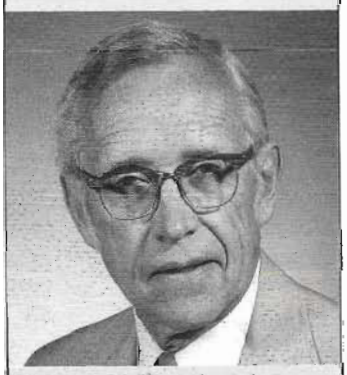
SEARCH

Scientists Who Serve God

HE TRACKS INHERITED DISEASES



V. Elving Anderson (the V. is for Victor) was born in 1921 in Stromsburg, Nebraska. Sixty years later, at its annual Swedish festival, his hometown honored him for his achievements. Anderson is a "genetic detective" who tracks down clues to mental retardation and epilepsy. Part of his job in the Department of Genetics and Cell Biology at the University of Minnesota is to counsel couples worried about passing on defective genes to their children.

Helping to prepare bodies for burial in his father's small-town funeral parlor probably sparked Anderson's interest in human biology. As a boy, though, he wasn't at all sure what direction his life would take. He had many interests.

A Different Kind of Mission

In an evangelistic service young Elving gave his heart to Christ and asked God for guidance. His family were Swedish Baptists of the Baptist General Conference, so at eighteen he went off to that denomination's college in St. Paul, Minnesota. After receiving an A.A. degree at Bethel, which was then only a two-year college, he entered Bethel Seminary to prepare to become a missionary.

As a college sophomore, Elving had been appointed to assist in Bethel's zoology course. In seminary he continued that teaching, which became a major interest. He also developed a new interest, a home economics student named Carol, whom he married in 1946. He left seminary after two years to take up a scientific career. Yet his early commitment to Christ, plus his seminary studies, have given him a lifelong interest in relating science and Christian faith, both in theory and in practice.

Toward a Research Career

After completing his B.A. at the U. of Minnesota, Anderson again taught at Bethel while he went on for an M.S. It kept him busy, but he "learned a lot of biology from teaching it." His genetic research at Minnesota on human predisposition to breast cancer earned him a Ph.D. in zoology. As Bethel grew into a four-year college, Dr. Anderson chaired its Dept. of Biology, became acting dean and later dean of students. In 1960 he left to take part in a large-scale Perinatal Research Study at the National Institutes of Health, investigating the inheritance of disease in over 50,000 pregnancies.

When Elving and Carol returned from Washington, D.C., to St. Paul, he became a full-time faculty member at the U. of Minnesota, associated with what was then the Dight Institute for Human Genetics. When the professor under whom he had received his Ph.D. retired as head of the Institute, Anderson became its acting director. He continues at the renamed Dight Laboratories and as a professor at the university.

Looking back at his experience of studying and teaching at a Christian liberal arts college, Professor Anderson says, "I can see how God was leading me step by step into human genetics research." In the clinical terminology that finds its way into his everyday speech, he speaks of the "gradual onset" of his research career the way he might refer to one of the diseases he is tracking. Being a scientist seemed to come so naturally to him, it was almost as though he had inherited a capacity for it.

Heredity affects us all. And because some people inherit life-threatening diseases, Elving Anderson "keeps on tracking."

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Scientific Investigation

GOOD GENES AND BAD GENES

When Elving Anderson entered the field of human genetics nearly four decades ago, there was a sense of fatalism. If some physical or mental problem were genetic, what could be done about it? Today, he says, with all the talk of "genetic engineering," there is fear that we might be able to do *too much.*

It's true that the scientific picture keeps changing. Our new understanding of the chemistry of the genetic material (DNA) has begun to affect human studies. The first scientists to go into human genetics were trained by working on fruit flies or mice. Now the field includes studies on human populations, families, chromosomes, and even human DNA itself. A multibillion-dollar long-term project to "map the human genome" is underway.

Putting a Gene in its Place

In a sense, Professor Anderson has been sketching in a small area of that huge map. His work on mental retardation and psychotic disorders turned his attention to behavioral genetics. Seeing that the brain would become an important research frontier, he helped form the Behavior Genetics Association. Since about 1975 he has been studying the role of genetics and environment in recurrent seizures (commonly known as epilepsies). It soon became clear that genetic factors are more important in some kinds of epilepsy than in others. Almost 2 percent of the general population have some form of epilepsy by age 40.

With the help of several physicians and a research lab in Salt Lake City, Anderson studied a rare type of very early seizure, called benign familial neonatal convulsions (BFNC). The frequent convulsions begin in babies only three days old and end spontaneously by three to six months. They can cause great concern to parents and even to family physicians who may not know about the natural course of the inherited condition. Only about 10 percent of BFNC patients have seizures later in life.

Recently, Anderson and his colleagues pinned the gene responsible for the condition down to a particular region on chromosome 20 (humans have 23 numbered chromosome pairs). This successful example of gene mapping, though not yet at the level of the actual DNA structure, is a first step in finding out what the mutant gene does to cause the convulsions. The same group is now trying to map other, less benign, epileptic disorders.

Tracking a Mean Gene Through a Family

Part of Anderson's contribution is to study all the members of an affected family he can find to determine precisely how a mutant gene has been passed from one generation to another, and what other genetic traits have consistently accompanied it.

Soon, Anderson predicts, we can expect to learn much more about how certain genes guide brain development. Then we should be able to diagnose many behavioral and psychiatric problems more accurately and treat them more adequately—and perhaps more humanely.

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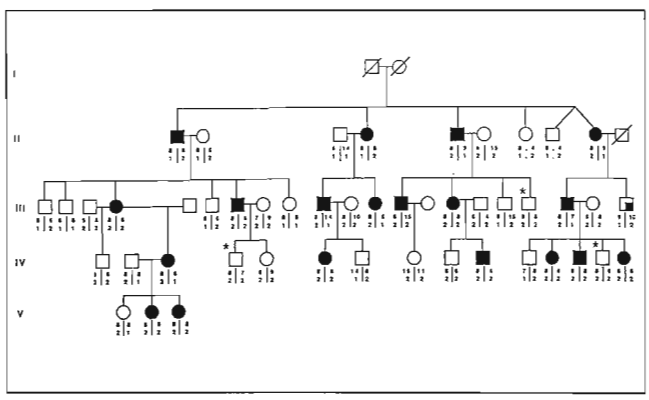


Figure 1:

"Pedigree" of a 5-generation family through which the BFNC gene has been tracked. Dark circles (females) and squares (males) represent individuals who had BFNC symptoms. Arabic numberals designate genetic markers used to locate the BFNC gene. Asterisks designate 3 family members who had the gene but for some reason did not have seizures.

"THE DIGHT"

The Dight Institute, established at the U. of Minnesota in 1941, was one of the first centers for human genetics in the U.S. (the other was at the U. of Michigan). Initial funding came from a bequest from Dr. Charles F. Dight, a Minneapolis physician, alderman, and activist for social causes.

Dr. Sheldon C. Reed (Elving Anderson's "chief" at Minnesota) first directed "the Dight." Reed coined the phrase *genetic counseling* and wrote one of the first books on that new area of human service. Such counseling provides information to individuals and families to help them make reproductive plans. Anderson sees it as "descriptive" (explaining as quantitatively as possible the probability of passing on defective genes) rather than "prescriptive" (advising clients about whether or not they should take that risk).

Genetic research at Minnesota is carried out in several university departments, but research at the Dight has focused on genetic factors in such problems as mental retardation, psychotic disorders, and epilepsy. Today a genetic counselor generally has more to go on than a family history of such problems. Chromosomal or biochemical tests may provide additional information for clients who come to the clinic for counseling.

Indeed, as "molecular genetics" has developed, emphasis at the Dight has shifted somewhat. Some years ago its name was changed to the Dight Laboratories, but counseling continues to be one of its functions.

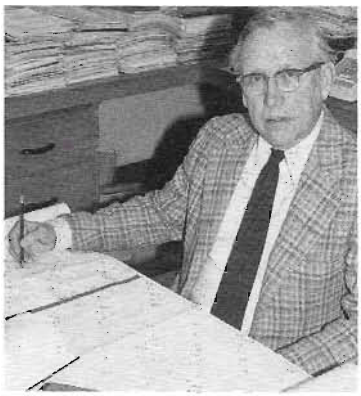
Theological Reflection

MADE IN GOD'S IMAGE

Today a lot of people worry about genetic research and especially about genetic manipulation. When Elving Anderson entered human genetic research there were few ethical or theological implications, but now there are many.

As a Christian, Anderson sees two kinds of problems: (a) In the excitement of new discoveries, some people may get carried away by the promise of research and disregard personal and social concerns. (b) In response, others may be tempted to reject the entire line of work, not making the careful distinctions that seem reasonable and necessary.

Potentials, Problems, and Priorities



In a 1987 *Eternity* article, Anderson pointed to potentials for genetic manipulation beyond simply a better understanding of how genes work: improved diagnosis of inherited diseases (such as Huntington's chorea); inexpensive production of precious natural compounds (like human insulin); improved treatment of some illnesses (perhaps by "gene therapy"); and creation of useful new species (such as disease-resistant crops requiring no pesticides).

Major problems to be faced include guaranteeing the safety of engineered organisms; preventing unrealistic expectations (of having only perfect babies, for example); deciding between the public good and private gain (as in questions about patenting new species); avoiding both secrecy and over-regulation in research; and preserving a Christian view of what it means to be human.

He set two priorities for ethical decision-making: environmental release of genetically altered organisms and human gene therapy. That was back in 1987. Since then, several experimental organisms containing recombinant-DNA have been deliberately released. In May 1989, physicians at the National Institutes of Health infused a terminal cancer patient with some of the patient's own white blood cells containing a foreign gene. It was not quite gene *therapy*, but it was a step in that direction. Actually it was a tracking effort, hoping to use the inserted gene to mark the lymphocytes acting against the melanoma cells.

Biblical Guidance for Genetic Experimentation?

Although genes and DNA were unknown to the biblical writers, God's "creation mandate" to Adam and Eve included a basis for science (studying, naming, classifying) and technology (subduing). Genesis makes it clear that such efforts are to be carried out in a spirit of stewardship, of being accountable to the Creator.

Elving Anderson concludes that we should use the new powers given to us by the science of human genetics, without misusing them. We should be realistic about new technologies, expecting them neither to solve all human problems nor to cause inevitable disaster. And we should always remember that God is the ultimate source of all knowledge and power.

Beyond resisting such "technological temptations," though, we must also *show love* by using our scientific knowledge to do good whenever we can. We must *maintain hope*, not in an autonomous science or technology but in Christ's conquest over all that is deadly, including our modern pretensions. We must *exercise faith* as science takes us into unexplored territory.

"Like Abram, who left Ur not knowing where he was to go," says Anderson, "we also face the unknown, but we can go on with confidence, trusting in God."

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PLAYING GOD?

"Playing God" is a phrase Elving Anderson doesn't like. When applied to genetic research, it is often misleading, he says. In a paper for a 1988 conference on The Health Sciences and the *Imago Dei* (Image of God), he wrote about the prospects of using genetic knowledge not just to cure disease but to produce better individuals:

"But are we playing God when we attempt to improve persons beyond any given norm? It is the Promethean myth, not the Bible, which describes a god who jealously guards the secrets of the universe from human discovery. The actions we fear are not to be described as playing God, but as mis-playing humans. A more reasonable approach is to insist that all of our endeavors be carried out in the spirit of being answerable to God. The Creator bestows the power of creation (in an analogical sense) on humans, to be used morally."

"All of this," he continued, "must be tempered with the humility that there are limits to the changes genetics can bring. The experience of conversion can produce profound changes in behavior without altering the genes. We cannot bring about the fruits of the Spirit or treat sinfulness by genetic engineering, for humanity is not fully defined or described in terms of DNA. An individual with an excellent genetic endowment would still be subject to arrogant pride and irresponsible behavior toward God and others."

Elving Anderson makes a good role model for other Christians seeking to integrate faith and work. Many Christians in science have come in close contact with him through the American Scientific Affiliation (ASA). Elving is a past president and has spoken at many ASA meetings and special conferences.

Finding Ways to Serve

Committed to serving God through his profession, Elving has been described as "gentle but decisive." His character and personal warmth "demonstrate who is Lord in his life." That was as true of his 1981 presidency of Sigma Xi, the scientific research society of America, as of his two terms on the board of Bethel College and Seminary. In Sigma Xi he encouraged scientists concerned about the impact of science on society and the need to improve public understanding of science to venture beyond their own narrow disciplines. Anderson feels privileged to serve on the board of the Institute for Advanced Christian Studies (IFACS). He enjoys the stimulus and fellowship of participation in a number of professional organizations, but is particularly in harmony with the goals of IFACS. It seeks to support research and publication in areas strategic both for a particular scholarly discipline and for the Christian faith.

Working as Part of a Team

"I don't work effectively by myself," he acknowledges. "Most of my research has been collaborative, cutting across the usual boundaries between scientific disciplines." Some problems have to be tackled by a team, of course, but to Anderson, it's also more fun to work that way. He thinks that Christians who work together at pursuing an understanding of God's created universe do a better job of it—and can enjoy knowing the Creator and each other in the process.

Elving and Carol Anderson have always thought of themselves as a team, both in raising their four children and in their Christian witness. Once the children were grown, Carol was able to accompany Elving on more of his professional travels. After over forty years together, they're very good companions.

Elving Anderson believes that Christians are called to "team up" with Jesus Christ, in scientific work as in any other calling. Jesus offers guidance and assurance in thinking through the daily decisions each of us must make. And Jesus is a mighty good companion to have along the way.

> Share each other's troubles and problems, and so obey our Lord's command. If we think we're too important to stoop to this, we're fooling ourselves; we don't amount to much. Let all of us be sure that we're doing our very best, for then we'll have the personal satisfaction of work well done, and won't need to compare ourselves with someone else. All of us must bear some faults and burdens of our own. For none of us is perfect!
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> *Galatians 6:2–5*
> **TLB** (paraphrased)

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Thoughtful Worship

PUTTING SCIENCE AND FAITH TOGETHER

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