

The Biology of Visual Aesthetics

Bjørn Grinde

ABSTRACT

We tend to add aesthetic qualities when producing art or other objects. This behavior can be explained by the reward mechanisms of the human brain. The theory I suggest is that certain types of visual stimuli are desired because the brain is constructed to connect them with a reward. When humankind developed the ability to produce artifacts, aesthetic elements were included because they offered positive visual stimulation. According to this assumption, the extra effort of adding aesthetic quality is not necessarily adaptive, but rather an indirect consequence of reward mechanisms that evolved long before we became artists. By understanding the adaptive value of rewards connected with visual stimuli, we may be able to indicate the nature of aesthetic qualities. The theory is discussed, and possible aesthetic elements described.

Introduction

Some 3–4 million years ago, hominoids began to walk in an upright position, thereby freeing their hands for the manipulation of tools. There is no doubt that the ability to use tools was of great importance for the success of humankind. What may be surprising is that at some point, possibly during the Upper Paleolithic period (Coe, 1992), our forebears started to decorate themselves, and add beauty to objects for social effect (e.g., to increase sexual attractiveness). Today, we have gone one step further—we create objects of art with no apparent practical value.

The word aesthetics will be used in this article for features that make something more visually attractive. In order to understand aesthetics, I believe we must distinguish between aesthetic elements and other aspects of art. More specifically, the associations or ideas fostered by a work of art should be distinguished from the more intuitive aesthetic pleasure.

The cross-cultural similarities of aesthetics suggests that the phenomenon is supported by inborn tendencies. One implication of this suggestion is that a biological perspective may be employed. In the analysis of Coe (1992), enhanced attention obtained by the use of color or form confers reproductive advantage. A well decorated person may, for example, find it easier to obtain a sexual partner. Such an advantage, she argues, could be sufficient to explain

Bjørn Grinde, Gunnars vei 8, N-0496 Oslo, Norway; e-mail: bjorn.grinde@login.eunet.no

Journal of Social and Evolutionary Systems 19(1):31-40
ISSN: 1061-7361

Copyright © 1996 by JAI Press, Inc.
All rights of reproduction in any form reserved.

a genetic basis. In her definition of art, an affective response (i.e., aesthetic pleasure) is thus not required.¹

Visual features employed to attract attention, moreover, do not necessarily add beauty. I shall offer an alternative, biologically-based explanation of the behavior connected with aesthetics. My theory includes an explanation of why particular qualities are considered aesthetically pleasing. Central elements of aesthetics will be suggested. In such a theory, a reproductive advantage is not required; but enjoyment is essential. Still, my explanation does not contradict Coe's assumption that decorations may have adaptive value—it rather complements it.

Reward Mechanisms in the Brain

Burning your finger hurts, so you avoid fire. Having an orgasm feels good, so you seek a partner. Basically the brain encourages what is good for survival and the propagation of your genes, while discouraging contrary actions. All vertebrate brains presumably influence behavior by offering rewards and punishments.² Human brains possibly rely more heavily on reward and punishment to direct behavior as we have developed a capacity for “free will,” rendering our behavior more vulnerable to the whims of the individual.

The ability to enjoy beauty is not unique to humans, but we probably have a more pronounced potential for appreciation than other species. We appreciate an orchid or a snail-shell, whereas for these organisms any “appreciation” of other organisms is just a means of survival. On the other hand, it may be correct to describe the response of a peahen to the feathers of the peacock as a reaction that includes some sort of pleasure.

All “rewards” are not as obviously pleasant as an orgasm or the viewing of flowers. The brain has various mechanisms that are used for persuasion. We generally refer to these mechanisms as emotions or urges. Sometimes our feelings have a distinct positive or negative value, in other instances the value is less obvious and depends on the situation. For the present purpose, any emotion that incites us in a positive sense is considered rewarding.

Using your brain or body to do what it is designed for is generally positive, in the sense that it is good for your genes, and therefore connected with rewards. Even sadness may “feel good” when elicited in the proper context. Some Hollywood productions testify to this—people flock to movies that make them cry. But the idea that feelings traditionally considered as negative may have a positive aspect needs some elaboration.

The loss of a spouse may be tragic for the genes, but, as such misfortunes do occasionally occur, the genes have perhaps prepared the brain to cope with such problems. Once your spouse is gone, the genes are best served by implementing a mechanism that helps you master the situation, because this improves your chances of finding a new spouse. I conjecture that the proper response includes grief and sadness as a means of coping. The feelings aroused are thus natural. The positive flavor is added because this is a standard mechanism employed by the brain to urge you to experience particular feelings. The loss of a spouse, of course, is something tragic you want to avoid, but if you can stimulate the accompanying feelings by identifying yourself with a fictitious person on a screen, you may “enjoy” the sadness that comes with the cinematic tragedy.

The point I want to make is that we need to differentiate between the occurrence of something unhealthy, be it loosing a close friend or cutting off your finger, and the psychological reaction the situation evokes. You want to avoid the natural stimuli eliciting these

responses, but the reaction, the sadness or the crying, are natural feelings—and have, in a particular sense, a positive value. The value is positive because the brain is constructed to evoke these feelings as a means of helping you. Similarly, going to the toilet may not be conceived as a favorite source of joy, but your brain does reward you for emptying your bowels, because it is a natural and necessary action.

Another important point to note is that reward-type mechanisms for directing behavior are not necessarily adaptive in the situation we live in at present. The reward of an orgasm feels good regardless of contraceptives (i.e., even when the brain knows the act is not productive). For the genes, this activity is an obvious waste of resources, but our genes did not foresee the invention of contraceptives. Likewise, adding aesthetic value to an object or a work of art is not necessarily adaptive. The point is that the reward mechanisms connected with the processing of certain visual stimuli were *once* adaptive. The key to understanding aesthetics lies in identifying the reward mechanisms so involved. These will be discussed below.

The essential feature of art is thus to evoke feelings perceived as positive. The feelings do not need to be cheerful. We may enjoy a sad painting just as we enjoy a sad movie. The quality of art should be measured more in terms of how efficiently and elegantly the feelings are elicited, rather than the actual nature of those feelings.

Limitations of the Visual System

Our eyes, and our ability to process the signals they generate, produce limits for experiencing visual aesthetics. I shall not attempt to outline the present knowledge of our visual system, but two features will be mentioned, because they are relevant to the following discussion, and because they remind the reader that our ability to see is just another bodily function with its inherent strengths and weaknesses.

The way our brain processes visual input gives the artist an opportunity to create special effects. We presume that the brain has at least three systems for making sense of the signals coming from the eyes (Livingstone, 1988). One is concerned with colors, another distinguishes objects from each other by looking for variations in light intensity suggestive of shadows or contours, and a third is concerned with movement. These systems can be deceived. You may, for example, create a feeling of unrest by adding dots of different colors, but similar light intensities. The color system will recognize the individual dots, but the contour system is not able to distinguish between them as it relies on variations in light intensity. The brain therefore finds it difficult to determine the positions of the dots. The impression created is one of motion.

The ability to recognize light of different wave-lengths as colors is not obvious. For certain nocturnal primates, the world is monochromatic, whereas other primates have dichromatic vision, as distinct from the human trichromatic eyes (Jacobs, 1996). The properties of human color vision reflect the evolutionary functions that guided their development.

The Elements of Aesthetics

Colors

Tomatoes are produced for the purpose of being eaten. The perfect start for the seeds of this plant is to end up in animal or human feces. (The tomato has not adapted to modern sewage systems.)

Many plants offer nourishment to animals in exchange for a favorable start for their seeds. To signal that the fruit is ready to be eaten, a color is usually added to make it conspicuous. The relevant animals have evolved the ability to respond accordingly. They have taste buds linking the nourishing sugar of the fruit with a pleasant taste, and they have a visual system enabling them to spot the ripe vegetable.

Fruits and berries have presumably been an important source of food for humankind. To induce us to find them, we likely developed appropriate brain rewards connected with our visual system. The rewards would stimulate us to look for colorful objects that contrast with the surroundings. Such objects become desirable and pleasing to look at. I believe these rewards constitute one element in the biology of aesthetics.

A reasonable amount of research has been carried out to indicate color preferences in humans (e.g., by letting subjects choose among various colored cards). There seems to be a tendency towards preferring warm colors, such as red or yellow, rather than blue, green, or brown (Woodworth, 1938). Ripe fruit is typically red or yellow. In order to be conspicuous in the green-brown environment of vegetation, red and yellow are the colors of choice. The fact that the earliest pigments found associated with human decoration are red and yellow (Wreschner, 1980) substantiates the color preference.

Brown tends to be less popular. This may be explained by brown being the color of feces and rotten fruit; both of which should be avoided because of possible harmful effects on health. Nuts are typically shades of brown or gray. They are nutritious, but not designed for animal consumption. Their color is partly due to a camouflage strategy, but it may also reflect an attempt to make the nuts less desirable.

Colors that are light and fresh tend to be considered pleasant while darker and more muddy colors, particularly brownish or grayish, tend to be depressing. In addition to the points made above, this may reflect a preference for colors that are easy to distinguish, and a preference for light rather than darkness. Humans are diurnal animals (many primates are nocturnal). Daylight is more useful for our activities than the dimness of evening or early morning. We thrive where there is plenty of light, and tend to become depressed in its absence (e.g., during winter in the far North).

Before leaving the subject of color, I should remind the reader that the artist may want to induce feelings other than joy. As previously indicated, even sadness has a positive connotation. A successful painting may therefore very well be dominated by dark brown.

Curiosity and Attention

Certain animals are specialists. Cows and anteaters, for example, concentrate their attention on a limited range of visual impressions, such as the quality of grass or where to find ants. Humans are quite the opposite. We are specialists in non-specializing. We are stimulus-hungry and have an inclination to gather all sorts of information from our surroundings. Obtaining information is important for survival. It is necessary to observe details in order to find our way in the forest, to notice signs indicating sources of food, to recognize faces, etc. We enjoy the exploration of visual inputs, and we enjoy learning by gathering information, because our curiosity is connected with rewards in the brain.

The term 'boring' is used in aesthetics when there is not sufficient variation or novelty in a work of art. The object lacks sufficient detail, or surprises in color or form, to attract attention. A suburb consisting of a single type of housing, all in rows, is considered depress-

ing. On the other hand, complexity (i.e., richness in detail) stimulates our curiosity and is therefore pleasing. The brain wants you to explore novel visual images.

A too-complex visual input may, however, prove adverse. The mind needs to find clues that can help it organize the details. There should be a unity in the diversity. It is preferable to find patterns or connections that make the visual information comprehensible. The confusion of not understanding the image may be uncomfortable, because strange or unfamiliar objects may imply danger.

In the aesthetic tradition of the Chinese, there is a concept called “The rule of five,” referring to the limitations of the attention span. The mind can without too much effort grasp five objects at a time. If more elements are needed in order to extract information, the effect may be stressing and unpleasant. The picture is complicated rather than complex. As a rule of thumb, the complexity should not move beyond the attention potential of the human brain.

Depth and Movement

A significant characteristic of primates is their binocular vision. This feature is probably connected with the visual requirements for living in trees where moving from branch to branch demands an accurate ability to measure distances.

In order to take full advantage of the various potentials of the brain, we need practice. Children are encouraged to practice by participating in play activities. The purpose of play is to learn tasks that the brain has a rudimentary potential for performing. The brain rewards us for developing our potentials. This applies to grown-ups as well—we just refer to learning behavior by other names. Our ability to measure depth and calculate movements requires practice. We may therefore be rewarded for processing visual input relevant to this task.

A typical criticism of amateur paintings is that they appear flat. We appreciate a painter who manages to create the perception of depth in his or her picture. We are also fascinated by illusions of depth such as in holography.

Sculptures occasionally include actual movement, but this is not practical in a two-dimensional picture. However, as mentioned above, it is possible to lure the brain into perceiving motion by adding dots of different color, but the same light intensity. Furthermore, a picture may contain lines that the eyes are induced to follow. In a culture where people are trained to start looking on the left side of a page, stripes tilting to the right are perceived as going down, and may feel depressing, whereas lines running the opposite diagonal may feel elevating.

The creation of depth and movement are examples of effects the artist may utilize. If carried out successfully, they add quality to a picture in the sense that it obtains a capacity to induce agreeable feelings in the viewer.

Balance and Symmetry

One of the few rules of aesthetics that has won a certain acceptance is the principle stating that the main motif in a picture should divide the sheet in a ratio of approximately 3:5. What the principle suggests is that placing an object in the middle of the sheet is boring, while placing it too far to one side produces a too unbalanced appearance. The ratio of 3:5 is supposedly the optimal compromise between these two undesirables. The disagreeable effect of the unbalanced picture is possibly connected with our fear of falling. Falling is not a common problem for an animal stationed on the ground, but our ancestors did at one point live in

trees. Furthermore, even ground-dwelling animals would be conscious of the possibility that an unbalanced rock may roll, either causing them to fall, or hitting them from above. A dominant object on one side of a picture gives the unpleasant impression that this side is tilting unless a balance is added on the opposite side.

On the other hand, again, a completely balanced picture may be boring. Yet in some cases an exact balance may add particular value. Not just humans, but many other animals as well, seem to appreciate symmetry (Møller, 1992; Concar, 1995). Perfect symmetry is apparently a sign of excellent gene quality, which is to be desired. There are also indications suggesting that our visual system reacts favorably to symmetrical input (Johnstone, 1994). The positive value of symmetry in connection with aesthetics is most obvious in architecture. Many buildings considered to be great works of art have symmetrical features.

Functionality

The idea that the functional is also visually attractive was particularly influential on architecture in the thirties. A central doctrine then was that form follows function.

A related idea is that art should try to perfect nature. Baumgarten, who first coined the term aesthetics in his treatise *Reflections on Poetry*, printed in 1735, describes beauty as a “comprehensible representation of the perfect.”

There are obvious reasons why looking for functionality and perfection should be connected with a reward. Consuming sick animals or rotten fruit may be dangerous, whereas eating the best specimens keeps you healthy. It is also important to learn to recognize the functional qualities of tools. Receiving a pleasant sensation when viewing the right objects helps the individual to distinguish good from bad, and stimulates us to try to obtain the best items.

A school of aesthetics related to perfectionism is the organistic theory of art (Osborne, 1970). In this philosophy, all the details of a work of art are closely related and must be viewed together as a whole. It is important that all aspects of the object are consistent and wholesome. The concern is not so much the perfection of functionality, but the perfection of the work of art as performed by the artist.³ Both functionalism and the organistic theory may reflect the same aesthetic element (i.e., we are rewarded by the brain for viewing objects that appear to be perfect). The point is exemplified by how a single fault in an otherwise great work of art, either due to the artist's lack of concentration, or later damage such a rift in the canvas, tends to lower the value of the art drastically.

The way we judge human appearance may be used to illustrate the point further. Experiments in which people are asked to choose among a large number of pictures indicate that the visually most attractive persons are those with average features (Allman, 1995, p. 116). We prefer a spouse perceived to be healthy. Regularity implies health, whereas oddities may be signs of bad genes. Yet, special features, such as a particular mouth or bigger than average eyes, may add value because they catch attention. But yet again, interesting features that cast doubt on genetic quality are not likely to be preferred.

Discussion

Aesthetics as Rewards

I postulate that our inclination to add aesthetic qualities to art or other objects is a consequence of how our brains influence behavior. The word reward has been chosen for the

various persuasive mechanisms of the brain. We should again note that emotions such as sadness, which are traditionally seen as undesirable and negative, may nonetheless imply a reward in the above sense.

Reward mechanisms are based on genetic instructions. The genes give us the potential for a positive sensation when we focus our attention on objects with certain visual qualities. What the artist does is to accentuate these qualities.

The above list of elements is not necessarily exhaustive. My main intention has been to indicate a way of understanding aesthetics. The list includes what I believe to be the more important factors. Based on the argument that it is positive to let the brain be occupied with natural emotions, we may well reason that the induction of any feeling is worthwhile. Certain feelings, however, such as those connected with looking at pleasant colors and the triggering of curiosity, may be more valuable than others.

Our visual system, including accompanying reward mechanisms, was developed for viewing nature, not artificial objects. The attributes of this system, as well as the characteristics of nature, may guide us when utilizing aesthetic elements. For example, we value complexity because it stimulates our curiosity, but if the scene becomes too complicated and lacks coherence, the result may be disapproved. Knowledge of the biology of vision may help us balance between order and confusion, or amazement and disquietude. The concept of harmony presumably reflects a proper balance.

There are numerous ways of using aesthetics to elicit sensations and thus rewards. For the sake of curiosity or excitement, any rule may be broken. People pay to ride a roller coaster, or they may enjoy the thrill of an extremely unbalanced picture. The purpose of the present article is to help develop an awareness of aesthetics that may be useful both artists and their audiences. The theory presented obviously does not restrict the artist to narrow rules.

The taste and choices of the average person are probably influenced more by nurture than nature, and the survival-associative content of the art is probably more important than the purely aesthetic ingredients. The present essay thus only considers a minor aspect of the enjoyment of art. What is covered is the inborn tendency to enjoy aesthetic qualities of visual inputs. The average person in the average culture is expected to appreciate these qualities, even though each individual has his or her particular preferences.

The rewards offered by the brain may be considered to be a main currency for the quality of life. Indulgence in art (as most other diversions) is an ability that needs to be cultured in order to obtain maximal rewards. It therefore makes sense to encourage our capacity for aesthetic enjoyment. Rewards are obtained either by producing art, viewing the work of others, or utilizing natural stimuli. Exactly what you find attractive is less important than learning to enjoy whatever sights that elicit rewards.

Art as Hedonism or Communication

The above understanding of aesthetics is related to a dominant philosophy of art sometimes referred to as the hedonist school. Its central idea is that aesthetics is about creating images that induce pleasure.⁴

My model adds substance to this theory. I agree with the central idea, except that I presumably use the word pleasure in a broader sense. The present model should thus help resolve a paradox of the hedonist school—to wit, why so many of the great works of art reflect sadness and tragedy. As explained above, the feeling of sadness is not necessarily neg-

ative. Furthermore, I propose an explanation for why visual stimulation may be associated with pleasure.

Coe (1992) offered an interesting alternative view of art. In her definition, aesthetics is a means to create attention to an object or a person. I would agree that a central purpose of art and decoration is to communicate, which involves obtaining attention. However, both attention and communication may be achieved without adding beauty. A traffic sign is perfectly designed for attracting attention, yet few would treasure it as a work of art. Paintings, on the contrary, are sometimes very subtle and quiet. Although attention may have much to do with why people spend time and resources on decoration, I still believe that aesthetic elements are included because they fit the reward mechanisms of our brains. Furthermore, much of the art produced, such as that of children or amateurs, is apparently made solely for the satisfaction of the creator, and not for obtaining attention.

Although I consider appreciation to be a central component of art, all pleasant visions are not art. Natural beauty may be equally enjoyable, and visions only meant to create associations do not require aesthetic qualities to be appreciated. No artistry is needed to make a picture of a nude women that delights a man. In my definition, aesthetic qualities are present when a production involves the use of elements such as those outlined above in order to create rewards.

I conjecture that the greatest art is produced when aesthetic elements are used to enhance the survival-associative content. The aesthetic rewards are then added to associative rewards, creating a particularly strong impression. There is a parallel to this combination of rewards in how dancing enhances the experience of music.

The Evolution of Art

Likely the reward mechanisms suggested above are present in other mammals as well. It seems reasonable, however, to assume that they are stronger in humans. Besides, art depends not only on the ability to appreciate visual inputs, but also on the ability to create them. Animals usually lack the opportunity to do this.

It is possible, however, to demonstrate that animals can enjoy art. Morris (1994) describes the chimpanzee Congo who became so fond of painting pictures that he earned the nickname Picasso. Although Congo never managed to create figurative pictures, he did show an appreciation for color, and he did prefer a balanced composition. Interestingly, his favorite color was red.

Even if the basic abilities for enjoyment go far back in the evolution of mammals, it seems fair to assume that art has only been produced recently. In the archaeological records, indications of art or decoration are not obvious until the Upper Paleolithic period (Coe, 1992). From this period we find evidence that humans tried to improve appearance by using decorative pigments and mutilating their bodies (Halverson, 1987; Mellars, 1989; Romero, 1970). As indicated above, Coe suggests that the first art was a question of decorating oneself, and that the increased attention obtained resulted in improved reproductive success (e.g., by increasing the chance of obtaining a partner) thus in turn selecting for those artistically inclined. This may be true. Coe's assumption, however, does not negate my suggestion that humans started also to give the decorations an aesthetic appeal because of reward patterns in the brain.

The first tools were presumably produced with regard for nothing but function, but at some point humans could not resist making the objects more desirable by adding aesthetic elements.

Aesthetic factors may of course themselves be used to obtain attention and to influence others. The potential is perhaps best illustrated by the substantial amount of art connected with religion, although most aspects of human life can be enhanced by art. You decorate a temple to make people feel more strongly about god, a palace to induce reverence, a dance hall to elevate the atmosphere, or you make paintings that stimulate revolutionary ideas. The question of where most works of art are produced is mainly a matter of who had the time and resources. In Western history, the answer is the nobility and the church. Religion and art have, without doubt, been a particularly successful combination.

It may be adaptive for individuals to decorate themselves in order to attract lovers, for the tribe to have a powerful religion, or to have the position of a leader improved by decorating his or her throne. Art thus may be adaptive in several ways. Yet, I would contend that the genetic contribution to aesthetic behavior is mainly indirect—I see aesthetics as primarily a secondary consequence of the reward mechanisms. Although more direct inborn tendencies may play a part, they are not required to explain the phenomenon.

Notes

1. Coe (1992, p. 219) defines art as: “Color and/or form used by humans in order to modify an object, body, or message solely to attract attention to that object, body, or message. The proximate or immediate effect of art is to make objects more noticeable.”
2. This statement is substantiated by experiments in which animals are given the chance to self-administer either electrical pulses to pleasure centers in the brain, or euphoric psychoactive substances (Wise, 1989; Gardner & Lowinson, 1991; Koob, 1992).
3. The presentation of the organistic theory of art does not pretend to offer a comprehensive description of this philosophy. The perfection of the organic whole is only one aspect of the theory.
4. Santayana (1896) may be regarded as the founder of the hedonist school. More recent discussions of art as a pleasure inducing entity are to be found in Munro (1970) and Dissanayake (1989).

References

- Allman, W. F. (1995). *The stone age present*. New York: Touchstone.
- Coe, K. (1992). Art: The replicable unit—An inquiry into the possible origin of art as a social behavior. *Journal of Social and Evolutionary Systems*, 15, 217–234.
- Concar, D. (1995, April 22). Sex and the symmetrical body. *New Scientist*, 146, 40–44.
- Dissanayake, E. (1989). *What is art for?* Seattle, WA: University of Washington Press.
- Gardner, E. L., & Lowinson, J. H. (1991). Marijuana's interaction with brain reward systems: Update 1991. *Pharmacology Biochemistry and Behavior*, 40, 571–580.
- Halverson, J. (1987). Art for art's sake in the paleolithic. *Current Anthropology*, 28, 63–87.
- Jacobs, G. H. (1996). Primate photopigments and primate color vision. *Proceedings of the National Academy of Sciences USA*, 93, 577–581.
- Johnstone, R. A. (1994). Female preferences for symmetrical males as a by-product of selection for mate recognition. *Nature*, 372, 172–175.
- Koob, G. F. (1992). Drugs of abuse: Anatomy, pharmacology and function of reward pathways. *Trends in Pharmacological Science*, 13, 177–184.
- Livingstone, M. S. (1988, January). Art, illusion and the visual system. *Scientific American*, 258, 68–75.

- Mellars, P. (1989). Major issues in the emergence of modern humans. *Current Anthropology*, 30, 349–385.
- Morris, D. (1994). *The Human Animal*. New York: Random House.
- Munro, T. (1970). *Form and style in the arts*. Cleveland, OH: The Press of Case Western Reserve University.
- Møller, A. P. (1992). Female swallow preference for symmetrical male sexual ornaments. *Nature*, 357, 238–240.
- Osborne, H. (1970). *Aesthetics and Art Theory*. New York: Dutton.
- Romero, J. (1970). Dental mutilations, trephening, and cranial deformation. In Wauchoppe, J. (Ed.) *Handbook of Middle American Indians*. Austin, TX: University of Texas Press.
- Santayana, G. (1896/1955). *The sense of beauty*. New York: Modern Library.
- Wise, R. A. (1989). Opiate reward: Sites and substrates. *Neuroscience and Biobehavioral Reviews*, 13, 129–133.
- Woodworth, R. S. (1938). *Experimental Psychology*. New York: Holt.
- Wreschner, E. (1980). Red ochre and human evolution: A case for discussion. *Current Anthropology*, 21, 631–644.

About the Author

Bjørn Grinde has a Dr. scient. and a Dr. philos. in biology from the University of Oslo, and is currently employed as a senior scientist at the National Institute of Public Health in Norway, and as a professor at the University of Bergen. He has recently published a book entitled *Genene—din indre guru (The Genes—Your Inner Guru)*, Grøndahl & Dreyer, Oslo. The book is about how knowledge of human behavioral biology may enhance the quality of life.