizza.

In another vein, olfactory receptors are unique among neurons for the ability to regenerate throughout an animal's life. Several experimental manipulations have been developed to induce neuronal regeneration and proliferation *in vivo* allowing one to harvest neurons with a known date of birth. By applying physiological techniques for cell recording we are quantifying biophysical parameters, such as the appearance of ion channels or receptors and the development of synaptic contacts, in developing neurons. [102]

From all his statements, only one meaning can be extracted: Very little is actually known about the sense of smell, even at the science's present advanced level. The conclusion from all the resources that have been mobilized and the research carried out is that much of what is known is still theoretical. What's known, however, is the magnificent structure of the olfactory system. Indeed, Stuart Firestein draws attention to this in the abstract section of his paper:

The mammalian nose is arguably the best chemical detector on the planet, capable of detecting and discriminating among many thousands of compounds.[103]

The truth is therefore this: the sense of smell is exceedingly complex, an extraordinary mechanism that cannot be explained in terms of such hollow concepts as chance, mutation or natural selection. The flawlessness of the sense of smell is one of the signs of God's perfect creation, made by the Lord of infinite knowledge and might.

The Sense of Smell's Irreducible Complexity

One fact revealed by Professor Michael J. Behe of Lehigh University is that science has discovered *irreducible complexity* in living organisms. This term means that all systems, from largest to the smallest, possess an exceedingly wide-ranging complexity; and within these, there is such order that not even one component can be dispensed with. In order for an organ to function, not even a single one of the components that compose it can be omitted. Otherwise, the organ will fail to function.

This scientific fact totally undermines all the claims of the theory of evolution, because irreducible complexity makes impossible the gradual development expounded by evolutionists. It is impossible, for example, for the eye's 40 different components to form individually and gradually, since unless all 40 are complete, the eye cannot function. Again according to the theory of evolution, a functionless organ will be eliminated through natural selection.

Under these conditions, the same question for evolutionists arises with regard to other complex organs. The sense of smell—that superior mechanism that we've been examining so far—also possesses irreducible complexity. In order for scents to be perceived, the micro-hairs, receptors, scent receptor cells, scent cells, pain receptor cells, olfactory bulb, mucus secretion, basal cells, special protein and enzymes and a great many other factors need to be present together, all at the same time and fully formed. Yet even if all these details do come together, the system is not yet complete. It is essential that the nose should *perceive* the smells it receives. For that reason, the human brain, described as "the most complex structure in the known universe"[104] must also be present. Unless all these components are present together, this complex system will have no meaning at all.

It is impossible for any evolutionary process to have occurred in a system like this, which can in no way be reduced to any simpler form. Scent-receptor cells will serve no purpose in the absence of micro-hairs. In the absence of nerves, the signals received will fail to reach the perception center. If a single link in this chain —all of which operate together in separate areas—is removed from the equation, then no odor will be perceived in the brain. Therefore, this system must have emerged at once, with all its components fully formed. In order to detect one or 10,000 scents, all the elements cited above must be present, working in harmony together with one another. This points to a manifest truth: God created this mechanism, with all its flawless features, as He did everything else in the universe.

Darwinists' insistence on the subject of gradual evolution, despite all its illogicality, stems from their unwillingness to accept this. So long as they deny that there is a Creator Who created all living things together with all their features, they can never escape from the impasse in which they find themselves.

Yet the truth revealed by God is crystal clear. God makes His existence clear through the incomparable beauties and designs He has created. The way that evolutionists oppose this fact, despite having no evidence with which to do so, doubtless results from this world being a place of testing. As revealed in Surah Saba', 21; God created this world **". . . to know those who believe in the Hereafter from those who are in doubt about it . . ."** Those who refuse to believe in the Hereafter will continue to manufacture lies in order to deny God's superior creation. And those who believe in His existence will prepare from themselves a place in Paradise where they will enjoy the greatest pleasures from the beauties they see.

This, of course, is the greatest salvation. It is revealed in the Qur'an that:

But those who believe and do right actions will have Gardens with rivers flowing under them. That is the Great Victory. (Surat al-Buruj: 11)

TECHNOLOGY IN THE OLFACTORY SYSTEM

Have you ever realized that your senses constantly warn you against possible dangers from your surroundings? As you cross the road, for example, if you hear the horn of a car approaching at high speed, you immediately glance in the direction of the sound and thus avoid an accident that might otherwise be fatal.

Some dangers, however, are beyond the scope of sight and hearing. In some situations, the sense of smell successfully performs a warning function. Of all the potential hazards in your home, you can detect a gas leak, for example, only through your sense of smell. The first sign of a fire beyond your field of vision is the smell of smoke. People with weak or non-existent senses of smell are defenseless in the face of such situations.

Certain electronic devices have been developed to warn against such dangers. In the designing them, the human sense of smell was taken as the model. For example, gas or fire detectors produced along these lines are just crude imitations of the nose.

Fire Detectors

As you know, fire detectors react to smoke particles in the air and emit a warning alarm. Consider the models that work according to the principle of ionization. **(Figure 20)** These devices contain a special detection compartment filled with ions—electrically charged particles. So long as clean air enters the device, these particles' electrical charge remains stable. In the event that smoke enters, however, the ions are neutralized and the flow of electrical current is reduced. The drop in the current sets off a buzzer or other alarm.[105]

The special compartment in these electrical devices can be compared to the scent-receptor cells in the nose. You have already seen how the electrical charge in the receptor cell changes as a result of complex processes, and how a specific message thus emerges. The mechanism in a smoke detector is a rather primitive model of the perception system in the scent-receptor cells. Also, the difference between a fire detector and the human nose is far greater than that between a spacecraft and an oxcart.

The Electronic Nose

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[105] "Fire Fighting," *M. Encarta Encyclopedia 2000.*

The human olfactory system can distinguish some 10,000 different odors. A professional in the perfumery business is able to smell a perfume that has a 100 different odorants in it, and list the ingredients.[106] This superior creation in the human nose has encouraged numerous scientists to design similar apparatuses and various research and development centers worldwide are trying to reproduce the marvelous scent-perception system in human beings. One model developed along these lines is known as “the electronic nose.”

Instead of the human nose’s receptors, made of proteins, its electronic equivalents employ a series of chemical receptors. **(Figure 21)** Each of these receptors is designed to detect a specific scent; as their selective capabilities increase, production of the devices grows more difficult and their prices rise. The sensors gather signals from their surroundings, turn them into binary codes by means of electronic systems, and send them to a computer. Electronic systems may be compared to the nerve cells in the olfactory system, and the computer itself as an imitation of the human brain. The computer is programmed to analyze data transmitted to it, thanks to which it interprets the signals in binary code. **(Figure 22)**

Electronic noses developed in this way are used in various sectors, especially the food, perfume and chemical industries and medicine. Universities and international organizations provide major backing for such projects. Nonetheless, as stated by Julian W. Gardner of Warwick University, “We're at the early stages of the technology”[107]

A Comparison of the Human and Electronic Noses

Scientists say that there no equivalent to the perception capacity of the scent-sensitive cells in the nose.[108] Furthermore, some researchers openly state the impossibility of developing an electronic device that can fully duplicate the human nose. Edward J. Staples, an expert in electronic sensor technology, is one who openly admits this.[109] Another scientist, Professor W. James Harper, says, “An electronic nose is not a replacement for people—it is a supplement”[110] emphasizing that the electronic nose can only be an adjunct.

His statement may be expressed by an analogy: A camera cannot replace the eye, only support it. The relationship between the human nose and its electronic counterpart is much the same.

George Aldrich, chemical specialist at NASA, stated in the 23 June, 2001, edition of *New Scientist* magazine that nothing could surpass the human nose. When asked why NASA did not use electrical equipment in olfactory tests, Aldrich’s replied, “. . . in my opinion, they don't come anywhere close to the range of the human nose. There's nothing better than the human nose.”[111]

Leaving aside these facts for the moment, let us compare the two models, to once again reveal the superiority of creation in the human nose:

1) Electronic noses are able to detect only a limited number of odors, rather than the thousands that the human nose can.

2) Computer-supported electronic noses are much larger compared to the human nose and are delicate devices, requiring intense care and maintenance. Moreover, the short lives of sensors represent another major problem.[112] Our scent-perception system, on the other hand, never requires any maintenance during a lifetime of operation.

3) The cost of a single electronic nose can be as much as $100,000.[113]

4) In the human nose, the scent-perception process is completed in as little as less than a second. Analysis lasts for minutes in the electronic counterpart, however.[114]

5) Adjustment of the sensors and programming the computers to which they are linked are particularly important. Research has shown that high levels of water, alcohol, carbon dioxide and acetic acid can impair the device's sensitivity.[115] In addition, scent experts need to program the electronic nose very carefully, or else certain odors may cause the device to give incorrect or uncertain results.

6) Any system composed of sensors and computers lacks any mechanism for making logical judgments. Yet human beings carry out this process from a very young age. As soon as a baby is born, it can recognize its mother from her smell, and can distinguish between odors two days later.[116]

7) Despite the advanced technology of the present day, no electronic device with the capacity of the human nose can be manufactured, showing just how astonishing the design of our scent-perception system truly is. Experts working on the subject of the electronic nose are better aware of this than most other people.

This scent-perception system has been functioning perfectly since the creation of the first human being. Yet the structure is so complex that the details of the scent-receptor working mechanism and the perception system in the brain are, to a large extent, still not understood. Indeed, less is known about the olfactory system than about sight, hearing and touch.[117] Therefore, any electronic system to replace the human nose is clearly wishful thinking.

Apparently more advanced electronic noses will be produced in years to come, but that does not change this manifest truth: An electronic nose cannot emerge by chance, but is the product of specific planning, programming and design. Similarly, the nasal and scent systems, so superior to their electronic counterparts, did not come into being spontaneously or by chance. They are proofs of the superior artistry of God, the infinitely loving and merciful. And the way they have been placed at the service of all living things is a great blessing.

In short, every new scientific discovery regarding the human body and the scent perception system will once again inflict major disappointment on those who

insist on propounding evolution. At the same time, such advances will help us to obtain a better idea of God's infinite knowledge and intellect. This will enable believers to draw closer to Him, to better appreciate His might, and to increase their fear of Him.

Believers' attitudes in the face of God's verses have been revealed in the Qur'an:

In the creation of the heavens and the Earth, and the alternation of night and day, there are Signs for people with intelligence: those who remember God, standing, sitting and lying on their sides, and reflect on the creation of the heavens and the Earth: "Our Lord, You have not created this for nothing. Glory be to You! So safeguard us from the punishment of the Fire." (Surah Al 'Imran: 190-191)

THE PERFECT CREATION IN THE TASTE SYSTEM

We humans have to eat and drink if our bodies' vital functions are to be maintained. That's how we obtain the necessary energy for the trillions of cells in our bodies.

In eating, we actually take decisions that will directly affect our health. We know what to eat, and what not to. We understand which foods are nutritious, which have no nutritional value, and those that may be harmful. We throw out foods that go stale or rotten, whose tastes we immediately recognize. We can tell ripe fruit from unripe by evaluating how bitter it is. We can distinguish acidic liquids from bitter ones, and toxic substances by their bitter taste. We can easily select foods that provide us with mineral salts and fluids necessary for maintaining our bodies' equilibrium, the amino acids used for protein synthesis in our cells, and the carbohydrates and lipids to meet our energy requirements.

Moreover, we know when to eat certain foods and when not to. When feeling fatigued, we choose ones with high levels of vitamins, minerals and sugar. When our blood pressure falls, we eat salty foods, but avoid salty foods and drinks when it rises.

The marvelous system we possess, taste, allows us to do all this. Our flavor-perception system analyses proteins, ions, complex molecules and many other compounds, and works unceasingly on our behalf for our entire lives.

Along with meeting our daily nutritional requirements, we take great pleasure from the incomparable flavors of well-cooked meals, fruit, cakes and desserts. Try to recall all the many delicious foods and drinks you have sampled in your life: the lemonade and fruit juices to quench your thirst, the melons you ate in the heat of summer, a chop sizzling on the barbecue, chocolate ice cream, cakes, pies, pasties, puddings, rice, honey . . .

We perceive these delights thanks to the taste-perception mechanism placed at our service by our Almighty Lord. This chapter shall examine this matchless system in some detail and show what a superior work of Creation it is.

The Flawless Organization in the Tongue

Leaf through a cookbook; you will see thousands of recipes in it. It is estimated that there are some 20,000 edible plant species worldwide.[118] The variety of solid and liquid foodstuffs is striking. Yet despite all this variety, you have no problem in distinguishing among different tastes. For example, you can immediately tell the difference between boiled and roast chicken, even with your eyes closed.

You have no difficulty in distinguishing the flavor of chicken from that of dozens of different foods. The secret of this ability lies in the organization within the tongue, your taste-perception organ.

The tongue can be compared to a laboratory carrying out complex chemical analyses, because everything we eat or drink consists of very different molecules. There are hundreds, even thousands of separate chemical substances in every plate of food you eat.[119] According to taste expert David Schaeppi, the number of flavor-imparting chemical substances is 225 in a banana and 350 in a strawberry.[120] The significance of this information, which you may be encountering for the first time, is that the marvelous laboratory known as the tongue analyzes countless different molecules with unerring accuracy. **(Figure 23)** So what kind of design does this talented tongue of yours possess?

There are a large number of nerve fibers in the tongue, a design that makes it possible to move in all directions with ease. In fact, the tongue is four times more mobile than our fingers,[121] and assumes important functions in talking, chewing and swallowing. Foods placed in the mouth are moistened and softened by saliva released by the salivary glands, before being transmitted to the

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[74] "Salmon (fish)," *M. Encarta Encyclopedia 2001*

[75] "Sockeye salmon," *Britannica CD 2000* Deluxe Edition.

[76] "Salmon," *Ibid.*

[77]Marcia Barinaga, "Salmon Follow Watery Odors Home," *Science* 286, 22 October 1999, pp. 705-706.

[78] *Ibid.*

[79] David Malakoff, "Following the Scent of Avian Olfaction," *Science* 286, 22 October 1999, pp.704-705.

[80] *Ibid.*

[81] "Mosquitoes have discriminating tastes," *CNN Environmental News Network*, 26 August 1999, http://www.cnn.com/NATURE/9908/26/mosquitoes.enn/index.html

[82] "Mosquitoes use super senses," *BBC News*, 21 August 1999, http://news.bbc.co.uk/hi/english/sci/tech/newsid_426000/426655.stm

[83] "Butterflies and Moths,"*M. Encarta Encyclopedia 2001.*

[84] Bente Haarstad, "Insects' amazing sense of smell," January 1998, http://www.ntnu.no/gemini/1998-01E/30.html

esophagus. It is at this in-between point that the tongue's taste receptors are in their active state. In order to understand their activity, we must first be acquainted with the set-up within the tongue.

Taste-receptor cells are specialized cells found only in the tongue and in certain regions of the mouth. The taste-perceiving cells in the tongue are collected in bulb-like structures known as taste buds—structures known as papillae. These tiny protrusions that give the tongue its familiar rough appearance are found on the tongue's upper surface and sides. There are four kinds of papillae, distributed among various regions. **(Figure 24)** The most striking of these are the fungi form

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[85] "Butterflies and Moths," *M. Encarta Encyclopedia 2001.*

[86] T.C. Baker, H.Y. Fadamiro, and A.A. Cosse, "Moth uses fine tuning for odour resolution," *Nature* 393, 11 June 1998, p.530.

[87] Neil J. Vickers, Thomas A. Christensen, Thomas C. Baker, and John G. Hildebrand, "Odour-plume dynamics influence the brain's olfactory code," *Nature 410,* 22 March 2001, pp.466-470.

[88] Helen Pearson, "Sniffing out smell's secret code," *Nature Science Update,* 22 March 2001, http://www.nature.com/nsu/010322/010322-12.html

[89] Sara Abdulla, "Getting up bees' noses,"*Nature Science Update*, 12 November 1998, http://www.nature.com/nsu/981112/981112-9.html

[90] Jessa Netting, "What's in a smell?," *Nature Science Update,* 15 September 2000, http://www.nature.com/nsu/000921/000921-2.html.

[91] J.S. Hosler and B. H. Smith, "Blocking and the detection of odor components in blends," *Journal of Experimental Biology* 203, 2000, pp. 2797-2806;
Jessa Netting, *Op cit.*

[95]P. Whitfield, D.M. Stoddard, *Hearing, Taste, and Smell; Pathways of Perception*, New York: Torstar Books, Inc., 1984;
(http://www.macalester.edu/~psych/whathap/UBNRP/Smell/nasal.html) *The Olfactory System: Anatomy and Physiology*, Macalester College, 2001.

[96] "How The Nose Knows: Research On Smell Boosted," *Science Daily Magazine*, 24 May 1999, http://www.sciencedaily.com/releases/1999/05/990524040220.htm.

[97] Michael G. Pitman, *Adam and Evolution*, London: River Publishing, 1984, pp. 67-68; http://www.pathlights.com/ce_encyclopedia/10mut06.htm.

[98] Sir Julian Sorell Huxley, *Major Features of Evolution*,
http://www.pathlights.com/ce_encyclopedia/10mut06.htm.

papillae at the front of the tongue, which become more clearly visible after one has drunk milk. The vallate papillae, larger and fewer in number than the others, are set out in a reverse V shape at the back of the tongue. Foliate papillae are found on the rear sides of the tongue. Fungiform, vallate and foliate papillae contain taste buds. Filiform papillae, the most numerous type, do not contain taste buds, and cover almost the entire surface of the tongue. These are concerned with the sense of touch.

When the tongue is examined under a powerful microscope, the first thing one notices is a structural regularity. From smallest to largest, the order runs:

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[99] "Researchers Discover How Mammals Distinguish Different Odors," *Howard Hughes Medical Institute News*, 1999, http://www.hhmi.org/news/buck.html.

[100] Heinz Breer, "Olfaction," *Encyclopedia of Life Sciences*, August 1999.

[101] Earnest A. Hooton, *Up From The Ape*, New York: Mcmillan, 1931, p. 332; http://www.-acs.ucsd.edu/~idea/humanquotes.htm.

[102] Stuart J. Firestein, http://www.columbia.edu/cu/biology/faculty-data/stuart-firestein/faculty.html.

[103] Stuart J. Firestein, "A Code in the Nose," *Science*, 6 April 2004.

[104] G. Fischbach, "Dialogues on the Brain: Overview," *The Harvard Mahoney Neuroscience Institute Letter*, 1993, Vol. 2.

[106] Elise Hancock, "A Primer on Smell," *Johns Hopkins Magazine*, September 1996.

[107] Mia Schmiedeskamp, "Plenty to Sniff At," *Scientific American*, March 2001; http://www.sciam.com/2001/0301issue/0301techbus1.html.

[108] Philip Morrison, "The Silicon Gourmet," *Scientific American*, April 1997; http://www.sciam.com/0497issue/0497wonders.html.

[109] Mia Schmiedeskamp, *Op cit.*

[110] Pam Frost, "Electronic Nose Inspects Cheese, Hints at Human Sense of Smell," *The Ohio State University Research News*, 30/9/1998, http://www.acs.ohio-state.edu/units/research/archive/nosetron.htm.

[111] "Nose Jop, "*New Scientist Magazine*, 23 June 2001, pp. 44-47.

[112] W. James Harper, "*Strengths and Weakness of the Electronic Nose*," http://www.fst.ohio-state.edu/FS/nose/sld024.htm.

taste cell, taste bud, papilla. There are around 10,000 taste buds in the tongue.[122] **(Figure 25)** Vallate papillae contain between 700 and 3,000 taste buds, and foliate papillae from 320 to 2,950. There are around 3 to 10 taste buds in each fungiform papilla.[123] The number of taste cells in every taste bud varies between 50 and 100.[124]

These figures are significant in demonstrating the balance in creation. If the number of taste cells and taste buds is below normal, then one's sense of taste will decline, and even disappear. But if the number is greater than normal, then familiar flavors will seem excessively sweet or bitter. Clearly, each cell needs to be present in exactly the right number, or eating and drinking would be unpleasant, even uncomfortable.

As you know, the smaller an electronic device, the more successful its design is considered to be. That's why engineers try to the greatest possible use of a small space. Looking at the organization in the taste buds, examples of this design

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[113] Pam Frost, *Op cit.*; http://www.acs.ohio-state.edu/units/research/archive/nosetron.htm.

[114] Philip Morrison, "The Silicon Gourmet," *Scientific American*, April 1997, http://www.sciam.com/0497issue/0497wonders.html.

[115] W. James Harper, "*Strengths and Weakness of the Electronic Nose*," http://www.fst.ohio-state.edu/FS/nose/sld026.htm.

[116] "Infancy," *M. Encarta Encyclopedia 2000.*

[117] Pam Frost, *Op. cit.*, http://www.acs.ohio-state.edu/units/research/archive/nosetron.htm.

[118] Diane Ackerman, *A Natural History of the Senses*, New York: Vintage Books, 1995, p.133.

[119] Harold Mcgee, "Taking stock of new flavours," *Nature* 400, 1 July 1999, pp.17-18.

[120] Ayten Görgün, "*Tek başına ne tadın ne kokunun anlamı var,"(Neither Taste nor Smell has Any Meaning Alone,)* 2000, http://www.hurriyetim.com.tr/tatilpazar/turk/00/03/17/eklhab/08ekl.htm.

[121] Selçuk Alsan, "Yemeklerin Tadı, Kokusu," *Bilim ve Teknik*, ("The Taste and Smell of Food," *Science and Technology*), February 1999, pp.98-99.

[122] Eric Chudler, "That's Tasty," 2001, http://faculty.washington.edu/chudler/tasty.html.

[123] A.I. Spielman, J.G. Brand, and W. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[124] Stuart J. Firestein, "Neurobiology: The good taste of genomics," *Nature* 404, 6 April 2000, pp.552-553.

principle are immediately apparent. Some 100 taste cells are set out in the taste bud in an ideal manner **(Figure 26-27)**. In addition, the buds also contain a number of basal cells and secretion cells, the taste cells' production center. When we examine the structures in the papillae, we encounter a similar situation. **(Figure 28-29)** In the cleft around the papilla, the taste cells arranged along the edges of the papillae establish communication with taste molecules. Thanks to this structure, the widest possible surface for communication is established in a very small area.

That these cells are present in just the right number and form reveals evidence of a very superior Creation. Another extraordinary property is that they are located in exactly the right place.[125] If just one of these many details in the taste-perception system were to change—if the taste cells were beneath the tongue instead of on top and to the sides of it, then clearly, the sense of taste would largely disappear, and life would become difficult. The fact that every detail in the system is exactly right reminds people of reason and common sense that God has created all things flawlessly, within a perfect order.

There can be no organization without an organizer, and no arrangement without an arranger. When you look around you, everything you see—tables, chairs, lamp, curtain, window, television, computer—is a product of Man's creation. The taste system, many times more complex than these, is also the product of a Creation that belongs to God, the Lord of the worlds.

Basic Tastes

The prevailing scientific view is that there are five basic tastes: sweet, salty, bitter, sour and *umami*.[126] Everyone is familiar with the first four, though the fifth may be a new concept to some. Umami is a taste stemming from glutamate, one of the 20 amino acids in the structure of proteins, which is found in meat, fish and leguminous plants. (Monosodium glutamate, used to enhance flavor in ready-to-eat meals, also imparts this flavor.)

Some scientists do not agree that the foods we eat and drink consists of combinations of only these five tastes. Some researchers, such as Professor Andrew L. Spielman (New York University, College of Dentistry), Professor Joseph G. Brand (Monell Chemical Senses Center), and Dr. Wentao Yan (New York University, College of Dentistry), think that other tastes, such as fat, water and metallic tastes, may constitute fundamental flavors.[127]

One piece of information that research brought to light is that the *taste map* is incorrect.[128] **(Figure 30)** The taste map was originally based on the assumption that sweetness was perceived at the tip of the tongue, saltiness on the edges,

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[126] Stephen D. Roper, "Taste: Cellular Basis," *Encyclopedia of Life Sciences*, May 1999, http://www.els.net.

sourness on the sides and bitterness at the back. But this map resulted from a misinterpretation of 19th-century research. The latest research shows that taste cells react to more than one stimulant,[129] and that each taste receptor has a more complex communication system than had been thought. Contrary to previous belief, every taste cell establishes communication with several specific stimuli, not just one. The methods of communication in receptor cells are one of the proofs that these cells are the work of Creation.

Complex Communication Systems

Professor Joseph Brand is a scientist known for his work on the sense of taste. According to him, it takes only 0.2 to 0.5 seconds for us to perceive the taste of anything placed on the tongue.[130] What takes place during this interval—shorter than the time it takes you to open and close your eyes has been the subject of investigation for many years. Presently, the main lines of the processes involved in taste perception have been established.[131]

Taste begins when compounds from the food you chew are dissolved in saliva. We detect the taste of salty foods more quickly because salt dissolves faster in saliva than do other substances. Indeed, the salivary glands sometimes start working when the smell of food is detected—in the so-called Pavlovian response—preparing the tongue for tasting. Like every detail in taste perception, this stage is important too. Were it not for this secretion, you would be unable to taste dried foods. (Saliva also contains proteins and enzymes that assist the digestive and immune systems. Research into saliva's features and functions is ongoing, but studies have already revealed that this fluid, generally regarded as insignificant, has a rather complex structure.)

The molecules from food communicate with the taste receptors on the tongue via hair-like structures known as microvilli on the cell's tip. These microvilli, or micro-hairs emerge into the mucus membrane coating the tongue through tiny apertures known as taste pores. Taste-cell receptors are located on the micro-hairs. The average diameter of a taste pore is four-thousandths of a millimeter, or 0.000157 of an inch.[132]

Taste compounds are also communication molecules, transmitting the messages they carry to the ion channels or receptors on the cell membrane. The events taking place at this stage at the cellular and molecular level are, as stated by Professor Stephen Roper of Miami University, still the subject of investigation.[133] There are many different methods of communication, corresponding to many different taste compounds. In other words, different communication networks are established for different tastes such as sweet, bitter and salty. Taste cells have more than one way of communicating, and only the general lines of some of them are understood as yet.

Another surprising factor is the significant differences in taste perception mechanisms between species.[134] These phenomena call for long reflection: Naturally, molecules and cells devoid of consciousness cannot by themselves develop wholly different means of communication; these communication systems are signs of the omniscience of our Lord, Who created them.

Those taste molecules that carry the news of saltiness and sourness establish direct links with the ion channels in the cell membrane. Sweet, bitter and umami molecules, on the other hand, attach to receptors in the cell membrane. The well known researchers David V. Smith (of the University of Tennessee Health Science Center) and Robert F. Margolskee (of the Mount Sinai School of Medicine) compare the link between molecule and receptor to that of a lock and key, as is the case with scent perception.[135] In the same way that a specific key opens a specific lock, a specific molecule sets each receptor into action. On the cell membrane, which consists of fat and proteins and is just 1/100,000th of a millimeter (0.000000394 of an inch) thick, are channels that regulate entry and exit to the cell and receptors that function like switchboards. These astonishing marvels recognize millions of different taste molecules without error, each and every time, and flawlessly carry out their various functions.

We pointed out that there are around 1,000 different receptors in scent perception, but the number of different receptors in taste perception is unknown. Last years, various researchers first discovered the *T2R/TRB* receptors.[136] Professor Linda Buck states that this discovery is only the beginning of a likely long process of research into taste.[137] The researcher Professor Charles S. Zuker states that it is impossible to estimate how many different taste receptors will emerge before the research is completed.[138] Even with 21st -century technology, a large part of the structures in taste-cell receptors remain a mystery. This once again shows that the structures in question are the product of a superior Creation.

When the receptors are stimulated, a series of complex processes is initiated within the taste cell. During these stages, a great many proteins and enzymes fulfill their functions to the letter. For instance, when a sugar or artificial sweetener molecule attaches to a receptor, the protein complex known as *gustducin* goes into action. Particles separating from this complex activate a special enzyme. The enzyme in question transforms certain proteins inside the cell into *second messengers*. These messengers, in return, send the command for the potassium channels in the cell membrane to close. At the same time, the sodium and calcium channels are opened, and positively-charged ions begin entering the cell. In this way, the cell's initial negative charge is eliminated, and the cell enters a neutral state. As a result of certain complex processes still not fully understood, the cell begins emitting chemical messengers known as *neurotransmitters*. These chemicals carry messages to the neurons around them. It is still not known for sure which neurotransmitters carry messages between the taste cell and the neuron. However, it is thought that chemical messengers such as serotonin, GABA, acetylcholine and adrenalin play a role in the taste-perception system.[139]

Figure 31 shows the events that take place in taste cells, depending on various stimuli. In examining these, bear in mind the following two points: First, the changes that take place in the taste cell in response to different stimuli are shown with different drawings of cells, to assist your comprehension. In fact, as we have already discussed, taste cells enter into reactions not with one, but with more than one stimulant. The second point is that only the main lines of the communication in the taste cell are shown here.

As you know, engineers produce detailed technical drawings showing the working systems of mechanical or electronic devices—clear evidence that the devices were designed by engineers, technicians or experts. No rational person can imagine that a device which he has seen in a blueprint came into being spontaneously. Now look at the taste cell communication mechanisms in Figure 31. Can you imagine that these came into being without being designed? Of course not! No rational, logical person can be taken in by such an idea.

The theory of evolution maintains a similarly irrational claim. It is crystal-clear that the taste cell's advanced methods of communication cannot be the work of chance or coincidence. Every stage of the system contains the most delicate and detailed calculations and arrangements that occur in a small fraction of a second. Any one of these stages is sufficient to show the existence of God, its Creator. The way evolutionists persist in their denial in the face of all the obvious evidence can be explained by their inability to rid themselves of their irrational, illogical obsessions.

The Sense of Taste in the Brain

The nerves in your body work far more perfectly than the postal system of a developed country. Every day since you were born, and even every moment, they have carried information to exactly the right addresses with an extraordinary success, never losing any information. In your brain there are around 100 billion nerve cells.[140] When you eat or drink anything, three nerves related to taste carry the message they receive from your taste cells to the relevant addresses from among those 100 billion. In addition, they do this impeccably, for so long as you live.

The diameter of these nerves is less than 0.004 of a millimeter (0.000157 of an inch).[141] Taste messages are transmitted to the brain by the *chorda tympani* nerve from the front two-thirds of the tongue, and from the rear third by the *glossopharyngeal* nerve. The *vagus* nerve transmits to the brain the taste signals it receives from the back of the mouth.[142] **(Figure 32)** These three nerves send the reports from tens of thousands of taste cells to the region known as the brain stalk. From there, taste data go to the cortex, hypothalamus and amygdala regions of the brain. When you snack on a cracker, these three nerves are constantly occupied with transmitting reports to the relevant regions of the brain.

In addition to these, a special nerve (known as cranial nerve V) also carries data from the cells concerning temperature, touch, pressure and pain to the brain.

How, though, do these messages turn into perceptions such as a delicious chestnut cake or a flavorful mushroom soup? How do we tell whether what we eat is fresh or stale? How do we instantly recognize foods? How is it that we analyze them in such a way as to describe their details?

In order to provide a satisfactory answer to these questions, we need to await the findings of new research. It is still not known how nerve messages turns into taste perceptions in the brain; the encoding system in the taste-perception system and the mechanism by which the brain decodes this are still not clear. What is known is that taste distinction does not stem from any particular cell model, and that the data from the taste cells constitute taste perception by being analyzed collectively in the brain.[143]

Very probably we shall obtain more information about the workings of the taste perception system in the years to come. However, you may be sure that every new scientific discovery about the taste system will once again reveal the fact of Creation. That is because it is God, the Lord of the worlds, Who created and imparted as a blessing for living things the countless plants, fruits and vegetables, with their delightful smells and matchless flavors. This is revealed in several verses, and we are advised to reflect on and learn from this. Some of these verses read as follows:

Say: "Who provides for you from the heavens and Earth?" Say: "God. It is certain that one or the other of us, either we or you, is following guidance or else clearly astray." (Surah Saba': 24)

It is He Who sends down water from the sky from which We bring forth growth of every kind, and from that We bring forth the green shoots and from them We bring forth close-packed seeds, and from the spathes of the date palm date clusters hanging down, and gardens of grapes and olives and pomegranates, both similar and dissimilar. Look at their fruits as they bear fruit and ripen. There are Signs in that for people who believe. (Surat al-An'am: 99)

O humanity! Remember God's blessing to you. Is there any creator other than God providing for you from heaven and Earth? There is no god but Him. So how have you been perverted? (Surah Fatir: 3)

The Changing of the Guard in the Taste Cells

As you know, every piece of apparatus has a finite working life. The harder and heavier the conditions under which a device operates, the shorter its lifespan

will be. The same applies to the taste cells in the tongue. Every day, they come into contact with foodstuffs considerably above or below body temperature, and with acidic foods, which present them with difficult, even extreme conditions. For example, a hot cup of tea, an iced fruit juice, strong coffee or bitter grapefruit juice all wears them down to a degree. One would naturally expect the taste cells to gradually lose their perception capabilities and for the sense of taste to be lost. Yet such a thing does not happen. Why, then, does your sense of taste not fade and die?

The reason is the taste cells' renewal mechanism. On average, they change every 10 days.[144] In other words, the taste cells you have now are entirely different from those you had 10 days ago. Basal cells in the taste bud mature and replace the old cells within a few hours. **(Figure 33)** These processes, of which you are utterly unaware, take place so quickly that the taste cells you use at dinner are different from those you had at breakfast.[145] Thanks to this perfect mechanism, your taste cells are always reliable and healthy. You continue to perceive familiar flavors and to identify substances that could harm your health.

Have a look around you. Can any of the high-tech devices you see renew themselves? Of course not! Bearing this in mind, you can better appreciate the superb creation in the sense of taste. At the same time, this truth is a means whereby we can once more be reminded of the infinite generosity and bounteousness of our Lord. Although the great majority of people are well aware of this, still they persist in ingratitude and refusal to give thanks. At every moment, they witness the ever more stupendous proofs of creation in their own bodies, yet heedlessly turn their backs on them.

The situation of such people is described in Surat an-Naml:

God shows favor to humanity but most of them are not thankful. (Surat an-Naml: 73)

The Situation Facing Evolutionists

Pro-evolution researchers and writers share one feature in common, traces of which can easily be seen in their speeches, articles and books. They are blindly devoted to the theory of evolution. Although they have absolutely no evidence with which to back it up, they refuse to abandon their fixed ideas. Instead of admitting their errors, they become even more determined and continue to raise new speculations.

Consider the sense of taste, one of this book's main subjects. Evolutionist researchers claim that the sense of taste evolved in order to identify high-calorie foods and poisonous foodstuffs.[146] According to this claim, the first living things, having to eat in order to survive, found ways to use the resources around them by trial and error, until they could differentiate between what was useful and what

was poisonous. As a result of these endeavors, their tongues acquired structures that began perceiving tastes to tell these apart. The tongue gradually began distinguishing flavors as well, and the sense of taste became a source of delightful sensations, not just of meeting nutritional needs.

But actually, this account explains nothing. We already know that our sense of taste serves to distinguish flavors from one another. Ascribing this to a process of evolution is deceptive and lacks any scientific foundation. In addition, no matter how the system in question it may have emerged, evolutionists really have to explain how it allegedly *evolved*. In this imaginary scenario, it is unclear how any species managed to survive until it became able to recognize poisons. No explanation is offered of how acquired experience or the alleged changes were handed on to subsequent generations. There is no need even to touch on the question of the properties possessed by the tongue, the perception systems and their mechanisms, because one cannot find the slightest explanation of their evolution in any Darwinist reference.

The above fantasy is important in terms of revealing the methods that Darwinists employ in seeking to account for such a complex mechanism. Evolutionists generally resort to one of two tactics: Some prefer not to mention such matters at all, while others shelter behind clichés of the sort given above, and are careful to add these accounts to scientific findings.

An example of this is the expressions employed by Diane Ackerman, author of *A Natural History of Senses*, in claiming that we are indebted to the oceans for our sense of taste.[147] It is clear that her claim, for which she gives no scientific explanation, consists of merely glossing over the facts. Whenever evolutionists are pressed, they cling to the myth of the "oceans on the primordial Earth" as their savior. In fact, Ackerman is troubled by her inability to back up what she writes, and expresses the following wish:

Should an alien civilization ever contact us, the greatest gift they could give us would be a set of home movies: Films of our species at each stage in our evolution.[148]

We have to admit that to date, evolutionists have not found any evidence to confirm a single one of their claims. And in any case, it is impossible for them ever to do so.

Therefore, Darwinists encounter the same difficulties with the sense of taste as they do in the sense of smell. That is because accounting for the sense of taste —whose details have still not been explicated with modern-day technology—in terms of coincidences is merely demeaning to the person making that claim. From the code-receptor mechanism in the brain to the wide variety of its receptors, the sense of taste is so complex that every component is clearly the product of a special design. Furthermore, the taste system's ideal structure, the perfect and flawless way it functions, are plain for everyone to see. Bearing these facts in mind, it's not hard to understand that there can be no random and uncontrolled

intervention at work here. No random phenomenon can give unconscious molecules the ability to *perceive* what is eaten or smelled. No coincidence can create a harmonious geometric design for molecules that remain unaware of one another. It cannot make the harmony among them significant, in the way that a cake or an orange is. No coincidence can assume that information from molecules reaching the tongue needs to be transmitted directly to the brain.

Remember that chance suggests random developments taking place within an established order, like letters being distributed randomly throughout a meaningful text. These "extra" letters cannot possibly make that text more meaningful or give it any new meaning. On the contrary, they will have a confusing effect on the text as a whole. Evolutionists' claims regarding chance are no different, and they themselves are well aware of this.

In addition, as stated earlier, the sense of smell plays an important role in the sense of taste. Since the olfactory and taste systems are interconnected, the sense of taste means little in the absence of the sense of smell. This interrelationship no doubt causes evolutionists grave concern. Mutually dependent systems and structures displaying the irreducible complexity already referred to, reveal the impossibility of any gradual process of evolution. The fact that taste survives only with the sense of smell makes it impossible—according to the theory of evolution—for the two to have evolved independently of each another. But according to evolution, every organ, and even every feature possessed by these organs, must have had a sequential development lasting millions of years.

But if so, then taste perception must have stood by, functionless, until the development of the sense of smell—something the mechanisms of evolution itself would make impossible. According to the theory of natural selection, any structure with no function will atrophy, become vestigial, and eventually disappear.

All this means that even while evolutionists cannot explain how the extraordinarily complex taste perception evolved, they also face a major problem in accounting for how it evolved in cooperation with the sense of smell. How did two different systems, each of which permits the perception of chemical substances, evolve? The evolutionists have no answer to give.

Anyone possessed of conscience and consciousness will clearly see that for the way that the brain, tongue, taste nerves, papillae, taste buds, taste cells, taste receptors, various different proteins and enzymes came together in such complete harmony, there is only one explanation. It is God, the Lord of the worlds, Who created the sense of taste and placed it at our service. The situation of those who turn to the paths of superstition by ignoring God's flawless creation is described in the Qur'an:

God has given you wives from among yourselves, and given you children and grandchildren from your wives, and provided good things for you. So why do they believe in falsehood and reject the blessings of God, and worship, instead of God, things that have no control over their

provision from the heavens or Earth in any way, and are themselves completely impotent? Do not try to make metaphors for God. God knows and you do not know. (Surat an-Nahl: 72-74)

The Electronic Tongue

The dazzling structures in the tongue have inspired a number of scientists. Devices that imitate the functions of the human tongue, known as electronic tongues, are still at the developmental stage. These devices are being developed to be able to distinguish fresh foods from stale and to identify decay caused by bacteria. The electronic tongue is an electronic circuit with up to 100 tiny holes, each of them designed as an artificial taste bud. Any liquid dropped onto the circuit is absorbed by the holes, like a sponge. Then, the artificial taste buds change color according to the chemical composition of the liquid, and the results appear on a screen. For example, a liquid that tests pink is sweet, and a light yellow one is slightly sour.

Eric V. Anslyn, one of the researchers into the electronic tongue, states that its design can identify up to 100 different flavors.[149] That's the current state-of-the-art, at which research and development projects performed for years by a great many scientists and engineers with large budgets have arrived. Compared with the human tongue, the artificial tongue's capacity and quality is exceedingly primitive. Moreover, the sense of taste has been functioning to perfection ever since the creation of Man.

The difference is of course plain to see. The electronic version is the product of design, planning and engineering. If all the components of this device were set placed on a table, and if one waited for even billions of years, it would still be impossible for an electronic tongue to come into being by chance. It makes no difference whether the components are left in the sea, on the slopes of a volcano, or even in space. The result will be exactly the same. Nor could the human tongue and taste perception system, so incomparably superior to the electronic tongue, have come into being as the result of consecutive coincidences. It is a waste of time to look for any other explanation than Creation. Evolutionists must either accept this, or else admit their dogmatic devotion to the theory of evolution.

What Tastes and Taste Perception Suggest

You began becoming acquainted with tastes while still an embryo in your mother's womb. Your sense of taste began working immediately after you were born.[150] The first food you tasted was your mother's milk, which met all your needs. Thanks to the system you still possess, you consumed the necessary nutrients for growth, and avoided eating things that would have harmed you. During childhood, your sense of taste was stronger than in adulthood—which represents an important security mechanism. (Children have more taste cells than adults, and these are present in children's upper palate, cheeks and throat, as well as in the tongue.)[151] In short, your sense of taste was a great help in enabling you to distinguish between unfamiliar nutritious and harmful substances.

Your sense of taste was also at your service throughout your adolescence. It never broke down, but unfailingly identified everything you ate and drank. With its sensitivity, you analyzed substances that might be harmful or poisonous the moment you put them in your mouth. (Bitter is the taste with the lowest perception threshold among the tastes.)[152] Taste buds can detect sweetness in something even if only one part in 200 is sweet. They can detect saltiness in one part in 400, sourness in one part in 130,000 but bitterness in as little as one part

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[125] Charles Zuker, "A Matter of Taste," *HHMI Bulletin*, June 1999, Vol. 12, no. 2, pp.10-13.

[127] A.I. Spielman, J.G. Brand, and W. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[128] David V. Smith, Robert F. Margolskee, "Making Sense of Taste," *Scientific American*, March 2001, pp.26-33.

[129] *Ibid.*

[130] The International Food Information Council Foundation, "Experiments in Good Taste," *Food Insight*, March-April 1995, http://ificinfo.health.org/insight/exper.htm.

[131] Stephen D. Roper, "Taste: Cellular Basis," *Encyclopedia of Life Sciences*, May 1999, http://www.els.net.

[132] A.I. Spielman, J.G. Brand, and W. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[133] Stephen D. Roper, *Op cit.*

[134] *Ibid.*

[135] David V. Smith and Robert F. Margolskee, "Making Sense of Taste," *Scientific American*, March 2001, pp.26-33.

in 2 million.[153] This ability helped you immediately spit out any potentially poisonous substances, rather than swallowing them.

Were it not for your sense of taste, you would have had to live in a chemical laboratory and carry an analysis kit around with you in order to survive. You would have had to run tests in order to determine whether the small, white particles in a jar in your cupboard were salt, sugar, or washing powder—a poisonous substance. Even if you spent all your time analyzing the food and drink you needed, that still would not be sufficient.

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[136] Hiroaki Matsunami, Jean-Pierre Montmayeur, and Linda B. Buck, "A family of candidate taste receptors in human and mouse," *Nature* 404, 6 April 2000, pp. 601-604; E. Adler, M.A. Hoon, K.L. Mueller, J. Chandrashekar, N.J. Ryba, and C.S. Zuker, "A novel family of mammalian taste receptors," *Cell* 100, 17 March 2000, pp.693-702.

[137] Linda B. Buck, "Search for Taste Receptors Yields Sweet Success," *Howard Hughes Medical Institute News*, 6 April 2000; http://www.hhmi.org/news/buck2.html.

[138] Charles S. Zuker, "A Matter of Taste,"*HHMI Bulletin*, June 1999, Vol. 12, no. 2, pp.10-13.

[139] A.I. Spielman, J.G. Brand, and W. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[140] "Brain (medicine),".*M. Encarta Encyclopedia 2001*.

[141] Eric Chudler, "Brain Facts and Figures," 2001, http://faculty.washington.edu/chudler/facts.html.

[142] A.I. Spielman, J.G. Brand, and W. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[143]David V. Smith, Robert F. Margolskee, "Making Sense of Taste", *Scientific American*, March 2001, pp.26-33.

[144]Tim Jacob, "Taste", 2001, http://www.cf.ac.uk/biosi/staff/jacob/teaching/sensory/taste.html.

[145]A.I. Spielman, J.G. Brand, W. Yan, "Chemosensory Systems", *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[146] Charles Zuker, "A Matter of Taste," *HHMI Bulletin*, June 1999, Vol. 12, no. 2, pp.10-13.

[147] Diane Ackerman, *A Natural History of the Senses*, New York: Vintage Books, 1995, p.21.

[148] *Ibid*, p.130.

Were it not for your sense of taste you might not even think of eating at all. This process, which you have to perform two or three times every day, would become a terrible burden. If you ignored it, symptoms of malnutrition and disease would begin appearing. Now consider the actual circumstances, while still bearing these facts in mind: Foods essential for your health are at the same time pleasant to eat and drink. For example, the melon and delicious watermelon that quench your thirst in summer, and fruits such as oranges and mandarins help meet your vitamin requirements in winter.

Remember all the dry and liquid foods you have ever tasted: fruits such as bananas, strawberries, peaches, cherries, figs, apricots and dates; vegetables such as spinach, carrots, tomatoes, potatoes and peas; cereals such as chickpeas, lentils and beans; desserts such as puddings, pies and cakes; meat cooked in various different ways; different kinds of cheese, soup, cakes, pies, biscuits, pastries, fruit juices, ice creams, jams, and so many more besides. Were you not equipped with a sense of taste, none of these would have any distinction or appeal. Or imagine that these did not have the tastes with which you are so familiar; if they might have been tasteless, unpleasant, disgusting or repellent.

Clearly, each taste has been specially created for human beings. Clearly, too, it would be a grave error to ignore this fact because of our familiarity with all these flavors. It is revealed in the Qur'an that God has created clean and pleasant foods for us:

It is God Who made the Earth a stable home for you and the sky a dome, and formed you, giving you the best of forms, and provided you with good and wholesome things. That is God, your Lord. Blessed be God, the Lord of all the worlds. (Surah Ghafir: 64)

There is no doubt that for thinking, rational people, every taste is a means whereby to appreciate God properly, remember Him with gratitude, praise Him and give Him thanks.

Everybody knows that under normal conditions, even the most attractive-looking, delicious food soon spoils and becomes inedible. There is considerable wisdom behind this. One aspect of this is to remind us that the life of this world is merely transitory, and that it is a mistake to forget the Hereafter and become excessively attached to this life. Paradise is where the originals of the flavors in question persist throughout all eternity. This feature of Paradise is revealed in a verse:

An image of the Garden which is promised to those who guard against evil: in it there are rivers of water which will never spoil and

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[149] Gina Smith, "High-Tech Taste Tests," *ABCNews*, 1999; http://more.abcnews.go.com/sections/tech/cuttingedge/gina990304.html.

rivers of milk whose taste will never change and rivers of wine, delightful to all who drink it, and rivers of honey of undiluted purity; in it they will have fruit of every kind and forgiveness from their Lord. Is that like those who will be in the Fire timelessly, for ever, with boiling water to drink which lacerates their bowels? (Surah Muhammad: 15)

Some people do not know how to thank others enough for giving them food when they are hungry, entirely forgetting that our Lord gave them their splendid senses of smell and taste. The foods to be eaten by those who are ungrateful to God, Who has created countless blessings, are described thus in the Qur'an:

Hell, where they will roast. What an evil resting-place! This! So let them taste it—boiling water and scalding pus. (Surah Sâd: 56-57)

[The inhabitants of the Fire will be] drinking from a boiling spring. They have no food but a bitter thorny bush which neither nourishes nor satisfies. (Surat al-Ghashiyya: 5-7)

CONCLUSION

Imagine a manager who has received a sound education and has gained experience working in several departments of a company. Assume, further that the owner of the company regards this manager as a success by appointing him to the position of general manager. Then let him, as general manager, be given unlimited authority for a year, running the company as he chooses, organizing the employees and its commercial activities. However, let his contract and rights be valid for one year only.

Naturally, at the end of that period, the owner of the company will hold the manager to account and ask how wisely he used the powers entrusted to him and the kind of profits he earned. Any intelligent manager will seek to demonstrate that he made the best of the means at his disposal, thanks to which the owner will reward him for what he did. But a manager who wastes the funds at his disposal, spending without thought or calculation and consuming all the company's assets, will show an enormous lack of intellect. His year will go by very quickly, and he will then be punished for misusing his authority.

In fact, every human being's life bears a close resemblance to the situation of that general manager. Some of the elements a person is given to manage are his limbs, and matchlessly designed organs and cells. But these actually belong to God. A person has a duty to make the very best use of these means entrusted to him for the specific duration of his life. After death, he will give account to our Lord, Who created him and endowed him with blessings. The way to make the best use of this great blessing has been revealed in the Qur'an:

You who believe! Shall I direct you to a transaction which will save you from a painful punishment? It is to believe in God and His Messenger and strive in the Way of God with your wealth and your selves. That is better for you if you only knew. He will forgive you your wrong actions and admit you into Gardens with rivers flowing under them, and fine dwellings in the Gardens of Eden. That is the Great Victory. (Surat as-Saff: 10-12)

Our senses of taste and smell are matchless blessings unconditionally placed at our service. Throughout this book, we have frequently emphasized that complex systems such as taste and smell, many of whose details are still not fully understood, cannot form through random additions, nor through blind chance. Neither can they evolve, either gradually or in a single moment. For systems that work in such an ideal, perfect and flawless harmony, there is only one explanation. As with everything in the universe, God has created the systems that make it possible for us to perceive countless smells and tastes.

These blessings are important means whereby a person may give thanks to our Lord. Yet some people ignore this, follow their selfish desires, forget our Creator, and consume all the blessings at their disposal in the light of their worldly desires.

A person can perceive impressive smells and delicious tastes throughout his life because God so wishes it. This increases the faith in and devotion to God of people possessed of reason and conscience, and helps them in appreciating God properly. It is a means whereby they can reflect on His boundless might, knowledge and compassion. Those who are aware of this also realize that they must serve only Him. This submissive state of mind of believers and their powerful devotion to our Lord is revealed thus in the Qur'an:

[People with intelligence are] those who remember God, standing, sitting and lying on their sides, and reflect on the creation of the heavens and the Earth: "Our Lord, You have not created this for nothing. Glory be to You! So safeguard us from the punishment of the Fire." (Surah Al 'Imran: 191)

In contrast to this attitude of the faithful, some say they believe in God, but in fact deviate from the path of the true religion. The situation of such individuals is described in these terms in the Qur'an:

Say: "Who provides for you out of heaven and Earth? Who controls hearing and sight? Who brings forth the living from the dead and the dead from the living? Who directs the whole affair?" They will say, "God." Say, "So will you not guard against evil?" That is God, your Lord, the Truth, and what is there after truth except misguidance? So how have you been distracted? (Surah Yunus: 31-32)

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[150] The International Food Information Council Foundation, "Taste Matters," *Food Insight*, July-August 1999; http://ificinfo.health.org/insight/julaug99/tastematters.htm.

[151] *Milliyet Resimli Vücut ve Sağlık Ansiklopedisi İşte İnsan (Milliyet Body and Health Encyclopedia*: *The Human*) Milliyet Publishing, p.13.

[152] A.I. Spielman, J.G. Brand, and W. Yan, "Chemosensory Systems," *Encyclopedia of Life Sciences*, June 2000, http://www.els.net.

[153] Diane Ackerman, *A Natural History of the Senses*, New York: Vintage Books, 1995, p.139.