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Writers Workshop

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CONTENTS

3  Louis T. Milic: From the Editor

4  Robert J. White: The Artificial Extension of Life and a New Definition of Death
    Neurosurgeon reveals difficulty in drawing the line between life and death.

8  Edward T. Bartlett III: Brain Death—A Philosopher’s Perspective
    A commentary on Dr. White’s article from an ethical viewpoint.

11 Keith M. Kendig: Mathematics, Truth and Beauty
    A great mathematician will often choose beauty over correctness.

27 Elizabeth Kirk: Severance Hall, Cleveland’s Temple of Music
    The Cleveland Orchestra’s sumptuous home began as John Severance’s
    memorial for his wife.

47 Joel S. Hauserman: A sequence of photographs, “The Lost Dance”

56 Susan and Buzz Gorsky: Ni’ihau: The Island Time Forgot
    Tropical breezes, palm trees, no phones, no cars, no government—and no
    visitors allowed.

65 Six Poets: A Sampler
66  Roy Bentley: “The One Life We Have”
68  Jeanne Norris: “When Old Tillie Moved”
       “Secrets”
69  Jeff Gundy: “Chainsaw Inquiries”
       “Grease in the Fingernails”

71 Alois Zimmerman: “While Contemplating a Slice of Wonder”
       “Reprieve”

73 Paul Bennett: “The Conference on War and Peace”

75 Lyn Lifshin: “Bad Middle of the Night Blues”
       “Hearing About It”
       “Other Valentine’s Day in the Apartment on Main Street”

77 James M. Schueger: Personality Questionnaires for Hiring Decisions
    Why your future employer wants to know if you would rather live in the city
    or the country, and if you had an imaginary playmate as a child.

84 Hester Lewellen: Feeding the Poor in Cleveland
    How churches are trying to take up the slack from federal budget cuts.

BACK MATTER

94  Michael Samerdyke: Fiction, “Spellbound at the New Mayfield”
    Dwight Brown: Letter

Errata
Cover: Photographer Joel Hauserman uses techniques of combining ambient light with strobe light to explore the movement of dance in his series "The Lost Dance" (pp. 47-55).
From the Editor

"Always different." "Predictably surprising." The Gamut might adopt these as its slogans. At any rate, they express, we believe, our accomplishments over the past six years and our aims for the future. That ours is an unusual goal we are aware. Many periodicals offer the latest news or specialized details about some minute slice of life's variety. Very few have refused to set limits to their interests. In this issue, once again, we present the results of our quadriennial search for the lively and the informative, wherever it may be found. Elizabeth Kirk describes the social and aesthetic forces that created the Cleveland Orchestra's Severance Hall during the Great Depression, and Hester Lewellen's involvement with two Hunger Centers provides insight into a question often swathed in hypocrisy or sentimentality. Further out geographically, some former Clevelanders report on the fortress of obsolescence called Ni'ihau, a privately-owned Hawaiian island. What does a great mathematician look for in a theory? According to Keith Kendig, it is beauty (or perhaps symmetry); and he explains why. This issue begins with a well-known surgeon's analysis of a spiny ethical problem—determining when death occurs—followed by a critique from a philosopher who specializes in such questions. Then there is a piece on those nosy personality tests that prospective employers subject job applicants to; a portfolio of unusual photographs of dancers; and an elegy, in the form of a short story, of a local art movie theater recently pronounced defunct. Of course, to paraphrase a well-known literary figure, the poets we have always with us—and a good thing, because they tell us about ourselves what we cannot or will not see. So there is a sampler of poets of the region along with something about each of them that reveals why he or she does this bizarre thing, writing unsalable bunches of words called poems.

For next year, we have plans for two thematic issues: the Future—oracular word!—in the Fall issue (#19), with the results of our "What If?" contest and articles on other topics relevant to the cloudy tense that follows the present in the Latin paradigm. The Winter issue (#20) will be partly devoted to the Great Lakes, those vast reservoirs that excite the cupidity of desert Southwest real estate developers. Our use of special sections is not a move away from our policy of miscellaneity, but the fortunate concurrence of topics on our collective editorial desks and in our minds. What will be different next year—beginning with our Future issue, of course—is a modest change in our appearance, perhaps not perceptible to our readers without this notice. Instead of three different colors (red, blue, green) to accord with our seasonal rhythm (fall, winter, spring/summer), we shall have a different color for each year. To improve readability, our page will be single-columned with a wider margin in which you will find illustrations, glosses, and other visual distractions to relieve the eye of the tedium of looking at solid type. Beyond these, there will be other minor changes to make us graphically more attractive and possibly more "modern," though we don't mind being called old-fashioned, or even stodgy, if those terms indicate the qualities—nowadays all too rare—of literate prose and substantial content. We hope you will like our new look, especially since our editorial policy has not changed. And, I forgot to mention, you will get a sample of the editorial voice in a brief preliminary comment in each issue. You are welcome to reply, condemn, applaud, comment, or respond in any way you like (for example, by renewing your subscription and giving gift subscriptions to the people you particularly wish to delight and instruct).
Robert J. White

The Artificial Extension of Life and a New Definition of Death

The rather dramatic title of this article presents at least two divergent concepts which we must examine carefully if we are to establish the relationship between them. To understand what the "artificial extension of life" means, it is necessary to define life. And to understand the implications of the medical procedures that act to extend life, a new definition of death is also necessary. The moral and scientific justifications for extending life or defining some forms of life as death require that we make distinctions beyond the common meaning of these terms.

In recent years, medical science has developed sophisticated instrumentation and pharmacology, which make possible a prolongation of life well beyond what was imaginable just a few decades ago. For several decades, the use of such terms as extraordinary or artificial to characterize means of treatment was central in Christian moral theology in defining the level of medical intervention that was ethically required in the management of the terminally ill. In other words, what was considered to be extraordinary therapeutic intervention yesterday may be considered today only a routine means of medical treatment. Thus, these significant terms, endowed with almost mythical and religious "power," have lost a great deal of their appeal in modern-day bioethics.

While the term "artificial" implies something other than the organic (for example, having a mechanical, instrumental, or even pharmaceutical nature), modern-day biotechnology can literally and successfully replace, temporarily, many of the individual organs of the human body with mechanical systems, such as the artificial kidney, heart, lung, and liver. Thus, whereas formerly a person with documented organ failure (e.g., kidney or heart failure) was destined to die, it is now eminently possible that, in our country, the diseased organ or organs can be "rested" while laboratory-designed equipment in the form of artificial organs can assume the biochemical and physiological responsibilities of the impaired body organ and life can continue, often in an amazingly normal fashion. Certainly, with the availability of such technologically advanced devices as the artificial kidney and, most recently and spectacularly, the artificial heart, human life can be extended for considerable periods of time (even for years) through biotechnological intervention.

In a more conventional sense, one sees the everyday "prolongation of life" in hospital intensive-care units or even in a common chronic nursing facility, where patients who are terminally ill, often aged, and not infrequently in coma, are maintained with a mod-

Robert J. White, M.D., received his medical education from Harvard University from which he was graduated with honors in 1953. He earned a Ph.D. at the University of Minnesota and did his internship and residency at the Peter Bent Brigham and Children's Hospital and the Mayo Clinic. Dr. White's interest in medical ethics comes as a natural outgrowth of his work in neurosurgery, particularly his research on the brain. The first scientist to isolate the brain of an experimental animal (a rhesus monkey), he has developed advanced techniques for the treatment of spinal cord injury and the protection of the brain during surgery. Currently Director of Neurosurgery and of the Brain Research Laboratory at Cleveland Metropolitan Hospital, he also teaches at the Case Western Reserve University Medical School. He has published extensively on the subject of medical ethics, and was recently instrumental in organizing the Advisory Committee for Biotechnology Applied to Man, which advises the Pope on bioethics. Dr. White is married to the former Patricia Murray, and they have ten children.
icium of instrumentation or pharmacological application. An outstanding example of such a person would be the late Karen Ann Quinlan, a young woman who was maintained for a ten-year period without regaining consciousness, by means of ordinary nursing care that provided only exogenous food, fluid, and routine drugs; her demise finally came when her family and physicians collectively decided against treating a medical complication that had developed.

**Defining Human Death**

Modern medical teaching is rapidly advancing the concept that the uniqueness of human existence, as we know it, is inseparable from the unique tissue structure and function of the human brain, and that within this cellular substrate the human mind and, very possibly, the human soul or spirit reside. Since the seminal publication of the Harvard Committee on Irreversible Coma, in 1968, American medical science has recommended that human death be considered the total and irreversible loss of brain function. In many states, this single-organ definition of death has been codified in law. As a consequence, is it not conceivable that human life and human existence as we know it is appropriately and intimately associated with this unique organ? Staggering as this concept may appear on first acquaintance, it logically follows from the new scientific definition of death.

**Individual Organ Replacement**

Already, the advances of medical science strongly suggest that in the near future all of the organ systems other than the brain will be replaceable by compatible biological tissue or artificially-designed mechanical systems. Thus, it would appear that the only organ system that is incapable of replication or replacement is the human brain. Nevertheless, for several decades now, it has been known that the subhuman primate brain could be surgically separated from the body and viably supported exclusively by miniaturized extracorporeal equipment. There is also experimental evidence that the subhuman brain can be successfully transplanted, either with the intact cephalon (the entire head) or separately. In such cases, it must be mated to a somatic system or organs that are compatible to ensure its survival.

Equally significant are the successes with the human artificial heart implants, which already indicate that the brain can be supported for considerable periods of time, even at a human level, when its circulation is totally furnished by an external circulatory system. Even human brain transplantation is not beyond the realm of scientific possibility. Unfortunately, however, there seems to be little evidence, at present, that central nervous system regeneration is possible, and this would be required to gain functional and performance relationships between transplanted and residual nervous tissue. Nevertheless, an individual who has suffered a spinal fracture and has no motor or sensory function below the neck, is for all practical purposes representative of a human cephalic brain transplantation. In each case, the brain would have no control over the body, nor would there be any sensory information provided to the brain from below the point of injury or transection; yet, neuroscientific investigation has demonstrated that, through cranial nerve input (visual, auditory, olfactory, etc.), the human brain, under these limited circumstances, would not only be fully capable of receiving and perceiving a rich array of environmental information through these normal sensory systems, but would also be capable of expressing itself through presently available electronic technology.

Thus, when one speaks of the "artificial extension of life," it seems that one must speak of the artificial prolongation of brain life, for, as already mentioned, the various organ systems of the human body can be replaced individually or in toto.

**Brain Death**

If we now turn to a "new definition of death," we once again find ourselves dealing with the human brain.

Since the original Harvard criteria, which discussed the concept of brain death under the rubric of "irreversible coma," Western society, and indeed Western medical science, has grown more and more accustomed, scientifically, socially, legally, and theologically, to defining death in relation to the functioning of the human brain. It is, of course, literally impossible to determine the "exact moment of death," unless one has established, in a scientific or clinical way, the
criteria for such a determination. It is well also to remember that many authorities in this field argue that total body or organ death, biologically, is really a continuum, so that, unless one insists on total dissolution of cellular architecture and complete putrefaction of tissue, one is always left with criteria for defining death (either for the body as a whole or each organ individually) that are less than scientifically absolute. Thus, such criteria must entail some "failure or imperfection" within any clinically appropriate definition of death. An example of such a failure or imperfection would be the ability to grow, in tissue culture, cells from a body or organ some days or weeks after death has been pronounced. Even in the case of the human brain, certain of its cellular elements, known as glia cells, can be preserved, provided the brain organ is stored at low temperature during this time. Granting such biological possibilities or exceptions, modern-day medical science prefers the inclusive concept of the organizational structure and functioning, particularly in relation to the human brain, which would seem to argue most appropriately for either the viability or nonviability of the organ. The human brain is probably the most complex and sophisticated structure in the entire universe. When it has been demonstrated that its multitudinous functions are totally absent and there is absolutely no possibility of reconstituting any or all of these functions, then it seems most appropriate to declare this organ and, therefore, the individual to be dead. While there are now hundreds of specially designed clinical criteria set up throughout the world to define brain death and, therefore, human death, all presume to document the irreversibility and totality of brain failure.

Having acknowledged the practicality and even good sense of the criteria of brain failure for the definition of brain death, it should be remembered that, through the simple operation of temperature reduction, the brain itself, in the surgical theater or experimental laboratory, can literally be preserved for extended periods of time with complete return of all functions with re-warming, provided the temperature reduction is low enough. These hypothermic maneuvers bring about a state of "suspended animation" in which the brain meets all criteria established for brain death.

Notwithstanding such laboratory or operating room exceptions, the availability and application of the concept that brain death is equated with human death and, therefore, with the absence of human life have been of inestimable value in human medicine. This new definition of death has, on one hand, significantly reduced the numbers of patients being artificially supported who have no possibility of regaining meaningful function and, on the other, made available organs for transplantation to those many individuals throughout the world who are in desperate need of such therapy. Often young and disease-free patients who would serve as ideal organ donors would not be available as such without the availability of a diagnosis of human death based on brain death.

**Difficult Decisions**

In summary, then, the decision as to whether artificial prolongation of life is appropriate for an individual patient must to a large extent be based on the functional capability of the human brain, just as the definition of the presence or absence of human viability now must also be related to the functional state of the brain.

There are future concerns, however, about this question, and they have to do with patients who have cerebral damage in which there is some residual evidence of brain activity and, as a consequence, the criteria for brain death are not fulfilled. Perhaps the most disturbing and yet most important group who fail brain death criteria are those who are in, and will remain in, deep coma because of loss of cortical activity. In such patients, the delicate surface of the brain has been destroyed. Many authorities believe that the uniqueness of the human is best characterized by the cortex of the human brain and, regardless of the functioning of lower centers, it remains the repository for the higher functions incorporated into its cellular architecture. Such patients are often spoken of as in the vegetative state, a clinical condition in which they may remain for years, provided they are supported with nutrition and fluids. These are patients, of course, who can initiate their own respiration, but who, from time to time, require a modicum of medical therapy to control infection. A recent article in *The New England Jour-
nal of Medicine" questioned whether or not these patients should be removed from these ordinary exogenous treatments, particularly if there was family and physician agreement. It would certainly appear that such decisions would require very careful moral and legal deliberation. In the same article, consideration was also given to those geriatric patients who had reached a point where they could no longer feed themselves or be fed by mouth and would, henceforward, require tube feeding. Once again, in the judgment of these medical experts, it was felt that, with family agreement and presumed knowledge of the patient's own wishes, nasogastric feeding should not be instituted.

Without question, the advances of medical science are rapidly providing the combination of artificial systems and transplanted organs to sustain a failing somatic organism and to extend human life far beyond what had until recently been considered possible. Now it appears clear that all such advances must be based on the state of functioning of the human brain. We have now reached a time when we must not only set limits in the application of advanced and sophisticated biotechnology in extension of human existence, but also acknowledge the supremacy of man's brain in defining the presence or absence of human life.

References


Ted Bartlett

Brain Death—
A Philosopher’s Perspective

“The Artificial Extension of Life and a New Definition of Death” by Dr. Robert White (pp. 4-7 above) is a discussion of the issue of brain death from the view of an eminent neurosurgeon. In spite of our different professional backgrounds, I cannot find any substantive item on which I fundamentally disagree with him. This is, indeed, a very odd position for a professional philosopher to be in. There are, however, some supplemental points I would like to make as well as some minor points of difference. We may yet have our disagreement.

In the title and throughout the article Dr. White speaks repeatedly of a “definition” of death and sometimes of a “redefinition” of death. In fact, no definition, old or new, is ever forthcoming. This failing perhaps concerns only someone such as myself who has an overdeveloped interest in theoretical issues. It represents, however, a basic, common confusion, and one which I believe should be straightened out. What Dr. White is talking about when he draws our attention to the brain is a new criterion of death, and that is not the same thing as a definition. A full account of death is made up of, first, a definition; second, a criterion; and last, a series of clinically usable tests. The fixing of a definition is the philosophical process of establishing the appropriate concept of death. This is ultimately not a medical issue. It is a matter to be decided by a careful analysis of what we ordinary persons mean when we say that someone is dead. Such an analysis certainly must take into consideration what medicine has to say, but no more than, for example, what the law says.

When I say that “death” is basically a non-technical concept of ordinary language, I am not suggesting that determining its sense is a quick and easy matter. On the contrary, it is quite difficult. The new technology of medicine has upset our old ways of thinking about death without providing a clear alternative. What we have within the medical/philosophical literature is an ongoing argument about what the “correct” definition should be. But in spite of this debate there is a majority view that “ . . . the integrating function of the organism as a whole” gives us what we mean by “being alive”; its absence constitutes death. It is the organization and integration of the body’s organ systems that distinguishes a living human being from a dead one. There are, however, minority arguments to the contrary. In fact, in his concluding remarks on the persistent vegetative state, Dr. White suggests that he might agree with this minority view.

In spite of the current controversy at this abstract level, there is general agreement about the criterion. A criterion of death is the anatomical foundation for any definition. It

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Edward T. Bartlett III, Associate Professor of Philosophy at Cleveland State University, earned his B.A. at Cornell University and his Ph.D. at the University of Wisconsin. He has long been interested in the ethical implications of medical technology: he has taught related courses at Cleveland State University, University Hospitals, and Case Western Reserve University School of Medicine, and has been a consultant affiliated with the Medical Intensive Care Unit at University Hospitals since 1981. Currently he is directing a small number of graduate philosophy students who are involved in a concentration in medical ethics. Dr. Bartlett is also co-author of several articles in medical journals on brain death and organ transplantation. To relax from the strenuous pursuit of philosophical truth, he and his wife Molly have just bought a 75-acre farm where they plan to grow and sell produce and sheep.
identifies that part of the anatomy which must be destroyed in order for the patient to be dead. If we assume that "the irreversible loss of the integrating function of the organism as a whole" is what we mean when we say that someone has died, then we are focusing on the functions of the whole brain, and this is a medical matter. It is really at this level that our thinking about death has undergone a profound change. When the heart and lungs cease to function, it is no longer medically necessary for the organism to stop functioning as a whole. Whether or not it does, and so whether or not the person dies, is entirely a matter of the level and proximity of medical support. In this day of ventilators, artificial hearts, organ transplants, and intensive care units, no one would accept the irreversible cessation of the cardio-pulmonary system as constituting death, or perhaps even as necessarily causing it.

The third component of a full account of death is tests. These are the practical steps that a clinician must take in order to determine that the whole brain criterion has been fulfilled, i.e., that the entire brain has ceased to function. Current practice dictates that the cranial nerves be checked. So, for example, a physician would have to determine that there was no gag reflex. Were our concern still with the heart-lung complex, he would listen with a stethoscope to determine that it had ceased to function. What constitutes an acceptable test is entirely a medical matter. It is something that we would expect to change as new medical advances are made.

At one point in his article Dr. White indicates that Western medicine has more easily gotten accustomed to the account focusing on the brain. To some degree I believe that is correct. For example, in some 38 states, including Ohio, there are statutes officially defining death in terms of brain activity. Yet it would be wrong to imply that all the problems are solved. First, there is the theoretical dispute discussed earlier. Second, there is the practical outgrowth of that disagreement, which results in uncertainty over the application of its criterion. Dr. White himself, interestingly enough, refers to it as a "failure or imperfection." After a patient has been declared dead according to the whole brain criterion, life, in some very robust sense, continues on. One of the more dramatic illustrations of the problem was reported not long ago in the Journal of the American Medical Association. In an article entitled "Life Support and Maternal Brain Death During Pregnancy," the authors discuss two cases in which a brain-dead mother was delivered of a viable baby by cesarean section several weeks postmortem.

Let me be quite clear on this. These cases do not involve, as has sometimes happened, instances in which patients were incorrectly diagnosed as brain dead only to miraculously "recover." There is no question that these women were dead according to the established criteria. Yet there was enough life of sufficient complexity to sustain a fetus for several weeks. Let me quote from an editorial in that same issue of the journal.

It has been known for some time that brain-dead patients, suitably maintained, can breathe, circulate blood, digest food, filter wastes, maintain body temperature, generate new tissue, and fulfill other functions as well. All of this is remarkable in a "corpse."

Remarkable perhaps, but not at all out of the ordinary for a brain-dead patient. The same level of life is found in those brain-dead patients who are sustained as organ donors. In one study, some nurse-anesthetists who were part of the surgical transplant team found it "difficult at times to detach themselves from the idea that the brain-dead body is a living patient." This is not at all surprising since the donor patients who are about to have their organs surgically removed do not appear different from the ordinary anesthetized patient ready for surgery.

Some critics of brain death have used facts such as these as grounds for attacking the concept. Although I believe some attack and readjustment is appropriate, let me hasten to add that I do not believe that there has been any error at all on the matter of whether or not these patients are dead. They are dead. Whatever problems exist with the current concept of brain death, they are not such that we have been diagnosing patients as dead—and removing their organs—when in fact they were alive. The problem with the accepted notion of brain death is that, in my opinion, it is not able to explain satisfactorily how this ongoing, robust level of life is conceptually consistent with being dead. Surely it is appropriate to ask this question, and surely the answer ought to be forthcoming.
from the definition. If, however, I genuinely doubted that a certifiably brain-dead patient was indeed dead, and was told that it was all right to remove his pulsating heart because his organ systems were no longer spontaneously integrated, like the operating-room nurse, my concern would continue. Spontaneous or not, there is enough integrated life among the body’s systems to sustain a viable fetus for several weeks.

Working this problem out is a complex process continuing in the medical/philo­sophical literature. Without going into detail, let me suggest that the answer lies in a direction indicated by Dr. White. At a number of points he refers to what is “unique” in human existence, and he identifies it with the neocortex. If he would allow the substitution of the phrase “most important” for his term “unique,” I believe we could arrive at a useful line of argument. First, we would have to determine for our definition what function or quality was most fundamental to human existence. Then we would need to show that its possession was necessary and sufficient to life, so that its absence would constitute death. Armed with these arguments we would then go to the concerned operating-room nurse and explain that although a brain-dead organ donor still exhibits some functions at a high level, these do not constitute the type of life—human life—with which we are concerned. What we have left are the living organs of something that was once but is no longer a living human being.

The last point to make is that this problem is not unique to brain death. If one reverts to the earlier cardio-pulmonary account of death, one must still deal with some level of life after that criterion has been satisfied. If there is no support provided when the heart stops, all other systems will very quickly stop, so that the only remaining “life” will be on the tissue level. This may not be as dramatic as the brain-dead mother, but it is, nevertheless, “life” of the same type. It is, of course, a matter of degree.

Finally I would like to comment on a dangerous argument. Dr. White does not make this argument and I am confident that he would reject it. Still, it is suggested by some observations that he does make. I refer to the passage where he says, Often young and disease-free patients who would serve as ideal organ donors would not be available as such without the availability of a diagnosis of human death based on brain death.

The danger is that someone might take these remarks as reasons for adopting brain death as a criterion. Given the critical nature of the issue, there is only one reason to adopt brain death as a criterion: namely, that it is correct—in other words, that people in this condition are in truth, beyond any shadow of a doubt, dead.

Not only is it dangerous to support a brain-death standard because of its moral utility, it is unnecessary. Doctors have been removing support from hopelessly ill patients long before anyone thought of brain death, and they have been doing so correctly, on the basis of moral arguments. These arguments are becoming more widely accepted than they were twenty years ago, and they are just as essential. Although it may not be technically wrong, it is misleading to describe a corpse as having “no possibility of regaining meaningful function.” That is a description more appropriately applied to someone who is so critically ill that he is dying and for whom continued support would be a moral atrocity, but who is, nevertheless, alive. It is extraordinarily important to keep separate the arguments that show the important consequences of a brain death criterion from those which show it to be true. However beneficial such a criterion might be in its consequences, it must first be shown to be correct.

NOTES


Keith Kendig

Mathematics, Truth and Beauty

Overheard at a party: "In mathematics, if I have a choice between something correct and something beautiful, I'll generally take the beautiful!" A cocktail party profundity one might easily forget, except that this was uttered by one of the real giants of mathematics, Hermann Weyl. And he was serious. Through the centuries, mathematicians and scientists have become more efficient in their investigations; they have learned some things about the way nature holds, and finally reveals, her secrets. This wisdom often has a great deal to do with beauty.

I would like to offer the following as a distillation of some of the wisdom gained over the years:

If a theory seems flawed, search for beauty.
If a theory seems beautiful, search for flaws.

But just what is "beauty" in mathematics or science? Of course beauty of any kind is difficult to define; in our case one can try using words like "symmetry" or "conciseness." A phrase like "revealing simplicity in what before seemed complex" also touches on the idea. Perhaps the following illustration will make the point.

Ships Lost at Sea

For centuries, natural magnets and static electricity were thought to have magical powers; gradually, understanding increased and theories evolved about these curiosities. Franklin, Volterra, Ampere, and Faraday, along with scores of other experimenters, gave us a wealth of new knowledge—some practical, some theoretical, some both and some neither.

In particular, by 1860 there were two very important electrical laws. One was Faraday's Law and the other was Ampere's. Around 1870, the Scottish physicist James C. Maxwell was contemplating these together. There were three equations in one law, and three in the other. They looked curiously alike, although Ampere's equations did not have three of the terms appearing in Faraday's. Except for this, the set of six equations was what one would call "beautiful." They were also well-established; many experiments had confirmed both laws. But the "three missing teeth" kept bothering Maxwell. He tried many times to rewrite these laws to achieve perfect form, but always some flaw, some lack of symmetry, would remain. Then, in an almost heretical act, Maxwell simply wrote three new terms into Ampere's equations. (See the two clouds in Figure 1.) Now the laws were indeed beautiful—but apparently incorrect, too. (He'd made the very choice Weyl was talking about at the party.) Maxwell was now faced with making sense out of the altered equations. The physical consequences were strange indeed: people back then knew that electricity could flow through conductors (like metal) but the new laws were saying that some kind of "current" could flow in absolutely empty space, with no material conductor at all!

Keith M. Kendig has commented, "Even as a boy, I remember being attracted to things with a kind of timeless quality, beautiful old stone churches, for instance. Mathematics, too, has a universality and a timelessness, and offers a special kind of esthetic experience." Dr. Kendig, a professor of mathematics at Cleveland State University, earned his Bachelor's, Master's and Ph.D. degrees at U.C.L.A., and did two years' additional postdoctoral work at the Institute for Advanced Study in Princeton. He is a jogger, an accomplished cellist who has given four recitals this year, and a vegetarian. He and his wife Joan, now residents of Shaker Heights, have published a vegetarian cookbook and have subsequently appeared together on the Morning Exchange demonstrating their recipes.
Even more baffling, it seemed that any alteration in such a theoretical current would be reproduced at other points far removed from it, by means of "waves" traveling from one point to the other.

It wasn't until 1888 that the strange predictions flowing from the beautiful equations were finally confirmed. The 31-year-old experimental physicist Heinrich Hertz succeeded in generating "electromagnetic radiation" with a wavelength of about six feet, created by a spark oscillating between two electrodes. These waves, detected or "received" at a distance of no more than fifteen feet, created a weak spark oscillating between two receiving electrodes. Hertz's radiation today corresponds to approximately Channel 13 VHF waves. Maxwell's instinct was correct.

It was thus that mathematical beauty virtually drove us into discovering something useful that had been previously invisible. Not only that, it revealed Hertz's radiation as just like light waves, but of a different wavelength. We had met one of the truly big ideas in physics—the electromagnetic spectrum, which ranges from waves that can be several miles in length, to radio, VHF, UHF, micro (as in microwave ovens), infra-red, the visible spectrum, ultraviolet, x-rays, and waves even shorter, whose lengths are measured in trillionths of an inch.

It was but a matter of time until the new part of the spectrum found practical application. Seven years later, in 1895, a little-known 21-year-old Italian physicist named Gugliemo Marconi improved Hertz's 15-foot experiment, and succeeded in transmitting a "wireless" signal over an astonishing 2500 yards, rapidly improving his invention to ever greater distances. Soon the world was given something it had needed for centuries: a way of communicating with and locating ships lost at sea. "Crystal" sets followed some five years later, and they grew up to become the familiar "radio" which used Lee De Forest's "Audion" (radio) tube to amplify the weak radio signals. Television followed, and the great communication explosion was under way.

There seems to be a great deal of beauty, of the sort I've been talking about, both in mathematics and in the universe. "Thinking beauty" can often supply us with a key to discovery.

What About Flaws?

The second part of our principle asks us to search for flaws if the theory is beautiful. "But," one may ask, "if a theory is beautiful, why not leave well enough alone?" One reason is that searching for flaws may uncover errors.

Example: Many of Euclid's proofs, though beautiful, are incomplete—a fact which went unnoticed for some two thousand years. His set of assumptions, along
with his proofs, have apparently been set straight; but the example of Euclid, along with all the other incorrect assumptions, faulty proofs, and the like throughout the history of mathematics have taught us that rigorous reasoning is not a luxury but a necessity.

Example: In the last half of the nineteenth century there was a very simple, elegant definition of curve. It was general, yet concise, and accounted for curves with even very complicated self-intersections (like curves an ice-skater might make). In fact, it was just a little too general, as the young Italian mathematician Giuseppe Peano pointed out in his doctoral dissertation in 1890. He constructed, according to the accepted definition, a “curve” so complicated that it filled up every single point enclosed by a square! Now is a solidly filled-in square a curve? The definition surely had to be changed. That one illustration forced mathematics up another rung of the ladder towards increased appreciation of the nature of the curve.

Another reason for searching for flaws in a beautiful theory is that the theory might be limited, failing to answer questions which occur when one presses to the extreme.

Example: In the early grades, one learns “algorithms,” or mechanical procedures, for adding, subtracting, multiplying and dividing numbers. One need only trace the history of computation back a couple of hundred years to appreciate the beautiful efficiency and power of today’s algorithms (see Figure 2). But what about, for instance, adding not two numbers, or ten, or even a million, but instead adding together infinitely many numbers? That’s pushing the notion of adding to an extreme. The big area of mathematics known as analysis has some of its roots in this kind of problem. Today we know that certain infinite sums converge—for example, \(1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots\), which approaches a limit of 2. But others do not approach any limit and are said to diverge. Examples of this phenomenon are \(1 + 1 + 1 + \ldots\).

---

**Fig. 2: An Old-Fashioned Algorithm—Multiplication Wrapped in a Box**

Textbooks teaching the basics of arithmetic looked quite different two centuries ago. Here’s how some primers of yesteryear taught multiplication. (We will use 1.234 \(\times\) 567 as an example.)

First, count the number of digits in each number (4 and 3 in our case), and draw a rectangle of that size. Then subdivide the rectangle into unit squares (12 of them). Further subdivide each square into 2 triangles (so we have 24 triangles). Next, write the two numbers along the top and right side of the rectangle, as in the illustration at the right. Now multiply each digit in one number by each digit in the other, putting the result in the corresponding square. (For example, 4 \(\times\) 7 is 28, and 28 goes in the extreme bottom right square—the 2 going in the upper triangle and the 8 going in the lower one.) Next, along each 45-degree line, add the numbers in the triangles along that line. (See the arrows in the illustration.) Start at the bottommost arrow and work upward—8 is our first (single) sum, then 4 + 2 + 1 in the next-higher line, and so on. (Carry to the next-higher line when necessary.) Write the sums along the remaining two sides of the rectangle. The answer (699,678) appears along those two sides, reading counterclockwise.
1 + \ldots + 1 + \frac{1}{2} + \frac{1}{3} + \ldots , both of which grow infinitely large, and 1 - 1 + 1 - 1 + \ldots , which never settles down to any limiting value.

Example: What about pushing not the size of the list but rather the size of individual entries to infinity? It turns out that there is a whole structure out there in the world of infinity. There’s a smallest infinity—the “number” of integers. There’s an infinity which is larger than this: the “number” of points on a line. There are infinities larger than either of these, and still larger than that, and yet larger than that, \textit{ad infinitum}. The area of mathematics called “transfinite arithmetic” answers questions at this very remote extreme (see Figure 3).

Example: There’s geometry in two, three, and even four dimensions. What about five, six, seven, and beyond? Could there even be an infinite-dimensional geometry? The answer is “yes” to each of these questions. In fact, infinite-dimensional space is fundamental in everything from very pure mathematics to applied mathematics and physics; it has provided a high rung on our ladder, giving us a much better view of many things in both mathematics and physics.

It is hard to resist pointing out that almost any theory is valid only within a certain range; we can embarrass everything from day-to-day perceptions to a very general theory by pushing to extremes. When cooled to near absolute zero, a flower can shatter into hundreds of tiny pieces, and certain gases can turn into liquids which mysteriously crawl up and over the walls of their containers. When subjected to the extreme conditions of the interior of the earth, ordinary elements can produce beautiful gems. If we could extend the sensitivity of our eyes beyond the extremes of the visible spectrum, we would see cold objects glow after being held awhile, for they radiate infra-red rays. And in sunlight we would see a violet ring in the center of a butterfly, for ultraviolet light is reflected here. (Bees see this—we don’t.)

One could also take a well-established theory like Newtonian mechanics. Go too \textit{anything}, and the theory doesn’t work right: go too large, for example, and we notice a complicating curvature to the universe; go too small, the theory breaks down, and we see phenomena that are not predicted by the theory.

\textbf{Fig. 3: How to Make Giant Infinities}

Consider a set \( S \) made up of just two points, \( a \) and \( b \):

\[
\begin{array}{c}
\bullet \\
\bullet
\end{array}
\]

From \( S \), one can manufacture a larger set \( S_1 \), comprised of all possible subsets of \( S \). These subsets are: \( \emptyset \) (the “empty” subset consisting of no elements), \( \{a\}, \{b\} \), (the two subsets consisting of one element), and \( \{a,b\} \) (the subset consisting of \textit{all} the elements of \( S \)). If our initial set \( S \) consisted of three elements, say \( a, b, \) and \( c \), then \( S_1 \) would consist of \( \emptyset, \{a\}, \{b\}, \{c\}, \{a,b\}, \{a,c\}, \{b,c\}, \text{ and } \{a,b,c\} \) —for a total of eight subsets. In general, if \( S \) has exactly \( n \) elements in it, then \( S_1 \) will have \( 2^n \) elements in it. Note that \( 2^n \) is always larger than \( n \), so the set \( S_1 \) is always larger than \( S \).

Now one can play the same game even if \( S \) has an infinity of elements in it. Let \( S \) be this set,

\[
\begin{array}{c}
\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \ bullet \\
\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \ bullet
\end{array}
\]

made up of infinitely many evenly-spaced points. The “number” of points in \( S \) is usually denoted by \( \aleph_0 \) (aleph naught), and it is the smallest infinity. Now let \( S_2 \) be the set of all subsets of \( S \). The “number” of elements in it is written \( \aleph_1 \) and is a larger infinity than \( \aleph_0 \).

But why stop? Consider the set \( S_2 \) of all subsets of \( S_1 \). The number of elements in it is greater than \( \aleph_1 \); we write \( \aleph_2 \). And so on. One can continue this process indefinitely, creating a majestic tower \( \aleph_3, \aleph_4, \ldots \) of successively-larger infinities. There is even a “transfinite arithmetic” for this tower.

Example: For any \( \aleph_i, \aleph_i + \aleph_i = \aleph_i \). And if \( j \) is larger than \( i \), then \( \aleph_i + \aleph_j = \aleph_j \).

But one can push to even more remarkable extremes, for the entire infinite parade, \( S, S_1, S_2, S_3, \ldots \) can be considered as a whole—that is, as one truly collossal set! Call it \( T \). \textit{This is now the first rung of an even more stratospheric succession of towers,} \( T, T_1, T_2, T_3, \ldots \).

And this stratospheric succession is in turn the first rung of an even more stratospheric succession \( U, U_1, U_2, U_3, \ldots \) And on. And on. And on \( \ldots \).
too small and we encounter subatomic particles which don’t behave as Newton’s laws say they should. Go extremely fast and the speed of light increasingly asserts itself, showing us certain limitations in the universe never guessed at in Newton’s day. Or if a mass is too big and dense, it will begin to collapse, due to extreme gravitational forces, creating a black hole in the universe.

The point to these examples is this: searching for flaws, pushing to extremes, playing the role of the devil’s advocate—all this is healthy scientific thinking, and can yield a wealth of new ideas.

It Could Have Been . . .

Mathematical history is replete with examples showing how seeking beauty or flaws could have been used to further progress.

Take, for instance, simple counting. The ancient Greeks, Babylonians, and Egyptians all knew about positive integers. But what about their symmetric analogues, the negative integers? And what about the integer sitting in the middle of them all, zero? They had none of these. The concept of zero, however, plays a crucial role in today’s efficient counting and computing schemes; it is linked to the notion of place value and decimal point—basic notions that make for power, compactness and easy flow in our present decimal system. Consider: there is no zero and no real notion of place value in Roman numerals. Try writing one trillion, or multiplying 1776 by 1812 in those numerals. The system is bulky and uncooperative. It breaks down when subjected to even moderate demands; try pushing the system to extremes, and it crumbles.

It is not too much to guess that scientific progress was likely held back some hundreds of years because the ancients missed this one number, symmetrically poised between the positive and negative numbers.

They all also tried their hand, in one form or another, at solving simple equations. There were equations like \( x + 3 = 5 \) which they could solve, and then there were those like \( x + 5 = 3 \), which “had no solution.” (The solutions are negative.) Such equations were considered exceptions. Insisting upon removing exceptions in those early equation-solving days would have forced the introduction not only of negative numbers and zero, but of many irrational numbers (numbers which are neither whole nor fractional, like \( \sqrt{2} \) or \( \pi \)), as well as “imaginaries” (like \( \sqrt{-1} \)). This big chunk of today’s counting and measuring system was missing for centuries.

But alongside all the “could have been,” there is an impressive list of success stories in which sensitivity to beauty helped fashion mathematical history. Here are three examples.

The Line Euclid Missed

Jean-Victor Poncelet joined Napoleon’s army as an officer of the engineers after having studied mathematics at the École Polytechnique in Paris. During Napoleon’s ill-fated 1812 venture into Russia, Poncelet, then 24, was captured by the Russians and marched off to prison.

Jean-Victor had always liked geometry, and to while away the tedious hours, the
young prisoner started to reconstruct in his mind the geometry he had learned earlier. He had no books and, in the beginning, only walls and little pieces of charcoal to write with. He found that he'd forgotten most of his geometry; only the large peaks and main ideas remained. Thus unfettered by the authority of books or by too many facts, he slowly began one of the most remarkable two-year periods in the history of mathematics.

He did remember from plane geometry that any two different points determine a straight line. He also remembered that any two different lines determine a point—except if the two lines are parallel (for then they never meet). This exception, this lack of symmetry in these two basic facts, began to bother him and he began trying to figure a way out. Let us reconstruct some of his reasoning.

Suppose you've got two lines which are not quite parallel—say one of them is horizontal and the other tilts slightly toward the horizontal line on the right side, as in Figure 4:

Then the two lines will meet in a point on the right side, some distance out. The closer the two lines are to being parallel, the further out their point of intersection is. Gradually "untilting" the second line seems to suggest that the two lines, when finally parallel, should somehow meet on the right side, infinitely far out. Now Euclid himself never supplied us with any such "points at infinity." So let's add one! (Madness? Remember, the ancients had no zero or negative numbers. We have added all those numbers, together with many more, to arrive at today's number system. It is fruitful to enlarge our mathematical "world.")

There's a problem, however. We could just as well have started with the second line tilting a bit the other way, as in Figure 5, so that the point of intersection is on the left side. Again, "untilting" suggests that a point should be added at infinity on the left, too. This is hardly a very sanguine situation—we wanted any two different lines to meet in one point, not two. But Poncelet had plenty of time. He also had no mathematical authorities to intimidate him. He gave his imagination free rein, and imagined that the two points at infinity were actually one and the same, much as two explorers starting out in opposite directions at the south pole, and

**Fig. 6: The Incredible Shrinking Plane**, in which an entire plane is squeezed into a small disk.

In a giant implosion, each point moves towards the center. Where does each point move to when the implosion occurs?

To see, let's look at a typical, unsuspecting point, say this one, right here...

...it is, say, 3 inches from the center. When the implosion occurs, the point travels directly toward the center, finally coming to rest here...

...this resting place being just 3/4 inches from the center.

**Here's the trick:** If a point is $d$ inches from the center originally, it ends up $d/(d+1)$ inches away from the center.

**Note:** $d/(d+1)$ (like 7/8, 13/14, etc.) is always less than 1, so everything ends up inside a disk only 1 inch in radius!
always traveling northward, eventually meet at the north pole. Put differently, he thought of a line as an enormous circle with one point missing: the point at infinity. Mutually parallel lines then all pass through that point at infinity. For each different direction of line, he added the missing infinite point. This somewhat mysterious-sounding process can be made easier to visualize by using some "incredible shrinking." Figure 6 shows how to do it. The entire plane ends up fitting perfectly inside a disk. No point in Euclid's plane ever ends up exactly on the edge of the disk. It is the edge points that we add in, these being the new points at infinity. Diagonally opposite points are identified, or "sewn together," and all these new points themselves form one new line, called the line at infinity. (See Figures 7-9.) In one stroke this filling out of Euclid's plane opened up a whole new kind of geometry called "projective geometry."

Actually, insisting on symmetric statements ("two points determine a line" and "two lines determine a point") yielded a much larger bounty than one might initially guess. There is a symmetry, or "self dual" nature running throughout all projective geometry. New results fall out of old ones by mechanically interchanging dual words. (In Poncelet's plane, the words "point" and "line" are dual, for instance.) Various facts, often proved a century or more apart, were found to be long-lost twins. Projective geometry unified the parabola, ellipse, and hyperbola of the ancient Greeks into one big idea. It also answered a question posed by Leonardo da Vinci some three centuries earlier: "Find a mathematical method of drawing any scene projected on a screen, held at an arbitrary angle." Projective geometry got its name because it dealt in an essential way with "project-on-a-screen" problems.

What happened to Poncelet? He was released two years after his capture, returned to France, and wrote up his new discoveries in what is now a classic: Traité des propriétés projectives des figures. The strange new geometry met with storms of protest (would one suppose otherwise?), but the patient Poncelet was unruffled. He died at the age of 79, a dignified soldier whose geometry, with its splendid beauty, became a favorite subject for whole generations of researchers.
Sir William Hamilton, who had an important mathematical discovery engraved on the bridge where he first conceived it.

**On a Dublin Bridge**

Projective geometry represented a breaking out from the Euclidean mold. Its importance can hardly be overestimated; Euclidean geometry had, after all, been the geometry for over two thousand years. Now things were different. Mathematicians began to realize that they could alter some of the underlying assumptions and thereby discover totally new geometries that were consistent within themselves and that had concrete representations—for example geometry on a sphere or egg-shaped surface, geometry on a saddle-surface, as well as higher-dimensional geometries. There were even finite geometries, in which lines and planes contained only finitely many points. Some mathematicians and physicists began to suspect that one or more of these new geometries might describe the physical universe better than Euclidean geometry. They turned out to be right. (Euclidean geometry is a "zero curvature geometry"—the space in which one "does" Euclidean geometry is flat, like the plane in plane geometry. But matter induces a curvature to space, somewhat as a cannonball on a large trampoline makes a dent, or curvature, in the trampoline's surface. A small marble rolling past the cannonball will then be deflected toward the cannonball, and may even go into orbit around it. In a roughly analogous way, the curvature of physical space around a star, for instance, "causes" planets to go around in orbits. Even light itself deflects slightly as it rushes past a star. If the concentration of mass is sufficiently high, inducing very intense curvature, the light will "go into orbit" and never escape. This is a "black hole," mentioned earlier.)

But tinkering with axioms was not restricted to geometry. Mathematicians began to realize that our very counting system, as well as algebra, could be axiomatized. Our notion of "quantity" also began to change, becoming more encompassing and representing something more than simply size or amount. For example, "vectors"—more general quantities, having not only magnitude but also direction—were natural for describing velocities, forces, and the like. Vectors could also describe rotations, the direction of the vector lying along the axis of rotation, and the magnitude telling us how much rotation occurred. Starting in the 1830s, the Irish mathematician Sir William Rowan Hamilton attempted to work out an "algebra of vectors" that would describe rotations in three and four dimensions. Such a system, he believed, would be very helpful to both physicists and mathematicians. But this question turned out to have a surprise lurking in it, a surprise that forever changed the mathematical landscape. Before Hamilton's work, it was believed that algebraic systems were commutative, that is, they did not have to be performed in any particular order (for example, $a + b = b + a$ or $a \times b = b \times a$). You can perform the following little experiment to get a feeling for the unsuspected phenomenon that Hamilton discovered.

Hold a penny directly in front of you so you're looking at the Lincoln Memorial on the back.

Do operation 1: Turn the coin 180 degrees about a vertical axis. (You should see Lincoln upside down.)

Do operation 2: Rotate the coin 90 degrees clockwise. (He should now be gazing skyward.)

No surprise, yet. But now start from the initial position of the penny (looking at the reverse), and do the operations in the other order—first do operation 2, and then
do operation 1. At the end, Mr. Lincoln will be gazing not skyward, but downward! We say that rotations in three (or four) dimensions are not commutative; the order in which one performs rotations can affect the outcome. This is totally different from rotations in the plane, which are always commutative.

Hamilton happened to be standing on a stone bridge in Dublin on October 16, 1843, when that realization struck him like a thunderbolt: an algebraic system (in particular, his new algebra, the "quaternions") need not be commutative. One could deny the commutative law and still have a consistent and useful algebraic system. In a way, this realization was to algebra what denying one or more of Euclid's postulates was to geometry. The results in both cases were the same: they heralded a period of tremendous expansion in the field. (Sir William later had the non-commutative multiplication table for the quaternions engraved on the bridge.)

Here are some of the axioms valid for ordinary numbers which algebraists following Hamilton "tinkered with." They may be arranged in a surprisingly neat and symmetric way:

For all \(a, b,\) and \(c,\)

\[
\begin{align*}
  a + (b + c) &= (a + b) + c \\
  a \times (b \times c) &= (a \times b) \times c \\
  a + b &= b + a \\
  a \times b &= b \times a
\end{align*}
\]

Notice how + and \(\times\) play symmetric roles: interchanging one for the other throughout either law yields its "twin." (This is vaguely reminiscent of the duality of "point" and "line" in Poncelet's projective plane.) Even 0 and 1 occupy symmetric positions:

\[
\begin{align*}
  0 + a &= a \\
  1 \times a &= a
\end{align*}
\]

Finally, the "distributive law" relates + and \(\times\) this way:

\[
 a \times (b + c) = (a \times b) + (a \times c)
\]

Amid all this symmetry, one can try to look for a flaw. (What, a flaw? In the good old numbers, among the most basic things in the universe?) Nonetheless, if everything is to be so beautiful and symmetric, then shouldn't this last distributive law have a "dual," just like the other axioms do?

If we carefully switch + with \(\times\) everywhere in the above distributive law, we get this "twin":

\[
 a + (b \times c) = (a + b) \times (a + c)
\]

If this is actually true, then it should hold for any choice of \(a, b,\) and \(c.\) In particular, it should hold if each of \(a, b,\) and \(c\) is chosen to be 1. Let's see what follows from this choice:

\[
\begin{align*}
  1 + (1 \times 1) &= (1 + 1) \times (1 + 1) \\
  1 + 1 &= 2 \times 2 \\
  2 &= 4
\end{align*}
\]

Not a very happy situation; it seems that numbers are unwilling to give us this symmetry.
Undaunted, we begin to look for some way out. Are there any "worlds," any systems, that obey all these axioms, including the twin distributive law, to get really perfect symmetry? Answer: indeed there are, and in some respects they play roles even more basic than numbers. An example is elementary logic, which of course mathematicians use and assume in day-to-day work. We interpret \( a, b, \) and \( c \) as statements (which may be True or False), \(+ as or and \times as and, 1 as True, and 0 as False. Then all axioms are satisfied.\(^2\)

Once again, we emphasize the main point to all this: looking for and insisting upon symmetry can lead to uncovering important, fundamental facts.

**Ghosts and Shadows**

The examples of Poncelet and Hamilton are from the annals of geometry and algebra. There are some mathematicians who believe that geometry (or more generally, the "pictorial") and algebra (or more generally, the "symbolic") represent almost all of mathematics. Mathematics itself, though, seems to make gentle mockery of any attempt to divide it into hard and fast areas. Like the islands of an archipelago, they may at first appear to be separate entities, but upon deeper exploration, they reveal themselves as all part of the same mountain range, partially submerged. The water is like ignorance, causing us to miss the connections.

\(^2\)For example, if "\(a'\)" and "\(b'\)" are two sentences, then their conjunction "\(a \land b\)" is true only if both \(a\) and \(b\) are true. If, for instance, \(a\) is "\(2 + 2 = 4\)" and \(b\) is "\(5 + 5 = 100\)," then the longer assertion "\(a \land b\)"—that is, "\(2 + 2 = 4 \land 5 + 5 = 100\)"—isn't true since "\(5 + 5 = 100\)" is a false statement. The conjunction "\(a \lor b\)" works just like ordinary multiplication: since \(a\) is either 1 or 0 (true or false), and likewise for \(b\), the sentence "\(a \land b\)" is true (that is, \(a \times b = 1\)) only if \(a = 1\) and \(b = 1\). One can also look at \(a \times b\) as simply the minimum of the values of "\(a\)" and "\(b\)." A similar thing holds for "\(a \lor b\):" the longer sentence "\(a \lor b\)" (which we write "\(a + b\)") is true if at least one of the two is true, and this corresponds to assigning to \(a + b\) the maximum of the values of \(a, b\). In this very basic "world," the operation "\(\lor\)"—that is, "\(+\)," therefore works like this: \(0 + 0 = 0\), \(0 + 1 = 1\) and (here's the difference!) \(1 + 1 = 1\). One can now check each axiom, testing it with each possible combination of 0 and 1 for \(a, b,\) and \(c\). The table at the right shows how this looks for the twin distributive law (the one failing for ordinary numbers).

A case in point is the relation of old-fashioned geometry and algebra. The two lived pretty much separate lives for centuries, somewhat like two big islands. Then a philosopher made a remarkable discovery: much of Euclidean geometry and algebra are shadows of each other—they mimic one another in wordless unison. The discoverer of this surprising symmetry between geometry and algebra was Rene Descartes, and he exposed it by successfully painting part of algebra right onto geometry; the numbers (positive, zero, and negative) were put onto Euclid's line. We say today that he "co-ordinatized the line." He also co-ordinatized the plane by attaching to each point an ordered pair of numbers. For instance, in the Cartesian plane in Figure 11, we call \((0,0)\) the origin, and we say that \((x,y)\) is the point \(x\) units to the right of, and \(y\) units up from \((0,0)\). If \(x\) and \(y\) are negative, of course, the point is to the left and below \((0,0)\).

This meant that geometric relations could be translated into algebraic ones. For instance, in the plane, the geometrically defined object "the set of all points equidistant from a fixed point" (a circle) translates into something algebraic like \(x^2 + y^2 = 1\). "Now," you may ask, "what practical use is all this?" The answer, in part, is that the translation process gives us another perspective, a new way of looking at problems. We tend to think about geometric problems differently.
I
\[ \begin{align*}
\text{Fig. 11. For point } p \text{ in this Cartesian plane, } x &= 3 \\
\text{and } y &= 2. \text{ For point } q, x &= 1, y &= -4.
\end{align*} \]

differently from algebraic ones. If one can be converted to the other, it in effect gives our imagination and intuition additional room, and so makes it easier to solve certain problems.

Example: Figure 12a represents a parallelogram together with two line segments RT (a diagonal), and MS (called a "semidiagonal"). M is assumed to be half way between Q and R. From this we can conclude: PS is exactly twice as long as MP.

There is a short, simple geometric proof of this. When you find it, you'll say, "Aha! That is simple, isn't it?" However, there's no reliable way of estimating how long it will take for the insight to occur. Now let's look at the problem from an algebraic perspective. We translate: the four points Q, R, S, and T get replaced by ordered pairs (0,0), (a,0), (a+b,c), and (b,c). The diagonal gets translated into an equation of the line it's on; likewise for the semidiagonal (see Figure 12b). The point where the lines meet is just the common solution to the two equations. If, for example, the common solution were \( x = 5 \) and \( y = 1 \), then the point P would be (5,1). Now finding the common solution is entirely routine. Our minds, working in algebraic mode, seem to require no special insight or inspiration; one only need be careful and accurate. Finding the lengths of PC and MP is similarly routine—almost boring. But when you look at your answers for the lengths, you'll see that one is just twice as big as the other:

The equation of \( L_1 \) is 
\[ y = \left( \frac{c}{b-a} \right) \left( x - a \right). \]

The equation of \( L_2 \) is 
\[ y = \left( \frac{c}{a/2 + b} \right) \left( x - a \right). \]

Their simultaneous solution is 
\[ x = \frac{2a + b}{3}, \quad y = \frac{c}{3}. \]

thus P has co-ordinates 
\[ \left( \frac{2a + b}{3}, \frac{c}{3} \right). \]

A standard formula for the distance between two points then shows that the distance from P to M is 
\[ \sqrt{\left( \frac{a + 2b}{6} \right)^2 + \left( \frac{c}{3} \right)^2} \]

and that the distance from P to S is 
\[ 2 \sqrt{\left( \frac{a + 2b}{6} \right)^2 + \left( \frac{c}{3} \right)^2}. \]

Hence line segment \( PM = \frac{PS}{2} \).

\[ \text{Fig. 12. A not-so-routine problem in geometry becomes a routine algebra problem when translated to Cartesian coordinates.} \]
In the centuries after Descartes’ great discovery, the bond between algebra and geometry became stronger and more complete. Before Descartes, “ancient” curves (circles, ellipses, parabolas, and so on) were defined geometrically. This was commonly done using sticks and string, the way one might draw a good circle on wet sand. But after Descartes, these curves could be defined algebraically, using simple equations such as $x^2 + y^2 = 1$ (circle), $y = x^2$ (parabola). Since it is so easy to write all sorts of equations using $x$ and $y$, much more sophisticated curves simply fell into our laps. Hundreds of new, interesting shapes were found, and their properties explored. Equations had the effect of freeing geometry from the ancient Greek constraints. Algebra further suggested new surfaces and geometry in higher dimensions, and it gave us a concrete way of handling such generalities. And in addition to making rigorous proofs easier to come by, it provided a natural and simple way of expressing many physical laws. Descartes in a sense hitched geometry to the powerful force of algebra.

The new perspective not only allowed geometry to nurture geometry; geometry itself suggested extensions and enrichments to algebra. The two began to help each other in a kind of symbiotic relationship. This relationship has continued throughout the centuries, progressing far beyond old-fashioned geometry and algebra. For instance, algebra has both helped and benefitted from all the newer geometries mentioned earlier. Even topology, a very general kind of geometry, has had a long and profitable friendship with modern algebra; algebraic concepts such as groups, rings, and homological algebras have been of inestimable value in understanding all sorts of topological objects.

Descartes had stumbled upon a basic twinship between a large part of algebra and geometry, and it initiated a revolution in mathematical and scientific thinking. The communication between algebra and geometry that it then represented is still strong and vital in the frontiers of mathematical exploration.

**A Perspective**

I have been treating my guiding principle as if it were infallible, but doesn’t it too have its limitations? Isn’t it possible to make good progress without it? Can’t we sometimes be worse off using the principle than not? Aren’t there other principles or bits of wisdom that are also useful in mathematical exploration? Of course, the answer to each of these questions is “yes.” Our principle surely has its limitations. In mathematics, there must often be an extensive period of fact-gathering, much as Faraday, Ampere, Volterra, and others did before Maxwell came on the scene. Without all the experimentation, observation, and some distillation, it would have been much more difficult for Maxwell to have had anything to apply his aesthetic sense to. The same is true with Poncelet. He had the whole landscape of geometry to survey, a big terra firma of established fact for his imagination and desire for symmetry to travel over.

And it certainly is possible to make progress without the principle. There were many useful electrical experiments carried out before Maxwell, in which regard for esthetics was not of special importance. A similar thing is true in Euclidean geometry—a great deal of progress in geometry was made long before Euclid. In fact, Euclid himself contributed almost nothing new to the fund of geometric facts which he inherited from the Egyptians. The ancient Egyptians were a practical lot who regarded geometry as an empirical science born of necessity. Geometry was pretty much what its name means:
"earth-measurement." The facts they gathered were useful, for example, in determining land area for assessing taxes and in re-establishing property boundaries whenever these boundaries were flooded over by the Nile.

Euclid himself played the role of the esthete, who reduced a huge mass of largely disconnected geometric facts to five quite simple postulates, or assumptions, from which all else logically followed. The fact that there are serious gaps in his proofs cannot detract from the beauty of his accomplishment, and certainly not from the monumental implications it has had on scientific thinking in general. In retrospect, we can look at Euclid’s ordering of the geometrical knowledge he inherited as the first big, successful application of the search for beauty in mathematics.

But the principle can lead to errors—sometimes serious ones. In the early sixteenth century, for example, Copernicus and his followers postulated that the six known planets revolve around the sun in perfect circles. After all, what could be more perfect than a circle? A century later Johannes Kepler at first strongly embraced the ‘‘circular orbit theory,’’ and wondered not only why there were exactly six planets, but why their relative distances from the sun were what they were.

An elegant explanation came to him during one of his classroom lectures at Graz, Austria, based on an old geometric fact known since the time of Plato: there are exactly five regular, or ‘‘Platonic,’’ solids, that is, polyhedrons whose edges all have the same length, and whose faces are all congruent to each other (see Figure 13).

Now starting with a sphere, Kepler contemplated successively inscribing a cube, then a sphere, then a regular tetrahedron, another sphere, and so on, finally ending in an innermost, sixth sphere (see Figure 14). The planets were to stay on the spherical surfaces, describing perfectly circular orbits. He called his arrangements the ‘‘Mysterium Cosmographicum,’’ and it was to have been the grand architecture of the solar system. Although the actual measured distances between orbits did not agree very well with the distances between his spheres, the theory was so beautiful and inspired that he assumed the experimental observations must
be wrong. In this Kepler was justified, since so many observations of the time were unreliable. The one man who had the accurate observations to support or knock down Kepler's "Cosmic Mystery" was the wealthy nobleman Tycho Brahe, and Brahe was unwilling to freely share his knowledge with the younger, potential rival. It was only after Brahe died that Kepler was finally able to wheedle the data out of Brahe's stubborn family. Then it became clear: the Cosmic Mystery, along with the circular orbit theory, had to go. Kepler finally realized that the planets move in ellipses, not circles.

Our principle can lead to psychological errors, too. An esthetically-minded scientist might size up a problem and seek an answer at a simpler level than is warranted. Albert Einstein, for example, did not pursue advanced mathematics with any particular vigor in his earlier years. He felt that the really fundamental facts of the universe should be expressible in very simple mathematical terms. His own keen sense of beauty worked wonderfully well in his special theory of relativity, which in a sense showed that the Newtonian "islands" of space and of time were really part of a single sub-

Fig. 14: Kepler's "Cosmic Mystery," in which an octahedron is inscribed in an icosahedron inscribed in a dodecahedron inscribed in a tetrahedron inscribed in a cube.
merged mountain range; likewise for the islands of mass and energy. But when he tried to connect the large islands of "space-time" and "mass-energy" in his general theory of relativity, he began to realize that much more advanced mathematics was needed, and he worked quite hard to learn it. The general theory also turned out to be beautiful, but at a different level of complexity than the special theory.

In other ways, too, one can be lured into having false expectations. For instance, it seems right, somehow, that a beautiful mathematical result should have a beautiful proof. But if one limits oneself to such a proof, it may in fact never be found. A correct proof, when finally found, may be a real Rube Goldberg creation, one that would seem a serious threat to our principle of beauty. Sometimes a mathematician’s unquenchable thirst for beauty pays off and a better, more natural proof is found. But at other times it seems that there’s little hope, that every avenue of approach has been tried. And then . . .

All mathematical ages, from the distant past to the present, have been witness to this struggle. As an example from the past, consider these two famous problems of antiquity:

(a) What is the area of a sphere of radius \( r \)?
   (The answer is \( 4\pi r^2 \).)
(b) What is the volume of a cone of base area \( B \) and height \( h \)? (The answer is \( \frac{1}{3} Bh \).)

Archimedes of Syracuse proved both of these. It took him many years, and so proud was he of his solutions that he requested that these formulas be engraved on his tombstone. His arguments were long and intricate—and Archimedes was highly regarded for the economy and elegance of his mathematical reasoning. For hundreds of years, the world had these two gems without any short, nice way of proving them.

. . . and then it happened. Over nineteen centuries later, while Newton was working on his theory of gravitation, he discovered an immensely powerful tool. He found it as an answer to a vexing problem: his theory seemed to work provided that big spheres (like the sun or planets) could be regarded as mathematical points having the same mass. But he needed to be sure that such an assumption was justified. In his long but successful search for a justification, he discovered one of the cornerstones of mathematics: the integral calculus. Its one unifying method used the tremendous power of algebra that Descartes had harnessed to geometry. Integral calculus easily disposed of hundreds of problems, any one of which could have tormented the great Archimedes. Today, a reasonably good calculus student can derive either of Archimedes’ formulas in fifteen minutes or so.

Here is another mathematical gem which ought to have a neat, beautiful proof: what is the smallest number of colors needed to insure that we can color any map whatever, drawn on a piece of paper, so that countries sharing a common border will get different colors?

The answer is four.

This is a pearl of mathematics like the two formulas of Archimedes, who certainly could have understood and worked on this "four-color problem" as well as we. Can a reasonably good mathematics student solve this in fifteen minutes or so? Not quite. This problem remained unsolved for 125 years, and in that time it suffered just about every mathematical indignity imaginable. Everything from supreme esthetics to tactical warfare was tried on it. Even the great Norbert Wiener, "father of cybernetics," spent serious time on the conjecture. "It may well be," he finally said, "unsolvable." It was at last cracked in 1977, and the proof is one of the longest and most complicated in all mathe-
mathematics. In fact, no human being could ever follow the entire proof through in a lifetime; the proof used a computer in an essential way. The problem has been reduced by humans to several hundred special cases, each of which must be checked and verified. It is the computer which performs this enormously long task, and it is the computer we must trust. There are many mathematicians who find it hard to trust a machine this far—too much of the proof, they feel, remains untouched by direct human consideration. The fact is, we have a new tool and, as happens so frequently in science, a psychological shift is inevitable. It is reminiscent of one elderly gentleman who sadly looked at a computer printout of \(\pi\), written to 200,000 places (equivalent to several hundred man-years of calculation). "I don't like it," he said. "I prefer my \(\pi\) to be hand-crafted."

Finally, we note that our principle represents only one bit of wisdom scientists and mathematicians have gained throughout the years. Here are a few others: share your knowledge with others; be courageous—don't be afraid to experiment, to guess, to be wrong; do enough spade work, gathering examples, working out special cases and the like, so your guesses can be good ones. A questionnaire given to a number of the world's leading mathematicians some years ago asked: "What trait(s) do you consider most important for success in mathematical research?" There were many answers like perseverance, a good memory, attention to detail, and the like, but the decisive winner was: Keep an open mind!

Another piece of advice comes from the mathematical giant David Hilbert (1862-1943). He used to say, rather cryptically, "The trick in doing mathematics is to start from the right end." In his later years, Hilbert threw himself into a vast project of solidifying the foundations of mathematics. He was a true champion of the axiomatic method (it was he who filled in Euclid's gaps), and he strongly believed it to be the road that would take us wherever we wanted to go in mathematics. But it was the younger, ever-doubting Kurt Gödel (1906-1978) who looked at the question of mathematical foundations from the other end. His work soon showed that Hilbert's grand dream, as originally conceived, was impossible. Mathematics, Gödel showed, is more like Swiss cheese, with infinitely many unanswerable questions, and no finite set of axioms can ever fill in all the holes. This turned the foundations of mathematics upside down, and of course Gödel immediately became a mathematical immortal himself. Gödel's proof has its own beauty—in fact, it is treated esthetically in Alfred Hofstadter's popular book, Gödel, Escher, Bach.

Though the level of complexity in mathematics may rise, esthetic considerations, properly used, will likely be an important tool of discovery for a very long time to come.
Elizabeth P. Kirk

Severance Hall, Cleveland’s Temple of Music

Visitors to Cleveland’s University Circle, where most of the city’s major cultural institutions are clustered, are immediately struck by a massive yet graceful edifice overlooking the Art Museum’s lagoon on one side and the campus of Case Western Reserve University on the other. The building is Severance Hall, home of the Cleveland Orchestra, completed in 1931 in the depths of the Great Depression. For some Clevelanders at the time, this architectural gem, stately without, tastefully sumptuous within, was a feast of extravagance at a time when food and jobs were scarce. For the millionaire principal donor, it was a deeply personal memorial to his beloved wife (it has been called
Cleveland's Taj Mahal). For all who view it, Severance Hall is a testament to the achievement—and a few of the mistakes—possible when a number of wealthy, public-spirited amateurs join forces with their community in a major civic enterprise.

By 1928, when the dreams of an orchestra hall finally began to be realized, Cleveland was a city in its prime. The 1928 City Directory boldly proclaimed Cleveland to be "The Fifth City in the Nation in Population; The Commercial, Financial and Industrial Metropolis of Ohio; A City of Progress, Beauty and Industrial Activity and Achievement." Two-thirds of all Great Lakes shipping was owned or controlled by Cleveland business. It was a national leader in manufacturing and the greatest iron ore market in the world.

Influential Clevelanders, wishing the city to reflect their glory, erected fine buildings and set them off with extensive park lands. The "Group Plan" for development of the downtown mall area was rapidly being realized in an impressive group of civic buildings.\(^1\) The City Directory urged trade and professional organizations to bring their next convention to Cleveland, citing as enticements the city's parks, art galleries, museums, and colleges. Clearly, culture and education were flourishing along with commercial success.

The area's park system grew rapidly between 1880 and 1900, along with the new cultural center in University Circle. Jeptha Wade had transformed acreage at the far eastern end of the city into a park, "in which the skill of the landscape artist had touched the attractions of nature but to adorn," and donated it to the city in 1882.\(^2\) Wade Park became the nucleus of a natural and cultural preserve. It was the first of several donations that created an extensive chain of park land reaching from Lake Erie to the new residential area in Cleveland Heights and Shaker Heights south and east of University Circle. Shortly after Wade Park was donated, action was taken to preserve the surrounding property for cultural development. In the 1880s, both Western Reserve University and Case Institute of Applied Science were established on properties adjoining it. Wade's grandson, J.H. Wade, arranged to have land designated so that the Cleveland Museum of Art could be built on the Wade allotment in 1916. With the Museum and the two schools in place, University Circle's destiny as a cultural center was assured.

Plans for an orchestra hall first took root in the discussions of the Cleveland Conference for Educational Cooperation (later known as the Conference for Educational Planning) in 1924. Organized by Frederick Allen White, Director of the Cleveland Museum of Art, this conference brought together the officers and executives of nineteen major educational and cultural organizations in the area.\(^3\) In the course of the conference, representatives of Western Reserve University and the Musical Arts Association discovered their mutual need for an auditorium and began to discuss possible cooperation in erecting a single building.

The Cleveland Orchestra had been leading a nomadic existence since its founding in 1918. Performances were given at the Cleveland Grays' Armory, which was also used for commercial exhibitions and poultry shows. The Orchestra moved to the more spacious Masonic Auditorium after the first.

Elizabeth P. Kirk, a native of Toledo, Ohio, has three academic degrees: a B.F.A. in music history (from Lake Erie College), an M.A. in musicology, and an M.S. in library science (both from Case Western Reserve University). She says that she is inquisitive by nature: "One way or another, my three degrees all relate to procuring information." Ms. Kirk's fascination with Severance Hall began in 1975 when she interned with Klaus Roy, publications director for the Cleveland Orchestra. In 1980, she worked as a consultant involved in the celebration of the fiftieth anniversary of the Hall, and wrote the text for the souvenir book, Severance Hall—The First Fifty Years. From 1981 to 1985 she served as Executive Director of the Young Audiences program in Cleveland. When she recently decided to launch into a career as a free-lance writer, the building of Severance seemed a natural topic to begin with.
season, but scheduling around Masonic ceremonials was a problem. Tours were usually arranged for times when the hall was unavailable, but still various rehearsal sites were often required. Sometimes the Hanna and Ohio Theatres were used, sometimes Euclid Avenue Baptist Church or Keith’s Palace Theatre. As one critic remarked, orchestra manager Adella Prentiss Hughes “was never driven to occupy the East 9th Street pier or the Public Square, but she had a lively run about the city, attempting the appropriate presentation of her artists.” Being a tenant was hard enough, but Mrs. Hughes finally lost patience when Orchestra members were unable to concentrate for the buzzing of vacuum cleaners readying the Palace Theater for an afternoon show.

Adella Prentiss Hughes was a woman of great determination and her plea, “Would music never be given the first consideration anywhere?” became a call to action. Long before the Cleveland Conference for Educational Cooperation, she investigated alternatives for a permanent Orchestra Hall. First she turned to former Clevelander John D. Rockefeller, Jr., for assistance. Trading on her friendship with his family, Mrs. Hughes appealed to him for donation of some Rockefeller property at Euclid Avenue and East 40th Street, in an April 6, 1920 letter:

Now that the Musical Arts Association is definitely established in support of a permanently endowed orchestra and as a result of this, there is no doubt whatever of its undertaking to build a home for the Orchestra in the next few years. I once more want to ask your consideration of donating that piece of ground to the Musical Arts Association for that purpose. There is a large sum of money for a Music Hall promised to us by one of our most interested supporters, but I am not now at liberty to go into details . . . In the nature of things, I cannot go on indefinitely and it would be a great satisfaction if the quarter century could be reached and a permanent building for music assured in Cleveland.

Just who that donor might have been remains unclear. Rockefeller denied the request, advising, “When the time comes that you will undertake the building of a music hall definitely, regardless of whether we make a contribution or not, you may write to me again.” But Adella Prentiss Hughes did not give up. Plans for a music hall at East 40th Street, by architect Frank W. Bail, still exist.

Welcome support finally appeared in the Educational Group Planning Commission. Discussion progressed from whether an orchestra hall was necessary to where one could be located. Initially the Musical Arts Association Executive Committee had mixed reactions to the proposal of University Circle
as a location. Some members were convinced that moving so far from Public Square would kill the struggling organization. Two events simplified the decision. Inquiries determined that the cost of lots near Public Square was prohibitive. And a survey by Mrs. Hughes revealed that the highest concentration of orchestra subscribers and Maintenance Fund donors was centered around University Circle and in the new eastern suburbs.

The decision to locate in University Circle was progress, but the future of the orchestra's home was still uncertain. Three critical steps remained: to determine specific requirements for a hall, to secure financing, and to set a precise location for it. The Musical Arts Association granted Walter McCormack, architect for the Cleveland Board of Education from 1912 to 1925, permission to submit drawings for a facility. McCormack studied his subject extensively. He traveled east to examine concert halls, including Philadelphia's Academy of Music and Carnegie Hall, and consulted with acoustical engineer Clifford Swan. By February, 1928 he had sketches ready for Adella Prentiss Hughes. These consisted of the bare essentials: a symphony hall with boxes and foyer, and another, smaller hall at the stage end of the building for use by the University and the Orchestra.

John Long Severance was among the first to review these plans. His involvement at this time was as President of the Musical Arts Association, not as prospective donor of the new building. Severance was a descendant of Cleveland's pioneer families. His great-grandfather, David Long, came to the city in 1810 as its first practicing physician. John Severance had inherited wealth from his father's successful ventures in the Standard Oil Company, and increased it through business dealings as President of the Cleveland Arcade Company and a director of Cleveland Trust. He was a financier with an interest in a steel firm, Youngstown Sheet and Tube, and many other enterprises. His tastes in the arts were well developed. He was reputed to have a fine tenor voice and visitors to the Severance estate, Longwood, could depend on having first-rate musical entertainment. Before Severance assisted in founding Cleveland's orchestra, he was helping to sponsor touring artists. Longwood housed Severance's famous art collection, which included works by Reynolds and Turner. Severance donated extensively to the Cleveland Museum of Art's collections, chief among his gifts being the Court of Armor and Tapestries. It is not surprising that a person of his wealth and interests should be chosen to head the boards of the Musical Arts Association and the Cleveland Museum of Art.

Severance's response to McCormack's plans was encouraging. His only major objection was that the main auditorium needed to have a real stage, with equipment for presenting operettas and plays, rather than one designed exclusively for an orchestra. McCormack's plans were discussed, then revised through most of 1928. Price estimates based on square footage of these plans suggested that the building could be erected for $950,000.

The University proposed that the hall be located at the corner of East Boulevard and Euclid Avenue, on land previously owned by the First Church of Christ, Scientist, and intended as the site of a church. "It was only because the Educational Group Plan had behind it the power of a group, as distinguished from that of any one or two institutions, that it was possible to acquire [this lot] . . . , where plans for a most attractive building had been completed and arrangements made to start the work." Western Reserve University purchased the property in 1927, with the idea that an auditorium might be constructed there. University President Robert Vinson brought John Severance a tentative layout of the property made by Frank Walker and Abram Garfield, consulting architects for the University.

Detailed restrictions had been imposed by the Wade Realty Company on the dimensions, purpose, and cost of any building erected in that location. The Wade family had donated and still controlled much of the property in University Circle; any plan considered by the Musical Arts Association for that site would need approval by the Wade interests. Consideration of alternative sites was abandoned when the University trustees approved donation of the Euclid-East Boulevard lot at their June, 1928 meeting. Their only condition was that $500,000 to $600,000 be raised to support the maintenance of the new building.

By late summer, the appearance and location of the new music hall seemed far
more definite than did any method of paying for it. Vinson had approached Severance earlier that year about a donation. Severance was interested, but would not commit himself. Various Orchestra supporters had talked of making endowment contributions, but even promises were few. The stage was set for a decisive action to break the stalemate and drive the project forward. The wait was a short one.

On December 11, 1928, the Orchestra celebrated its tenth anniversary with a gala concert at the Public Music Hall. Given the festive mood of the evening, it is unlikely that either audience or musicians were surprised when Musical Arts Association Vice President Dudley S. Blossom walked out onto the stage before the Orchestra dispersed for intermission. Conversations stopped as attention turned back to the stage and the audience waited for Blossom to speak. Delight and astonishment swept through the auditorium at Blossom’s announcement that John and Elisabeth Severance had agreed to give $1,000,000 for a new hall, providing the University donated the land and friends of the Orchestra raised an endowment of $2,000,000 to $2,500,000. Severance had provided timely leadership. The Cleveland Bystander later summed up public reaction by saying,

Great gifts bestowed with a wisdom commensurate to the magnitude of the gift are rare indeed. The thought and fine appreciation of the urgent needs of this city evident in the million-dollar benefaction proffered by Mr. John Long Severance materially enhance the feeling of gratitude felt by the citizens of Cleveland. It is a gesture—if the gift of a million dollars may be described as a gesture—which expresses all the deep interest, loyalty, and devotion which John Severance feels to and for Cleveland. It is tangible evidence of his belief in our future."

Severance Hall became a more personal cause than Severance had anticipated. Scarcely a month after the anniversary concert, Elisabeth DeWitt Severance died of a stroke at their Pasadena, California home. In a March 25, 1929 letter to Frank H. Ginn, Musical Arts Association trustee and Building Committee chairman, Severance made it clear that the hall would be dedicated to his wife and all aspects of its equipment and construction should be fitting for a memorial. Severance assumed all costs of building and furnishing the hall that exceeded the original gift. Throughout the next two years, he devoted his time and income to creating this tribute.

In addition to Severance, several other powerful Clevelanders played key roles in the construction of the new Hall. Like most people who were deeply involved with its planning, Adella Prentiss Hughes had also been a force in establishing the Orchestra. Her career as a musical entrepreneur began at Vassar College when she managed a tour by the college banjo club. Cleveland’s cultural life owed much to her promotional activities. Beginning in 1898, until she became completely absorbed in founding and managing The Cleveland Orchestra, Mrs.
Hughes provided citizens with cultural sustenance, engaging visiting orchestras, famous soloists, and touring opera companies. She brought a lively appreciation for the practical side of the arts to her job as Orchestra Manager. As a member of the Building Committee, Mrs. Hughes immersed herself in the utilitarian aspects of hall planning.

Frank Ginn was a natural choice as Building Committee chairman. He and Severance had worked together in founding the Orchestra and assuring its continued growth by serving on the Musical Arts Association Board. A prominent corporate attorney in the firm of Tolles, Hogsett, and Ginn (now Jones, Day, Reavis, and Pogue), for many years he was associated with the real estate interests of the Van Sweringen brothers (who created Shaker Heights), and he was a director of two of their railroads.

Ginn’s commitment to music extended beyond the Orchestra. He was a member of the Northern Ohio Opera Association and an active supporter of chamber music. When the Cleveland String Quartet was founded in 1919, Ginn took a personal interest in its welfare, and for many years the ensemble performed a monthly Sunday evening concert in his home. Ginn also shared Severance’s interest in art. He had a large collection of paintings, specializing in modern French works that he frequently lent for exhibits.

When Dudley Blossom announced the Severance gift, he assumed leadership in giving Cleveland a fitting orchestra hall. Unlike Hughes and Ginn, Blossom was not involved with physical planning. His responsibility was money, and he was uniquely suited to the role. Blossom was involved with the community through his work as City Welfare Director. Area financial leaders were already well acquainted with his fundraising efforts on behalf of the Community Fund, and Blossom had invaluable contacts when he became Chairman of the Orchestra Endowment Campaign.

Blossom was a fine amateur violinist and for many years he enjoyed taking part in musical productions of the Hermit Club. One cold winter night in 1924 Blossom’s car broke down and he was forced to walk several miles to get help. Both of his hands were severely frostbitten and though he retained use of them, Blossom’s violin playing was curtailed by the loss of two fingers on each hand. His love of music was undiminished by the accident. Blossom undoubtedly shared Severance’s conviction that music had an important place in the community and he did much to support it. Though a heart attack in 1928 left Blossom an invalid for well over a year, he still agreed to undertake the Endowment Campaign.

The Endowment Campaign actually started long before the public fund drive of April 11-19, 1929. Many of the large gifts were quietly solicited, and by February, 1929, Blossom telegraphed Severance to say that $2,000,500 had already been pledged by twenty-one people. Blossom and his wife Elizabeth led the field with a substantial contribution of $750,000. John Severance pledged an additional $250,000 for the endowment on top of his gift for the hall. Samuel Mather, the Cleveland millionaire whose wealth came from his extensive interests in mining and steelmaking, gave $400,000 and John D. Rockefeller, Jr., came forward with an unexpected donation of $250,000.

The newspapers enthusiastically supported the Campaign. A Plain Dealer headline on March 16, 1929, read, “Can Music Reach the Pocketbook? Melody is Salve for Chafed Souls, But Orchestra Asks $2,500,000.” On April 7, 1929, in The News, Archie Bell took a different tack, alluding to the multiple uses of the Grays’ Armory: “Cleveland Habit of Mixing Music With Poultry Shows, Tractors and Trained Seals Will Come to an End With Completion of the Orchestra’s New Home.”

Over 500 volunteers directed by fifty team leaders flocked to campaign headquarters at the Hotel Cleveland to kick off the Campaign. PTAs, schools, and community groups took part. The Orchestra Endowment had become a public cause. The Campaign tally revealed that over 3,000 people were engaged in the drive to give their orchestra its home. Contributions ranging from seven cents to hundreds of thousands brought the Endowment Campaign to its total of $2,363,070, and the Maintenance fund required by the University to a gratifying $650,000. The initiative to build the Hall started with only a few dedicated people, but soon became a city-wide commitment.

Once a major portion of the endowment money had been pledged, it was possi-
ble for the Musical Arts Association to make definite plans for an architect. McCornack's agreement had been provisional. He had withdrawn from the firm of Warner, McCornack, and Mitchell in October, 1928, and was without the support of an office. The Building Committee wanted to consider new alternatives. A flurry of correspondence ensued among Ginn, Severance, Blossom, and McCornack. Ginn telegraphed Severance with an urgent message on January 4, 1929: "Have received from Dudley Blossom important and reliable information on account of which Dudley and I seriously doubt McCornack's qualifications as an architect." He followed this up with a letter three days later saying "Both Dudley and I agree that... [we] much preferred to have the work done through an established office and organization... My own preference is Walker and Weeks, as I feel they are the best architectural organization in Cleveland and are best equipped to do the work from all standpoints." Severance agreed with Ginn, though he pointed out that "There are many good things about his [McCornack's] plans that I like... It is possible that Fritz Walker, while incorporating the general design of the auditorium proper could design the external appearance of the building and make it equally pleasing while eliminating much of this waste space." McCornack heard rumors about Blossom's allegations against his professional
competence, and he wrote to Severance on March 21, 1929, "I understand that a lack of confidence in my ability to execute my plans has arisen, and that I have been approached to sell them. There are some things in life that are more important to me than money. My time can be bought, but my professional reputation in being able to carry through to completion any building I design cannot be questioned or bought. . . . With the project so well developed, it is a reflection on my professional standing to be replaced."

Neither Ginn nor Severance was anxious to deny credit for what McCornack had done on the project, but he had become unpleasantly contentious. Whether or not their suspicions about McCornack's ability to carry out his plans were true, he was no longer supported by a firm. They agreed with Robert Vinson's suggestion that Garfield and Walker be given a chance to submit plans because of "their association with a number of people who will be contributors to the Endowment fund," but they did want to treat McCornack fairly.15

Walker, Garfield, and McCornack were already acquainted with each other and the proposed building site. They had been architectural advisors on the University commission to recommend a scheme for future development of the University Circle area. Severance preferred Walker's firm, Walker and Weeks, and the Building Committee endorsed his choice. On May 10, 1929, Frank Ginn asked the Musical Arts Association Executive Committee to rescind their Decem-
ber, 1928 resolution authorizing McCornack to make drawings for the Hall, and to arrive at a contract with Walker and Weeks as the architects. The Musical Arts Association purchased McCornack's drawings for their use. To alleviate hard feelings, both Garfield and McCornack were named as architectural consultants on the project, and McCornack was evidently pacified by this solution. Building Committee correspondence suggests that neither of them played an active role in future planning.

Severance's choice of Walker and Weeks was unsurprising, given the time and place that the Hall was being built. It was a leading architectural firm in Cleveland from its start in 1911 until Harry E. Weeks's death in 1935. Buildings designed by them were scattered throughout Ohio, Pennsylvania, and Indiana; Cleveland alone had forty-seven major structures by them, including the Guardian Building (National City Bank, 1915), the Federal Reserve Bank (1923), Cleveland Public Library (1925), and the Allen Memorial Medical Library (1926).

Their reputation was founded on beautifully crafted, monumental buildings. Walker and Weeks interpreted Clevelanders' desire to celebrate their city's prosperity through rich architectural statements. The firm's designs tended to synthesize various styles in a harmonious eclecticism. Frank Walker had studied at the Ecole des Beaux-Arts in Paris and his work retained classical elements that blended with other styles. Walker and Weeks's buildings used rich ma-
terials and decorations: marble and granite both inside and out; bronze, iron, and aluminum for railings, grilles, and ornaments; frescos, sculptures, and murals which became an integral part of their designs. It is small wonder that John Severance chose Walker and Weeks to design his monumental Hall after viewing the splendors of Cleveland Public Library and the Federal Reserve Bank.¹⁰

Building Committee members worked closely with the architects; even minor decisions about decorative materials and designs had to be approved by Severance or Ginn. Severance was kept abreast of developments while he was vacationing by regular letters from Ginn, Hughes, and Vinson. Walker and Weeks sent detailed reports and photographs to Severance when he was wintering at his home in Pasadena, California. Ginn kept a tight rein on the proceedings and either met or corresponded with the architects weekly. Few aspects of the construction and furnishing of Severance Hall escaped his scrutiny and all contracts and payments were authorized by Ginn.

Walker and Weeks had the task of reconciling structural and aesthetic demands in a building already partially designed by another architect. There were occasions when priorities of the donors conflicted with recommendations by the professionals. Beauty and versatility were not always compatible with structural soundness. For better or worse, Severance Hall became a design in compromise.

The planners had various ideals of what the building should be. Severance wanted a beautiful monument to his wife, an auditorium which would have splendid acoustics and facilities to stage dramatic events. In deference to Mrs. Severance’s wishes, he also stressed the need for the Hall to be accessible and comfortable for patrons. The Building Committee was concerned with efficiency of time and cost. The University was concerned that concert facilities be adaptable for lecture and assembly space. Walker and Weeks had to accommodate these varied priorities and at the same time design an architecturally beautiful and technically excellent structure. It was no easy task.

The Euclid Avenue-East Boulevard location imposed severe limitations on the architects. The lot was an unusual triangular shape facing a busy intersection. The Wade restrictions dictated guidelines for the building’s design and its use: the new hall could be used only for educational or religious purposes and not for commercial ones; it had to cost a minimum of $125,000 and have walls covered with marble, granite, or another suitable stone. Even building placement on the lot was specified. The Museum of Natural History donated several feet of land.
By March 10, 1930, structural steel encloses the main auditorium.

from their adjoining lot to better accommodate the new hall.7

The site also posed esthetic challenges. Stylistically, the building had to be compatible with the Museum of Art and the Allen Memorial Medical Library which flanked it on either side. There was danger that a suitably grand hall would be obtrusive beside its neighbors. A relief model was constructed of the area so the problem could be evaluated. Walker and Weeks planned a creative solution by dividing the mass of the building across the corner in a central rotunda with wings sweeping back on two sides. This avoided making a narrow facade and created a building of majestic scope. Its symmetrical lines and restrained decoration would blend well into the architectural surroundings.

Severance Hall was to provide ideal listening conditions for audience and musicians alike. Using McCormack’s drawings for reference, the architects plotted out a new set of calculations. They began at the heart of the main auditorium—the stage. How much seating space would the orchestra need alone? How much with full chorus? A pit seating the entire orchestra would be necessary for staged productions. A flexible arrangement involving two elevators was placed at the front of the stage, and a smaller lift was installed within the larger elevator for moving stage equipment. This ingenious plan allowed for extending stage space or creating an orchestra pit, at need.

The Building Committee had clear notions about seating. They specified 800 main-floor chairs, primarily in front of the balcony, a full horseshoe of twenty-five boxes, and approximately 900 dress circle and balcony chairs to be arranged in sweeping curves above them. Sight lines were to be given rigorous attention. The auditorium seated approximately 1900 (432 less than the Masonic Auditorium), and the Chamber Music Hall 424. Mrs. Hughes extolled the virtues of a smaller facility: “Even the fifty-cent seat holders will be able to see and hear as well as the soloists.”

The main auditorium took shape quickly. John Severance and Walker and Weeks initially made a bold decision: scientific and acoustical demands should outweigh considerations of visual beauty and comfort in planning the hall. Dayton C. Miller, a physics professor at Case School of Applied Science, was called in to assist with acoustical design. Miller’s studies and reports gave acoustical calculations for the main auditorium, the smaller Chamber Music Hall, and the drive-through under the building, based on use of specific designs and materials. His recommendations influenced the selection of materials and the distinctive shape of the main auditorium ceiling.

Many conditions that Dayton Miller
Plaster-and-steel "sky dome" (since removed) seen from backstage floor, made an effective theatrical backdrop but deadened sound.

specified for design of the main auditorium were altered, with unfortunate acoustical results.\cite{2} Scientific considerations did not always prevail. Two modifications deviated substantially from his instruction that the stage be enclosed on all sides by hard, reflective surfaces. The first of these was a cyclorama or "sky dome" of plaster applied to wire mesh on a metal frame, added at Severance’s request to create a backdrop for dramatic productions in place of elaborate scenery. This structure curved horizontally around the stage back wall and formed a partial dome over the stage area. It was sixty feet wide and the top overhung the base by nearly sixteen feet, reaching forty feet above the stage floor. The sky dome was covered with a movable stage set during concerts, making a hollow, sound-absorbing chamber at the stage back.

The other major structural modification was the consequence of a generous gift. A magnificent Skinner pipe organ was donated in memory of Mr. and Mrs. David Z. Norton by their children. The architects could find no satisfactory method of incorporating the instrument into existing plans for the auditorium or stage. The organ builder himself, Ernest Skinner, was brought in as a consultant. The solution achieved by Skinner and the architects was inevitably a compromise. It benefited neither the hall’s acoustics nor the instrument. The vast organ was placed in an enclosed chamber high above the stage, sealed off by a large door when not in use. When the door was opened, the organ music could drift downwards. This chamber formed yet another sound-absorbing cavity.

Acoustical measures were taken for insulating against unwanted sound as well as for enhancing the music. The exterior stone walls were lined with heavy layers of plaster and block insulation. The plaster ceiling of the main auditorium was recessed and suspended to eliminate the sound of rain and hall. Elaborate precautions were also made to keep sound from traveling between different parts of the building. The extensive system of ducts and equipment for climate control needed to be designed for silent operation. Machinery rooms were to be located in the basement, well away from the main auditorium and surrounded by layers of plaster and tile.

John Severance, Orchestra Conductor Nikolai Sokoloff, and Walker and Weeks were fascinated by the potential for heightening musical experience through the coordination of sound and light. Professor S. R. MacCandless, brought in as a special lighting consultant from the School of Drama at Yale, was instrumental in planning the complex lighting system. Through it a vast array of light intensities and colors could be reflected across the auditorium ceiling and stage during performance in sympathetic response to the music. Lighting was also intended to take an important dramatic role during stage productions. MacCandless helped to plan the sky dome as a vehicle for the intricate lighting system. The concave surface of the sky dome was intended to convey a "designed illusion of infinite space and distance" as light reflected upon it, enhancing the action on stage.\cite{3}

The unusual shape of the building exterior demanded much patience and ingenuity in arranging for the various entrances, stairs, elevators, public spaces, and the small chamber music hall.\cite{4} The architects organized these symmetrically, to produce easy
traffic flow, satisfying Severance’s desire to make the building convenient and accessible for patrons. The drive running beneath the hall from Euclid Avenue to East Boulevard provided a covered access within the elegantly appointed hall.

The architect’s plans gradually took shape and the construction contract was let to Crowell and Little Company. Severance wielded a silver spade to break ground on November 14, 1929, as a trumpet call by Orchestra member Alois Hruby rang out. In February, 1930, Frank Ginn wrote to Severance in California assuring him that the building was going up as fast as possible, though, “as usually happens, parts get shipped out of order, and some parts are mislaid or lost in the shop or in transit, and delays result.” By late summer, though the exterior was completed and the interior structure was taking form, there was little hope that the hall would be completed by the opening of the 1930-31 season as originally expected.

Walker and Weeks designed Severance Hall’s exterior with simple elegance. T raced steps converged, then swept upwards across an Ohio sandstone base to the commanding portico set back and above the street level. The effect was balanced and imposing. The architects attributed its classical elements to the English Renaissance style, while acknowledging the decorative embellishments to be quite individual. The graceful low relief sculptures adorning the upper portion of the Indiana limestone walls were designed by the Cleveland firm of Fischer and Jirouch, which had already decorated many of Walker and Weeks’ buildings.

The portico was crowned with a striking pediment sculpture by the distinguished New York artist Henry Hering, who was already familiar to Clevelanders through his sculptures fronting the Federal Reserve Bank. Severance readily agreed to Walker’s suggestion that Hering design the pediment decoration. Ginn visited Hering’s New York studio, and on April 5, 1930, he wrote to Severance, “I think he has a real idea but I did not like the way it was worked out . . . .” Severance reviewed the photographs Ginn sent and decided that combining elements from several drawings would be preferable. The finished sculpture was a direct result of Severance’s advice.

The restrained elegance of the building’s exterior gave way to festive expression within. The grand foyer glittered with an ornate combination of Egyptian and art-deco motifs, unlike anything else in the Hall. Gilt, bronze, and variegated red marbles glowed

Below: Close view of light fixture and panelling in the Chamber Music Hall.

in lush profusion. By comparison, the main auditorium’s cool blue and silver lace tracery was subdued and refined. The Chamber Music Hall and Board Room reflected an elaborate eighteenth-century decor, achieved in the same lavish materials as the rest of the building. Many of Cleveland’s finest artists and craftsmen have left their work on permanent display in Severance Hall. Sculptural designs by Fischer and Jirouch were used throughout, giving underlying unity to the interior. They modeled the foyer ceiling, and the wall and ceiling decorations in both the Chamber Music Hall and the auditorium. Even the details of grilles and air vents were enriched with their craftsmanship. The Joseph Harsch Bronze Foundry executed all of the architectural metalwork using Fischer and Jirouch designs.

Cleveland Institute of Art faculty member Elsa Vick Shaw designed the colorful murals in the grand foyer. Adella Prentiss Hughes was concerned that the ancient instruments represented on these panels should be accurate as well as beautiful. She consulted Carl Engel and Oliver Strunk of
the Music Division at the Library of Congress. Strunk recommended illustrating man’s history through the evolution of musical instruments. Greek culture was to be reflected by pipes of Pan, Egypt by primitive and oriental instruments, and the Renaissance by lutes, recorders, and other instruments of the period. There had been some thought of showing a bagpipe, but this idea was rejected because the instrument had no descendant in the modern orchestra. Strunk’s advice influenced the sequence and content of Shaw’s work in the direction of scholarly precision.

The Joseph Sturdy Company decorated the Board Room, Green Room, and Chamber Music Hall, using designs ranging from the graceful pastoral murals of the Chamber Music Hall to the intricate ceiling and wood finishing of the Board Room. They ordered special zebrawood and avodire veneers to complement their work in the Chamber Music Hall and attended to small details, such as painting the exposed radiators and the hangers in the box cloak rooms to blend with their surroundings.

Above: Main foyer glows and glitters with red marble, gilt grillwork, and murals (over doorways) accurately depicting musical instruments of the past. Below: Rich appointments adorn the Board Room, including marble door trims taken from a Renaissance Italian palace.
Severance devoted special attention to furnishing the Board Room. The New York firm of French and Company secured a number of magnificent antiques for this purpose. This meeting place was to have the atmosphere of a mansion living room and Severance was prepared to go to considerable expense to achieve it. Among the most remarkable pieces chosen for the room were the antique white marble door trims and eighteenth-century carved Adams mantel. The door trims, sculptured with Renaissance ornaments, had been removed from the Palazzo Torlonia in Rome. Legend has it that the trims were cracked in shipment and accidentally discarded, and that Severance himself rescued them from the rubbish pile.

Lighting of the Hall was planned to accent the decorations. Much of it was concealed behind attractive fixtures, radiating off polished surfaces in a warm, indirect glow. The three flashed opal glass chandeliers in the grand foyer reflected across the gilded ceiling, their shape complementing the patterned marble terrazzo floor below. Delicate floral lighting fixtures were subtly
worked into the auditorium ceiling design. Tonal lighting was carefully planned to highlight the attire and complexion of female audience members both day and night.

The time between ground breaking and dedication was less than a year and a half. Severance spared neither expense nor detail to make his monument a fitting tribute to his wife and to the city in which they lived. Severance Hall opened to fanfare and acclaim on February 5, 1931. With conductor Nikolai Sokoloff on the podium, concertgoers heard the "Evocation" that Severance's friend Charles Martin Loeffler had composed for the dedication, the Bach C Minor Passacaglia arranged for orchestra by Goedicke, and Brahms' Symphony No. 1. Newspapers vied with one another in praising the new Hall. "Music Lovers Find Splendor In New Temple," proclaimed The News the next day. Newspapers across the country ran articles about the dedication, praising the beauty and comfort of the new hall. The discriminating Cleveland Press music critic Arthur Shepherd was even impressed with the acoustics. After attending the opening concert, he reported that, "The elusive problem of sound properties in the new building have apparently been triumphantly solved." He did mention that the Orchestra would have to adapt to the new space before it could achieve maximum effectiveness. Festivities continued through the opening weekend, with the dedication of the Chamber Music Hall on February 6, 1931, and two other symphony concerts. The Norton Memorial Organ was dedicated the following month.

Few lavish buildings were dedicated in 1931. The stock market crash in 1929 had ruined many fortunes and diminished others. Completing this splendid building must have seemed bravely optimistic given the troubled economy. Though Severance was not financially ruined, his fortune was seriously affected by the financial disaster. The Hall had become a much greater burden than he could have foreseen in 1929. The total cost of building and furnishing Severance Hall rose to $2,800,000, and Severance carried debts for it until at least 1935, the year before his death.

Many changes in style and technology have occurred since 1931. Though the beauty of Severance Hall has remained undiminished, many of its technical aspects have been modernized. Auditorium acoustics have provoked the greatest amount of discussion and revision. Both style and purpose had influenced the original design, and not always to good effect. Though Robert C. Marsh suggests that the "combination of live sound in a dead hall was very much in vogue at the time Severance Hall was built, and the intentions of the architects and the acoustician were perfectly realized in the finished structure," it is questionable whether Dayton Miller was satisfied. His specifications had been disregarded in stage design, so the completed auditorium was much less reverberant than he had calculated.

Several acousticians were consulted before substantial modifications were made. In 1947, the new Conductor, George Szell, was displeased by the sound quality and asked Clifford Swan to study the auditorium acoustics. Swan concluded, "Your hall is beautiful and luxurious, but it is also 'dead'; one is responsible for the other . . . Another matter which, although less important, should be considered is the stage set surrounding the orchestra."

Swan's criticisms were echoed and amplified by other experts. In 1953, Professors Arthur H. Benade and Robert S. Shankland of the Physics Department at Case Institute of Technology were asked to make a detailed acoustical evaluation. Shankland summarized his views on the auditorium to Plain Dealer critic Herbert Ewell: "It is generally agreed that the volume of musical tone which an orchestra can produce in Severance Hall is markedly lower than that which is created by the same orchestra in nearly every other music hall in the United States or abroad . . . . The adverse conditions in Severance Hall are such that they can be remedied by straightforward application of well known and tested principles of acoustical design that can be made without excessive cost." He went on to advise the removal of the sound-absorbing drapes and carpets and rebuilding the stage setting with heavy, resonant wood paneling on the walls and floor. Benade and Shankland's report prompted removal of drapes from the boxes and construction of a new movable stage set, but no extensive renovation was authorized.

Three years passed before further studies were undertaken. This time Heinrich Keilholz, the acoustician and chief recording
engineer for Deutsche Grammophon, was consulted. Keilholz's report was not much different from Benade and Shankland's, but its timing was more propitious. The Musical Arts Association Board finally approved a thorough renovation of the main auditorium. The Hall Committee Chairman, Walter K. Bailey, explained his committee's support for the changes by remarking that "We not only wanted to hear a pin drop, but we wanted to hear it drop longer." The architectural firm of Garfield, Harris, Schafer, Flynn, and Williams was hired to undertake the work during the summer of 1958. Robert Shankland was chosen as acoustical advisor to the architects. Walter Bailey wrote him a letter of thanks, saying "Your confirmation of what we were doing gave us the courage to go ahead on what we were planning to do."  

The renovation, which brought the main hall to its present state, made striking changes in the stage area, and lesser ones in the auditorium. A permanent sound-reflective shell was built around the stage. The sky dome and elaborate lighting system were dismantled and the organ loft closed to make way for the new structure. Maple veneer over basswood covered a seventeen-and-a-half-ton steel framework to form parallel convex panels. The side panels were filled with sand to a height of nine feet to prevent vibration and sound leakage. The hard-surfaced, curved panels were designed to reflect sound simultaneously in different directions with minimal loss of power. The projection of sound outward into the auditorium was aided by the new stage dimensions: forty feet across at the rear widening to fifty-two feet at the front, and twenty-five feet high at the rear rising to thirty-four feet at the outer edge. Electronic speakers at the rear of the shell carry the organ music from the loft onto the stage.

Many of the luxurious, sound-absorbing fabrics were also removed. The heavy stage curtain disappeared. Carpeting was pulled and replaced with sound-reflective
matting. Precise control of temperature and humidity was made by installing a new climate control system designed to maintain an optimal, sound-enhancing atmosphere. The Orchestra was even seated differently to enhance the impact of the acoustical change. Though great care was taken to preserve the beauty of the auditorium, new sights as well as sounds greeted returning concertgoers. The plain wooden shell was a stark contrast to the familiar surroundings and not everyone was pleased with the effect. For most people, however, the improvement of adding over a second of reverberation time more than compensated for the visual changes."

Styles and technology will continue to change, and Severance Hall, now in its mid-fifties, will doubtless undergo further modifications. John Severance's gift was made in support of musical excellence during his lifetime, and it has continued far beyond. The hall remains a superb example of the best that private wealth and taste can accomplish.

Grateful acknowledgement is made to the Archives of the Musical Arts Association and its Archivist, Denise Horstman, for invaluable assistance to my research on this article. Illustrations on the following pages are reproduced courtesy of the Musical Arts Association Archives: pp. 27 (Carl F. Waite); 34–35, 36, 37, 38, 39, 40, 41 (Carl F. Waite); 42 (top); 44 (Hastings-Willinger & Associates). The photograph on p. 42 (bottom) is printed with the kind permission of the Western Reserve Historical Society. Photos on pp. 29 and 33 are from the Press collection at Cleveland State University.

NOTES

1. These included the Fourth District Federal Reserve Bank, City Hall, the Cuyahoga County Court House, the Federal Building, Public Auditorium, and the Public Library. Eric Johannesen's excellent book, Cleveland Architecture 1876-1976 (Cleveland: Western Reserve Historical Society, 1979), gives a detailed examination of many architectural developments mentioned here, including the Group Plan.


3. White organized the conference with a $50,000 grant of support from the Carnegie Foundation. Participants included: John L. Severance and William G. Mather, Cleveland Museum of Art; Frank R. Walker and Abram Garfield, Cleveland School of Architecture; Dudley S. Blossom and Adelia Prentiss Hughes, the Musical Arts Association, which operated the Cleveland Orchestra; and Robert E. Vinson, Western Reserve University, among others (Matson and Clark, pp. 442-443).


6. Hughes, p. 76.


8. Letter from Adella Prentiss Hughes to John Severance, February 2, 1928. (Records of the Board of Trustees, Archives of the Musical Arts Association.)

9. Matson and Clark, p. 447. The Christian Science Church was built on Overlook Road in Cleveland Heights and designed by Walker and Weeks, the architects of Severance Hall. There is a striking similarity between the two buildings.


11. "The history of this crucial period in Severance Hall's development is based on the Musical Arts Association Building Committee correspondence. Much of the information about events in 1928 came from a report by Adella Hughes to Mrs. Dudley Blossom, dated July 13, 1928. (Records of the Board of Trustees, Archives of the Musical Arts Association.)

"For more information on Adelia Prentiss Hughes and her contribution to the founding of the Orchestra see Mary Reeb, "Adelia Prentiss Hughes and the Founding, Fostering, and Financing of the Cleveland Orchestra," *The Gamut*, #15 (Spring/Summer, 1985), pp. 62-68.

"Letter from John Severance to Frank Ginn, February 14, 1929. (Records of the Board of Trustees, Archives of the Musical Arts Association.)

"Related correspondence: Frank Ginn to Adelia Hughes, December 29, 1928; Frank Ginn to Dudley Blossom, December 29, 1928; and Frank Ginn to John Severance, January 4, 1929. (Records of the Board of Trustees, Archives of the Musical Arts Association.)


"Letter from Dudley Blossom to L.B. Williams, May 7, 1929. (Records of the Board of Trustees, Archives of the Musical Arts Association.)

"Quoted by Roelf Loveland, *Cleveland Press* (December 12, 1928). (Records of Marketing and Public Relations, Archives of the Musical Arts Association.)

"A detailed account of hall planning was given by C.W. Stedman of Walker and Weeks in an address before the Cleveland Chapter of the Society of Illuminating Engineers, February 21, 1931. (Reference File, Archives of the Musical Arts Association.)

"Dierer offers a more detailed explanation of this matter in his paper, pp. 15-16.

"Stedman, p. 12.

"Related correspondence: Harry Weeks to Frank Ginn, June 9, 1932, and January 10, 1933; John Severance to Frank Ginn, January 20, 1934; Frank Ginn to John Severance, January 11, 1933, January 17 and 29, 1934. (Records of the Board of Trustees, Archives of the Musical Arts Association.)


"Letter from Clifford Swan to Carl J. Vosburgh, December 30, 1947. (Records of the Board of Trustees, Archives of the Musical Arts Association.)

"Letter from Robert S. Shankland to Herbert Ewell, April 15, 1957. (Reference File, Archives of the Musical Arts Association.)

"Arthur Shepherd, *Cleveland Press* (February 6, 1931). (Records of Marketing and Public Relations, Archives of the Musical Arts Association.)

Joel Hauserman, a native of Cleveland and a graduate of John Carroll University (1973), makes his living as a free-lance photographer, a trade in which he is largely self-taught, although he has attended several workshops in photography. His work has appeared in numerous shows, including the Cleveland Museum of Art's May Show, and it is represented in many private and several corporate collections. Mr. Hauserman has taught photography at a number of schools; he believes that "classical technique is important for successful rendering even in abstract or other styles." His collaboration with dancers and musicians, as in the accompanying photographs, is important to him, he says, as an extension of his involvement in alternate forms of image-making. His other interests include films and music, and he is a self-taught songwriter.

Of this series of photographs he says: "My interest in photographing dancers to show their movement stems from an association with the artist Marilyn Szalay, whose photographic studies often used people in motion. When I began working with the dancer Laura Chapman several years ago, I applied the techniques of balancing ambient light with strobe light to render part of the image clear while the rest is allowed to be blurry, or in motion. I am quite intrigued with the process of randomly generated images using this technique. My control of the situation is limited to technical considerations of exposure, development, and printing. Intuition may tell me to release the shutter at the 'right' moment but I feel I am merely a vehicle for the unseen and for what cannot be completely controlled." Above: a self-portrait by Mr. Hauserman.
Susan and Buzz Gorsky

Ni’ihau: The Island Time Forgot

Hawai‘i—the newest state, the sole island state, the only state ever to have been a monarchy—has yet another anomaly. Twenty minutes by jet from the neon lights of Waikiki and the international trade of Honolulu is Ni’ihau, a privately owned island where there is neither electricity nor running water and where people speak a dialect of Hawaiian used nowhere else. But don’t try to visit this tiny island: it has no scheduled flights, no airport, not even a harbor or port. If, somehow, you landed a private plane on its shores, or sailed or even swam across the 21.5 mile wide, mile-deep channel from Kaua‘i to Ni’ihau, you’d be politely escorted to the beach to await the private launch that provides the only transportation to or from the island. When Governor Ariyoshi visited Ni’ihau in December, 1985, he was the first state executive to do so in twenty-four years, and he entered a world where life goes on as it did a hundred years ago.

An Island for Sale

At the beginning of the nineteenth century the island of Ni’ihau, like all of the inhabited Hawaiian islands, was owned by its king. In this period King Kamehameha I united all the islands except Kaua‘i and Ni’ihau, ruled by King Kaumualii. On two occasions Kamehameha mounted assaults, but the 100-mile distance between O‘ahu and this pair of islands defeated even this fierce warrior, whose efforts resulted in heavy losses. In 1810, however, Kaumualii was persuaded to cede the islands to Kamehameha, making possible the unification of all the Hawaiian islands into one kingdom.

Even then, Ni’ihau remained isolated. Since its arid climate discouraged the raising of cattle or the growing of sandalwood, at that time Hawai‘i’s primary trade item, ships rarely visited the island. No missionaries settled on Ni’ihau, although they occasionally visited from Kaua‘i. When Captain Cook and his crew landed on Ni’ihau in 1780, they gave pigs and goats to the islanders: the animals became wild and ate the sparse ground cover, leaving the island even more barren. The sailors left behind a second gift: venereal disease. Aware that his sailors had infected other islanders on their travels, Cook ordered his men not to spend a night on Ni’ihau. Unfortunately they disobeyed orders, arguing that bad weather made crossing the island’s protective reef too risky. After Cook’s visit, the residents of Ni’ihau didn’t mind when other ships bypassed their home.

Oral tradition suggests that in the mid-nineteenth century Ni’ihau had about 5,000 residents, but other sources use figures closer to 600. Until that time, land in the Hawaiian islands could not be sold; rather, the king divided it among the ali‘i or nobility, who in turn divided their property among lesser nobles; farmers leased land from its owner. In 1848 the monarchy, pressed by the United States, declared a great land reform (in Hawaiian, Mahele), making virtually all the
land available for sale to commoners and even to foreigners. Although the king sold some small parcels on Ni‘ihau, the arid climate and unsuitability for farming made the island unpopular, and most of it remained unsold—until the Sinclair family arrived in Hawai‘i.

The Sinclairs and Robinsons

In 1839 Captain Francis Sinclair of the Royal Navy, a native of Edinburgh and a veteran of the great British naval battles of his time, sailed with his wife and six children to begin a new career in New Zealand. He had purchased an unspecified parcel of land on the North Island from the government; but he arrived during the Maori Land Wars to find that the government had trouble wresting any land from the Maoris. Sinclair made friends with the local chief who protected him and his family, but they still could not obtain land. After four years the Captain moved the family to the South Island. They had very little time to enjoy this new life, for in 1846, on a trip to Wellington, Captain Sinclair and his eldest son, George, were lost at sea.

In 1862, the remaining members of the family sold its holdings in New Zealand and set forth on a new search for land. Captain Thomas Gay, who had also emigrated from Scotland to New Zealand, had married the Sinclair’s oldest daughter, Jane; with Mrs. Sinclair and the other four children, they set forth in Gay’s ship Bessie to find a new home. Following rest and supply stops in Tahiti and Honolulu, they headed to Victoria, B.C., where they intended to settle. They found the climate cold, the ranching prospects unsatisfactory, and the natives unfriendly (one wonders if the situation there could have been worse than the Maori Land Wars). So, armed with both a letter of introduction to King Kamehameha IV and with the knowledge that land was now available for purchase in Hawai‘i, they returned to Honolulu in 1863.

The king offered them a parcel of land from the approximate site of today’s Honolulu city hall to Diamond Head, including what would become virtually all of Waikiki resort and much of downtown Honolulu. Because the family wanted to establish a ranch, however, they did not find the marshy Mo‘ili‘i and Waikiki areas suitable. As they considered leaving Hawai‘i for California, King Kamehameha IV suggested Ni‘ihau. In 1864, they closed the deal with King Kame-
SUSAN AND BUZZ GORSKY

hameha V, purchasing two large parcels of land for $10,000 in gold; they later paid an additional $1000 in gold for the final parcel, which made them outright owners of the island. They also bought extensive holdings on Kaua‘i, where descendants of the family continue to live. Captain Gay left the family on Ni‘ihau and sailed to Australia to sell the Bessie. While there he became ill and died.

The Sinclair family established the Ni‘ihau Ranch Company on the island, and, through their descendants, the Robinsons, have continued ranching there to the present time. Originally the family resided on Ni‘ihau, but by 1869 the isolation drove them to Kaua‘i. Mrs. Sinclair’s holdings passed to her daughter, Helen Sinclair Robinson, who had separated from her husband, Charles Barrington Robinson. From Helen the land went to her son, Aubrey. (When Aubrey died in 1936, the family estates were valued at about three and one-half million dollars, of which Ni‘ihau accounted for nearly one-quarter of a million.) From Aubrey, the island passed to his second son, Aylmer Robinson, and then to Aylmer’s daughter, Helen. Today Helen’s sons, Bruce and Keith, great-great grandsons of the original Mrs. Sinclair, own the island, and Bruce takes responsibility for the company.

The Sinclairs founded the Ranch with livestock, primarily Merino sheep brought from New Zealand; to this they added sheep and a few cattle purchased in Hawai‘i. But the climate and the descendants of Captain Cook’s goats made any sort of farming difficult. The wild goats ate most of the ground cover and what little topsoil there was blew away.

Management of the Ranch has passed to each new generation of the family. The Robinsons killed the goats, so that by 1900 almost none remained to damage the island’s ecology further. In the first decades of the century, Aubrey Robinson introduced irrigation and sank some successful wells. He planted coffee, tea, and cotton, and some species of trees which would grow there, thus stabilizing the topsoil and establishing some cash crops.

The original Mrs. Sinclair left as her legacy a conviction that the island of Ni‘ihau should be maintained in an undisturbed state so that its Hawai‘ian population could preserve and follow their culture, untouched by development elsewhere. And with the exception of World War II, which disturbed the best-laid plans of many people, that is pretty much the way it has been.

World War II: Invasion of Ni‘ihau

On December 7, 1941, the modern world invaded Ni‘ihau in the form of a Japanese soldier whose Zero ran out of gas. Naval Airman First Class Shigenori Nishikaichi participated in the attack on Pearl Harbor, then, almost out of gas, sought a safe landing. The Japanese, believing Ni‘ihau uninhabited, had provided maps suggesting the island would be a refuge, so Nishikaichi directed his plane there. Knocked unconscious by the landing, he was discovered by Howard (in Hawai‘ian, Hawila) Kaleohano. Unaware of the events on O‘ahu that day, Kaleohano brought Nishikaichi to his home, offering him food before going out to seek an interpreter.

Howard Kaleohano had emigrated to Ni‘ihau (from Kona, on the island of Hawai‘i), like a few other non-native residents. Two such newcomers played a large role in what followed. Kaleohano initially sought help from Ishimatsu Shintani, a Ni‘ihauan ranchhand who spoke Japanese and thus could serve as interpreter. Nishikaichi may have told Shintani about Pearl Harbor: whatever he said to him seemed to startle Shintani, who did not explain anything to the non-Japanese speakers. Without an inter-
preter, the Ni'ihauans did what Hawai'ians always have done when a guest arrives: they fed him, sang songs, danced, and threw an impromptu party. Later, they sought help from the island's second potential interpreter, Yoshio Harada, a Kaua'i-born Japanese who worked as manager for the Robinson store on Ni'ihau.

With evening came the radio news of Pearl Harbor and a dilemma for the Ni'ihau residents. Clearly Nishikaichi was the enemy; besides that, he was an uninvited outsider. On both grounds, he had to go. The residents, unaccustomed to making decisions about the outside world, chose to wait for Aylmer Robinson's weekly visit, scheduled for the next day. At the proper time, they brought Nishikaichi, under guard, to the landing, but Aylmer didn't arrive. They signalled to Aylmer on Kaua'i, but, because of the new military restrictions and the general confusion of the first days of the war, he did not respond.

At this point, accounts of the events become fuzzy. Apparently Harada, torn by loyalty and concern for his parents still living in Japan, was swayed by Nishikaichi's talk. It may also be that he knew the Japanese pilot would not allow himself or his plane to be captured. In any case, the pilot, with the help of Harada and Shintani, obtained a shotgun and turned the island into a war zone. Shots were fired, the three men took hostages, Howard Kaleohano's house was burned, and those who could fled to the beach to hide.

It was then that Kaleohano spearheaded a rescue mission. With five others he rowed, by lifeboat, across the channel to Kaua'i. Met by two policemen who took them into custody (more for protection than for an unauthorized landing during war), they called Aylmer Robinson who arranged for military action. The rescue party consisted of thirteen soldiers, the Port Allen Harbormaster Eugene L. McManus, and two

Back on the island in the meantime, events had outstripped the rescue effort. Among the hostages were Ben (Benehakaka) Kanahele, a Ni‘ihauan pe‘iolo (cowboy), his wife Ella, and several other members of their family. They watched as their captors tired, then, suddenly, they acted. Ben leaped at Nishikaichi, who shot him three times; furious, Ben picked up the pilot as if he were one of the ranch’s sheep and flung him against a stone wall. Ella completed the job, bashing the enemy soldier in the head with a rock. Harada, presumably stunned and dismayed by all that had happened, turned the shotgun on himself and committed suicide.

When the rescue party arrived, all that remained was to hold a hearing on the events, where Aylmer intervened as only a Robinson could, acting not only as interpreter for the Hawaiian speakers, but also as their advocate. Together, the would-be rescuers and the residents went to find the two bodies, which were already covered with flies. The two men were buried on Ni‘ihau, while Shintani and Irene Harada were taken to Kaua‘i.

Irene, out of loyalty to her husband, refused to cooperate with the investigation, and she was the only person who knew Nishikaichi’s name. She served four years in prison while Shintani was confined in an internment camp on the mainland. This unique incident was cited as justification for the entire internment program on the mainland.

After the war, Nishikaichi’s body was moved first to a mortuary on Kaua‘i and then back to Japan, as an Unknown Soldier. It was not until 1953 that the “Soldier” was tentatively identified as Nishikaichi, a fact Irene Harada confirmed two years later. As for the heroes of the “Ni‘ihau Incident,” Ben Kanahele earned two citations, a Medal of Merit and a Purple Heart, in ceremonies in August of 1945, and Howard Kaleohano received the Medal of Freedom in May of 1946.

Some ten days after the incident, Army men came to inspect Nishikaichi’s Zero and started to remove parts of the plane. About a week later, the Navy also came to Ni‘ihau.

As the war progressed, the government had visions of huge military installations on Ni‘ihau, but that never occurred.

The 165th regiment was billeted there, and they did introduce radios, electricity, and modern guns (the latter of no apparent interest). The Robinsons assisted the 165th by housing soldiers, lending horses, and hauling men and equipment both on the island and between Kaua‘i and Ni‘ihau, and by furrowing fields to preclude additional unauthorized aircraft landings. The Robinsons performed all this work at their own expense.

The islanders cooperated as necessary with the military, but they no doubt also recalled Captain Cook’s visit; in any case, the Ni‘ihauans had minimal contact with the members of the military. When the soldiers left the island, little trace of them remained except some wide roads.

The Island Today

Because the island is privately owned and travel there requires permission both from the Robinsons and from the Ni‘ihauans, information about daily life is scanty. Before the recent visit by the governor—and the first reporter to set foot on the island in more than two decades—information was both very dated and very limited; primary sources (including unpublished materials) were buried in the Hawai‘i State Library. But the once-in-a-generation visits in December, 1985, produced several substantial newspaper articles and follow-up editorials, giving Hawai‘i’s residents more knowledge of “The Forbidden Isle” than most could ever have hoped for.

Economy

Any male resident of Ni‘ihau who so chooses can find employment with the Robinsons either on the Ranch or at a sugar plantation. Given the island’s aridity, it is not surprising that the Robinsons have never achieved financial success with the Ranch, though they have experimented with various types of agriculture. They have reforested the land, and, besides killing the feral goats and pigs, have banned dogs, for fear that they too would go wild. Motorbikes, which would erode what little vegetation existed on the sand dunes, are also banned. Some industries which date back to the first Sinclairs’ time, such as bee-keeping, sheep and cattle ranching, and shell-lei making, remain important to this day.
The Sinclairs originally began the Ranch as a sheep operation and that continued for many years; but when the O'ahu slaughterhouse stopped handling sheep, necessitating their shipment to the mainland, raising sheep for market became unprofitable. For a while only wool was exported, but the Robinsons' recent efforts to develop new markets for sheep and to increase the water supply on the island (through dams and reservoirs) have been successful. The number of sheep the island can handle in periods of adequate rainfall has tripled, and the Ranch is working on ways to reduce the flock each year before the dry summer season by culling and selling lambs.

The Robinsons have trained a new beekeeper to improve the production of honey after a period of decline. Ni'ihau shell leis, unique in their intricate designs as well as in their manufacture from shells found nowhere else on earth, remain a treasured form of jewelry, often selling for hundreds of dollars. The leis provide a source of employment and livelihood for the island women who carry on this traditional craft.

The newest product of the Ranch, charcoal, might just make the difference between financial failure and success. Charcoal from the local kiawe trees (similar to mesquite) enjoys enough popularity on the mainland to make its export feasible. Kiawe grows well on Ni'ihau, and the charcoal operation provides employment for many of the islanders, cutting the trees, loading, hauling, and stacking the wood in kilns, and unloading the charcoal from the kilns a week later; the job is complete when the men bag the coal, load the bags first on to trucks, then on to the barge, and then from the barge back to trucks on Kaua'i. The work is difficult, labor-intensive, and even dangerous, in part because of the gases that are a by-product of charcoal-making. The Robinsons have contracts on the mainland and are considering various kinds of technology to reduce the labor costs and the dangers, and to increase the profit of this new venture.

Daily Life

The staple diet consists of fish, sweet potatoes, and poi (a tapioca-like starch made from the root of the taro plant). Islanders catch their own fish and grow sweet potatoes, one of few crops that flourish in each family's garden. But poi is brought in from Kaua'i on the launch. Pheasants and turkeys, common when the water supply is adequate, all but disappear in the periodic droughts. Not only is there inadequate vegetation on Ni'ihau to retain the little rain that falls, but the amount of rain is severely limited because the island stands in the lee of Kaua'i. Ironically, the wettest and greenest island in the state helps to create the driest of the inhabited islands. Skeletons of cattle, sheep, horses, and donkeys are found around the water holes, which periodically dry up.
Most residents live in ranch-owned houses, and every newly married couple receives a home as a wedding gift from the Robinsons. Each village reflects the traditional Hawaiian pattern of a few larger buildings used for such communal activities as cooking and meetings, with houses for sleeping arranged nearby. In the villages today, the cluster of community and private buildings is set behind stone walls, and each home has a separate outhouse. Rainwater is collected in tanks next to each house, for the island has neither running water nor a community water system, although a few small wells have been dug for emergency purposes. There is no electricity except for some generated for commercial use; kerosene lanterns furnish light. Horses offer the primary means of transportation, and most families have at least one horse per person, though bicycles are gaining in popularity. Radios provide communication on the Ranch and with the Robinson family on Kaua‘i.

Except for schools, there is nothing on the island which one would recognize as government service. Telephones and paved roads don’t exist. Although transistor radios have become popular, there are no newspapers. The Robinson barge journeys between Kaua‘i and Ni‘ihau a few times a week providing the only transportation to or from the island. No alcohol is allowed on the island, though would-be drinkers can take the barge to Kaua‘i, enjoy their drinks, and then catch a safe ride home. The island has no doctors, hospitals, or dentists. Pregnant women near term usually move to Kaua‘i and others needing medical attention can take the barge there; in an emergency, the Robinsons send a helicopter to pick up the patient.

There are no guns, no police department, and no crime on the island, although there have apparently been some instances where individuals seen as unproductive or undesirable community members have been asked to leave. There is a great sense of ohana, a Hawaiian concept which roughly translates as “family” but which implies a kind of community integration generally lacking on the mainland. The people of Ni‘ihau respect their immediate families, their neighbors, their island, and the Robinsons.

Ni‘ihauans actively practice their religion (introduced by Protestant missionaries in the early nineteenth century), attending services during the week as well as on Sunday. Preachers at the small church, which forms part of the central community buildings, are selected from within the community; and, of course, take place in Hawaiian.

Plants and trees grow on Ni‘ihau that exist nowhere else, although some are related to species on the other islands. Ni‘ihauans respect what nature provides and have a strong sense of conservation.

**Education**

Ni‘ihau is a part of the state of Hawai‘i, and so by law all children must attend school. Three buildings, one just a year old, currently house 35 elementary students divided into three groups by age. The principal makes periodic visits from Kaua‘i; of the three teachers, only one is fully qualified.

The curriculum must be specially tailored for the pupils, since children speak only Hawaiian until they reach school, and because they then speak English only at school. In addition, up to one-fifth of the students shuttle between Kaua‘i and Ni‘ihau during any school year, and, to attend high school, students normally go either to the public school on Kaua‘i or, with scholarships from the Robinsons, to the Kamehameha School on O‘ahu. To complicate matters further, Ni‘ihauans speak a different dialect, one closer to Tahitian than is the Hawaiian used and taught on other islands. Insecure with English, using different texts from those

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*Hawaiian, belonging to the Austronesian language family, is closely related not only to Tahitian and to the language of the Maoris, but also to many other languages spoken throughout Polynesia, Melanesia, and Micronesia. Because the language was first written down by missionaries, rather than by native speakers, its written form is sometimes misleading. There are only seven consonants, several of which fail to represent accurately the sounds of spoken Hawaiian. Two diacritical marks, a glottal stop (‘) and a macron (‘), can affect meanings significantly but are rarely used in casual written Hawaiian. For example, the word pāʻu has several distinct meanings, depending on the use of these diacritics: pāʻu means to finish; pāʻu means soot; pāʻa means a skirt; pāʻa refers to mildew and, by extension, to something with an unpleasant odor.
they are used to, often boarding away from home, moving from an isolated island to a multi-cultural community. Ni’ihauan students have many handicaps to overcome.

The State Department of Education has begun a program designed to respond to such problems. Although English is the language of instruction everywhere else, on Ni’ihau teachers now may use Hawai’ian for basic education. At the same time, they work especially hard to increase students’ facility in English. By printing report cards in Hawai’ian, educators try to keep parents more aware of their children’s progress. The Kaua’i school with the largest number of Ni’ihau transients is experimenting with a bilingual pilot project designed to strengthen the students’ skills in both Hawai’ian and English. Hawaiian-speaking counselors work with the high-school students from Ni’ihau.

If the efficacy of this effort can be measured by a decrease in truancy and absenteeism and an increase in student morale, then the program has helped. Still, questions can be—and are—raised about the existence of such a private world. Ni’ihau is a closed society, run by the Robinson family. To visit Ni’ihau, you must apply to the Robinson family; anyone may leave, but to leave with the hope of returning requires the Robinsons’ permission. If you present a good case for leaving or visiting, you normally receive permission, but not always. If you work on Ni’ihau, you work for the Robinsons; you shop at the Robinson store; your provisions arrive on the Robinson launch. If you choose to get a higher education, you get it through the help of the Robinsons. From all reports, the Robinson family has been undeniably, unstintingly, unfailingly generous to the Ni’ihau population. But is it right to have a paternalistic fiefdom in America, no matter how benign the rulers or how happy the ruled?

The State struggles with this question periodically, in legislative discussions about such topics as standardized education, testing, and land use. Various factions in Hawai’i hold different opinions, balancing the issue of freedom against that of the preservation of Hawai’ian culture, for example. The debate, though practical and legal, obviously has moral and ideological aspects. As long ago as 1940, a Territorial Committee argued that “kindly and paternal as the dominion of their landlords is, it [the rule of Ni’ihau by one family] is still irreconcilable with the principles of liberty and freedom of individuals upon which our Nation was founded.”

Granted, this speech was made in the midst of an attempt by the Legislature to gain control of Ni’ihau, but the point has merit. More
recently, on the occasion of Governor Ariyoshi’s visit, a member of the Board of Education on Kaua’i described the condition of the Ni’ihauans as analogous to slavery.¹

These are harsh words, difficult to accept when residents who have the right to leave the island choose to stay, or when others leave only to return, to live again in their special world. According to recent reports in the Honolulu Advertiser, the residents seek and desire no change; they are happy as they are. The Robinsons have frequently said that if or when the Ni’ihauans want to change the system, the family will honor their desires, and history supports this claim.

On his visit, Governor Ariyoshi reaffirmed for the people of Ni’ihau their right to live as they want. For the time being, that seems to settle the issue, although another governor, another legislature, can change the rules; or some day, unlikely as it now seems, the residents may themselves seek change. After the excitement the governor’s visit generated both on Ni’ihau and elsewhere in the islands, after the flurry of reports (if one series of articles can be considered a flurry), all is reverting to normal.

Ni’ihau hovers, long and blue and low, on the horizon off Kaua’i, tantalizing and fascinating those who will never see it closer. But mostly, people tend to forget about Ni’ihau. It is unreachable; it is the forbidden isle. And maybe it should stay that way.

NOTES


²The “invasion of Ni’ihau” was first covered by the Kaua’i Garden Island War Daily for December 15, 1941, and was picked up by the national press. Blake Clark, “Never Shoot an Hawaiian More than Twice,” Reader’s Digest (December, 1942) popularized the tale. The authoritative source is Beekman, who not only used all the available published material but also interviewed Irene Harada, gaining information no one else has (including the identification of Nishikaichi). Where there are significant differences in the sources, we follow Beekman.

³One additional source about this period on the island is David Laruentsius Larsen, “Ni’ihau: A Letter from David Laruentsius Larsen, 1942” (an unpublished letter from Larsen to his wife Katherine, June 17-June 24, 1942).

⁴Jan TenBruggencate, “Ni’ihau Revisited,” Honolulu Advertiser (December 20, 1985), pp. A1 and A4; “When life goes on, the Ni’ihau way,” Honolulu Advertiser (December 20, 1985), p. A25; “Ni’ihau: Charcoal, sheep, aid economic comeback,” Honolulu Advertiser (December 22, 1985), pp. A1 and A 4. Follow-up articles appeared in the Honolulu Advertiser on December 29, 1985, and January 23, 1986. Prior to TenBruggencate’s visit and articles, the best contemporary source had been Stepnie. Stepnie drew his information from interviews with two former residents who return to Ni’ihau to see family, with the spouse of a former resident, with two Department of Health officials who visit Ni’ihau, and with a Kaua’i physician who sees patients from there. He also interviewed the current manager of the Ni’ihau Ranch Co.

⁵In addition to the sources listed directly above, several recent Honolulu Advertiser articles proved helpful, for the debate continues: Jan TenBruggencate, “Ni’ihau program paying dividends” (December 6, 1985); an editorial, “Hawai’ian on Ni’ihau” (February 27, 1986); and four articles by Kay Lynch, “High School Competency Test Under Fire” (December 11, 1985), “School Board Dialog Today about Ni’ihau” (February 18, 1986), “Ni’ihau Education Reform Called Urgent” (February 19, 1986), and “Forced English Use Leads to Pidgin, Ni’ihau Grad Says” (February 20, 1986). Figures on enrollment come from The State of Hawai‘i Data Book 1983: A Statistical Abstract (State of Hawai‘i Department of Planning and Economic Development), p. 105.

⁶Daws and Head make that claim. The figures for pre-twentieth-century population changes come from Stepnie as well; those on modern population trends are derived from The State of Hawai‘i Data Book, 1983, pp. 16 and 23.

⁷Quoted by Daws and Head.

The Gamut selects

Six Poets

a sampler

Roy Bentley
Jeanne Norris
Jeff Gundy
Alois Zimmerman
Paul Bennett
Lyn Lifshin
We, each of us, have a good alibi.
—Bonnie Parker

1
On the run after their first holdup, Bonnie Parker asks Clyde Barrow why he limps. Clyde tells her how he cut off his right great toe to get released from work detail at Eastham Prison Farm—sawed skin and bone with a straight razor—how the next week he was granted parole.

That afternoon, in Oklahoma City, Bonnie asks directions from a traffic cop who smiles and touches his cap brim. When she raises the sawed-off shotgun upward from the well of the black Ford, she knows, even before the blast, that it is a slow day and anyone will do. The body, adrift, headless, collapses onto hot asphalt.

O children who would hear stories, I will not lie. These are beasts. The cruelties, repeated, tamed, come to them like lazy hounds. Nothing to lie down, having killed, and take another to roll in the long grasses of Iowa or Missouri, to thrill at this assignation the whole earth endures.

Roy Bentley was born in Dayton, Ohio, grew up in Kettering, Ohio, holds an M.A. in English from Ohio University, and now teaches composition and creative writing at Hocking Technical College in Nelsonville, Ohio. He has published a chapbook, The Way into Town, and a collection, Boy in a Boat, out this spring from the University of Alabama Press. On writing, he says, "I look at poetry as a passion akin to first love—intense, full of possibility, a matter of life and death. Like anything wild swimming in water well over its head, I war ungracefully toward any footing. It's a helluva swim, and in the dark."
Outside Gibland, Louisiana, Clyde is driving in socks. Bonnie has a sandwich in her mouth. Well-armed, a posse will send 187 rounds after the notion there is in us that which twists under heavy fire, loafs at living, and will not be turned out. Texas Ranger Frank Hamer: "There wasn't much to it. They just drove into the wrong place."

2

When the steel bends some days, it splits along the one seam and collapses. Sometimes every other piece is scrap, cracked or going at the weld. You can hear a catch in the press, in the works somewhere, just before the break. The black snake hydraulic hoses umbrella overhead, two cold bends in 11 and 3/8-inch pipe blooming. The average, 1400, I top on principle, tell the college kid foreman it he wants 1650, step right up.

The guy next to me bets he runs his rack of 11 and 3/8 before me. I pick up the hard iron arbor and begin: left in hand out STEP right out turn in hard out STEP. Hours later, the challenger shifts his two hundred-plus pounds, next bend blows a fitting. Warm columns of hydraulic fluid drench the good race.

At shift's end, coils of razor wire shine unceremoniously in arc lamp, in pine and spruce scent like tinsel. The laughing little man who works the gate pins a night photograph of the Northern Hemisphere to the corkboard behind him by the fence. For anyone who listens he will point and explain how streetlights challenge the aurora borealis from five hundred miles up: Light's light. Make no difference.
Jeanne Norris

WHEN OLD TILLIE MOVED

how she missed her old oak
and that night she dreamed
tigers sniffing the walls
screamed so loud
a neighbor pounded the floor
but after a while
only her fingers remained confused
creeping the coverlet
dum de dum de dum de dum de dum
as she fell into the silence
that was cold as a cave
in the woods
on a late afternoon in midwinter

SECRETS

Who is to know
I have slept
in this bed
that is too soft
in places
and too hard
in others
and which
when covered with a spread
leaves no trace
of the life I led
in wild dream spaces.

Jeanne Norris was born in Cohoes, a little town in upstate New York, and has lived in Ohio for twenty-eight years. She has been writing poetry for six years, and says that before she began writing poems she had hardly read any. Except for a high school diploma, she has had no formal education. "To read a good poem," she says, "is (to me) a most astounding phenomenon because it compels the reader, as no other art form does, to participate and to create. Trying to write a poem holds many pleasures—of course it is also hard work and I'm often discouraged. But then there are the few moments when I think I have created something special, captured the will-o'-the-wisp."
CHAINSAW INQUIRIES

What do chainsaws love?
—Lumber, dust. Live wood pulled down by the dying. Sun on last year’s leaves.

Do chainsaws share a hidden fear?
—Rocks. Nails. A few, the wise, fear their appetites, and that what they chew does not nourish them.

If chainsaws dream, of what?
—Of hands that never tire, tanks that never empty. Forests rising quick as grass. A heaven where silence never falls.

Do chainsaws share a secret grief?
—Not that their eating draws nothing into balance. Not that they leave level what stood upright. But that they cannot see what they kill, that they cannot keep what they kill. That they cannot feed themselves.

Jeff Gundy was born on a farm in central Illinois and attended Goshen College in northern Indiana. He has published poems and reviews in numerous magazines and journals, and his third chapbook, Surrendering to the Real Things, will be published in 1986 by Pikestaff Press. He is currently teaching English at Bluffton College in Bluffton, Ohio. He says, “I see poetry as a way of engaging both the so-called real world and the equally real inner world we all inhabit separately and yet, weirdly, together. I want my poems to bring justice, prevent the nuclear barbecue, usher in the Millennium... or at least to make me feel better for having set down something, out of fear, hope, lust and love.”
GREASE IN THE FINGERNAILS

The usual tactics are futile. Biting them leaves a foul black taste on my tongue. They refuse to be scraped clean, though with a knife I can dredge out bits of skin black as Darth Vader’s heart. Five minutes after I gouge them raw they look dirtier than ever.

They teach me that labor lasts, that the past makes the present, that the car will run today as I arranged it yesterday. They remind me of my ignorance, what I see and don’t understand, the specks and dark sludge I sprayed free, the needle valves I turned and turned with my hands, asking Is this true? Is this right? If it runs better now I won’t know why.

The grease tastes of the levels of cost, of time I could have spent writing poems, planning lectures, taking naps, shoes I might have kept clean enough to wear in public. It reminds me how cheap and stubborn I am, how distrustful of people who cost money, how ready to ruin my afternoons bent over, sweating, hauling on bolts, touching hoses, starting the car again and again in my unshakeable dumb faith that somehow I will blunder into just the right arrangement, that somehow my fumblings and guessings will shake out into beauty like a crystal coming out of water, like a new life blooming clean and smooth from the grease and dirt of the old.
Alois Zimmerman

WHILE CONTEMPLATING
A SLICE OF WONDER

There
are countries
where they quarter
the loaves,
and on a good
lunch hour,
workers
invade
the bakeries
like hives.
It comes
like a breast
to the hand,
or a buttock,
so warm and round
(though sometimes
piping
and almost
untouchable).
They never
wrap it
it seems:
you take
the crust.

But the soup
from home
is nothing
without it.
Nor the sharp
red peppers
from the garden
or the chunk
of smoked bacon
from uncle.
Think
how it's inevitable,
stuff it
in the pocket
of your coat.

Alois Zimmerman was born in war-torn Yugoslavia, educated at universities in Vienna, Freiburg, and Ohio (O.U.), and has worked as a meatcutter, a periodicals abstractor, and a teacher. He is currently enrolled in the Cleveland State University creative writing program. In reply to a question about his esthetics, he commented, "Poetry, besides being communication with the outer world, remains primarily one with the inner world." And on these particular poems: "While Contemplating a Slice of Wonder" was rooted in my travels in southeastern Europe; 'Reprieve' is an attempt to make sense of the plight of the young, urban, upwardly-mobile male."
REPRIEVE

Home from the heat,
a brown bagged six pack
in the nook
of his arm,
he melts
into couch and TV talk,
unbelts his watch,
and with the same hand
pops the first can.
Up above
in the ceiling fan
five angels sulk
a song:
they drone
of sparrows,
of almost right
and always wrong,
and bend angled woes
into a spell
toward love.
The man's asleep.
So they descend:
one slips the shoes
from the feet.
Another removes
the tie and suit.
The third
peels socks
and underwear.
Meanwhile
the fourth has put
the house to rummage
and found in a box
deep in a closet,
some never-worn, satin
valentine pa:

"What's wrong with this?"
the angels wonder.
They dress the man.
"Well done," they concur.
"A fine surprise!"
"One thing yet," says
the fifth and last:
he puts the watch
back on the hand
and the rest
of the beer
in the fridge.
Paul Bennett

THE CONFERENCE ON WAR AND PEACE

I

Outside this conference hall I see
The marginal maple—ablaze in fall fire—
Feeding on sun, rain, its slight bite of soil,
And I think of growing food,
The luxury of feeding oneself and neighbors,
The freedom of saying to a stranger:
"Come to my house, sit down at my table,
Share what I have grown. Brother, sister."
Within walking distance of this hall
Rain as light as dew settles upon
The acre of earth I have tended
For some thirty years, soil more fertile today
Than the day I first turned it, spadeful
By spadeful. To love one bit of soil
Is to know the earth. And to know the earth
In southern inclination—thirty degrees equals
Three hundred miles nearer the sun
And its embrace: food, food, food, its way to peace—
Is to chart the sun for Trinity.

II

Years ago an old gardener in our town
Called on my father to borrow a boy
To help plant his musk- and watermelon crop.
Youngest of six sons I got the assignment
Of tedious labor, more tedious argument,
For as Father said: "With that good man
Day begins at first light and runs till moon-up,
And listening to him you never know

Born in Gnadenhutten, Ohio, and educated at Ohio University and Harvard, Paul Bennett has for many years run a garden and orchard near Granville, Ohio, where he lives with his wife Jeanne in a house they designed and built themselves. He has written numerous film scripts, two novels, and two collections of poetry, and he has taught writing at Denison University since 1947. As for his writing, he says, "I try—with some want of success—to honor the life I know, the values I care about (which happen to be at odds with the jingoism of President Reagan). I like poetry to be an experience I can gnaw on."
Whether he's discussing wife, garden, or life.
I spent summer's longest week
Mired in the labyrinth of his words
And instead of pay at week's end
I got his promise: We'll share the crop.
All summer long I took flak from my brothers
For being the biggest fool in town;
Late that fall I came home from school
To find a wagonload of melons in our drive,
Beside the load the grocer to buy them,
And later still, two loads more.

III
Many summer afternoons I drift away
From whatever work is at hand
To visit my white-peach-loving friend
Who in the South Pacific took bamboo slivers
Through his thick leather combat boots. I am
With him for countless operations—
Big toe right foot, right leg at ankle,
Left leg at knee, right leg at thigh.
Many summer afternoons I visit him
And see him as he was that last time—
Hoisting himself by the harness
Above his bed, his face aglow with drugs
And fever, but his voice steady, sure:
"Well old buddy, they're whittling me down
To give me a better stance on your hillside farm."
His face, his smile, his peace.

IV
Fine featured as carved ivory,
Breathing like a frightened dove,
Yukiko Hoshino seats herself before me.
"In your country—how you say—one term
To learn American poetry—okay?"
I leave my desk to sit by her side
And we talk of American poetry.
As she stands to go, she says, "Thank you.
Dickinson and Whitman I know more, okay?"
Days become weeks; she says: "You are someone
To talk to American—okay?" She attends each class,
Borrows my poetry anthology, and brings it
To our conferences wrapped in a handmade cover.
The book, I observe, opens automatically
To the poetry she wishes to discuss.
In deep winter snow our afternoons flower
In poetry of East and West. By early spring
She learns I took part in World War II. She smiles
And says, “They told me you were Navy—okay? My father
Was Imperial Navy too—how you say—your enemy?”
“Yes.” With outstretched hand I say, “Crazy.”
“Yes. You would kill him—he, you—
Crazy like crazy—okay?”

Lyn Lifshin

BAD MIDDLE OF THE NIGHT BLUES

the new coffee pot,
splinters where the
cat slapped it to
the floor slivers
of moon in ragged
pieces. My teeth a
fist as vodka throbs
like some infected
hand and a strange
man’s shudder jars
like an Oldsmobile
on a satin pillow
where I curl to the
left side of the
bed like a car
bent on plunging
thru a road block

Lyn Lifshin was born in Burlington, Vermont and now lives in upstate New York. The author of over 60 books and chapbooks, she is the subject of a documentary and of a critical study by Hugh Fox. Besides writing, Lifshin teaches a variety of workshops for children and adults, on such subjects as writing fiction and poetry, creative journal keeping, survival techniques for the writer, and the use of writing as therapy. Her latest collection is Kiss the Skin Off, winner of the Jack Kerouac Award. Her poetry has been described as direct, adroit, highly sexual. She herself says, “I try to be as open as possible to whatever I read, hear, smell, see, and feel.”
HEARING ABOUT IT

not just the possibility
that a wild shriek
in the loons as mist
licked the island
but claws of some
bird you didn’t
dream could get thru
red wood suddenly
over the bed, blotting
all light

OTHER VALENTINE’S DAY
IN THE APARTMENT ON MAIN STREET

ice breaking up in
Otter Creek whirlpool
it was as if the
cold chunks in me
could almost melt
gazing into where I
knew there’d be
pussy willows
in a new dress that
still couldn’t make
my plum belly lovely
tho the dreams of
what I could do
camouflaged what was
like my mother’s smile
James Schuerger

Personality Questionnaires for Hiring Decisions

You have a bachelor's degree in engineering, six years' experience in digital controls. You are applying for a job in a related field, and as part of the selection process you are asked to fill in a questionnaire containing items that have little or no relation to the job, as far as you can make out:

Would you rather live in the city or the country?  
Do you read mechanics magazines?  
Were you active in sports when you were in school?  
Did you have an imaginary playmate when you were a child?

You might with considerable justification wonder about the relevance of such questions to the job you are considering. What are they getting at? Are they trying to find out if you're crazy? What do these questions have to do with digital controls anyway?

These feelings would not be surprising in such circumstances. But personality questionnaires are regularly used in the pre-employment process, though their justification has been doubted. I shall try to explain their use first by describing kinds of personality questionnaires, then by discussing their relation to the selection process and to hiring decisions.

"Personality" is a term everyone understands, and almost no one would deny its importance in the workplace. Usually the word refers to someone's habitual manner of acting, the style in which one lives one's life. Personality questionnaires, then, can be thought of as those psychological measurements which consist of questions about a person's style of life—whether one prefers to be alone or with others, whether one has independent habits of thought, and so on—the sum of all the apparently insignificant choices one makes every day.

Alternatively, "personality" can mean the way one presents or dramatizes oneself—primarily for the benefit of others, but for oneself as well. This notion of personality is consistent with the etymology of the word "person" (Greek prosopon, face, mask, Latin persona, actor's mask). Accordingly, personality questionnaires test not only one's actual characteristics, but also one's way of presenting oneself. They are sometimes called "self-report inventories" or "self-report questionnaires."

A great many such questionnaires are in use. What they have in common is that they all consist of questions about personal matters such as likes and dislikes, common attitudes or self-descriptions; and they all make use of a multiple-choice format. The differences among them can be conveniently organized under three headings: kinds of items included; methods of assigning items to subscales within a given questionnaire;
and emphasis on traits or specific kinds of behaviors.

**Kinds of Items**

Among self-report questionnaires the most common distinction is between personality questionnaires *per se* and occupational interest inventories. Occupational interest inventories are explicitly concerned with jobs and activities related to them, whereas personality questionnaires are broader. For example, contrast the two following sets of statements (to which one is asked to respond "yes" or "no"):

1. I think I would like to be a biologist.
   I enjoy working with animals.
   I like understanding how living things grow.

2. I prefer my own opinions rather than those of others.
   My friends consider me a trustworthy person.
   I had a happy childhood.

Set 1 might have come from an interest inventory, set 2 from a general personality questionnaire.

A second distinction is between those questionnaires that deal with the whole domain of personality, and those that deal only with a part. Although the number of questions needed to deal with the entire personality is potentially infinite, in practice it is finite and can be handled in an ordinary questionnaire. In this limited sense, an adequate sample of normal personality items contains enough items that no important characteristic is excluded. Some questionnaires aim to sample the entire normal personality, others have fairly limited aims, such as discovering the characteristics which define "self-actualization," "self-concept," or "locus of control." The latter sort are called limited-domain questionnaires, in contrast with those which sample the complete normal personality.

The third distinction is, one might say, a species of the second, since it distinguishes between questionnaires concerned with pathology (abnormal personality), and those concerned with normal personality. Pathology is a "limited domain." Items in questionnaires will differ greatly depending on whether they are concerned with pathology or normal personality. For example, contrast the following two groups of items:

3. I often feel depressed.
   My parents disliked me greatly.
   I often feel that I just can't manage my life.

4. I would rather be alone than with a great many persons.
   My preferences are for the finer things of life.
   A rule is a rule and should be followed.

The first group would be suitable for detecting pathology, the second for evaluating normal personality. Questionnaires designed to identify pathology are not often used in routine pre-employment screening, but are generally confined to the clinic. Exceptions are in the selection of police, firefighters, and similar personnel who have an unusually serious impact on the society they serve.

**Assigning Items to Scales**

A personality or interest inventory usually has many items and more than one score. A group of items all contributing to one score may be called a *scale*. Particular items are selected for the various scales in one of three ways. In the first procedure items are included on a scale if they are observed to be answered (on the average) in one way by persons in a given group and another way by a comparison group. Items might be included on a "depression" scale, for example, if they are answered in a certain way more often by depressed persons than by those in a comparison group.

Some interest inventories use this method to select items for "occupational scales"—scales consisting of items answered in one way by the persons in a given group and another way by a comparison group. Items might be included on a "depression" scale, for example, if they are answered in a certain way more often by depressed persons than by those in a comparison group.

Some interest inventories use this method to select items for "occupational scales"—scales consisting of items answered in one way by the persons in a particular occupation and in another way by "persons in general." In scales constructed this way the items don't necessarily have similar manifest content. The items, for example, all might be found on an inventory scale designed to identify interest in nursing:

5. I like to care for persons who are ill.
   I dislike office work.
   I enjoyed biology classes.

It isn't difficult to understand why the first and third items are on the "nurse" scale, but
Trait Emphasis vs. Behavioral Emphasis

Cutting on the bias across all these other distinctions, much the way it cuts across the whole of American psychology, is the distinction between the trait emphasis (sometimes called "dynamic" or "psychodynamic" emphasis) and the behavioral emphasis. Early self-report questionnaires contained examples of both, but trait emphasis, in a naive form, predominated. At the core of trait emphasis is the notion that persons can be characterized according to fairly stable personal styles, like extroversion, independence, adjustment, and so on. The test responses are seen as signs of the trait, or as samples of behavior that might be expected from a certain "kind of person."

In contrast, the behavioral emphasis pays attention only to the relation between the test response and what people actually do. Consider:

I take pains to see that my work is neat and on time.

From the trait point of view, this item might contribute to the trait (or type) "compulsive." The behavioral emphasis, on the other hand, would ask, do persons who agree with that statement have more stomach trouble than persons who disagree? The behavioral emphasis isn't interested in what kind of person is responding, only what the person is likely to do.

Questionnaires in Personnel Selection

There are a great many personality inventories, and, as can be seen from the above, even quite a few varieties of inventories, each with its advocates. In using questionnaires for actual personnel selection, however, the law and psychology helpfully come together to simplify the decision.

Because of legal protection against invasion of privacy, for a procedure to be used validly in personnel selection it must be "job related." There are two acceptable ways to show "job relatedness" which are common to both the psychology of testing and the Federal Equal Employment Opportunity guidelines: content validity and criterion validity.
Job Relevance—Content Validity

A selection procedure can be considered job related if it involves specific skills, information, or activities required on the job—a typing test, for example, for a secretarial job. This "content validity" is determined by subject-area specialists who inspect the test.

In principle at least it is possible to have work-sample tests for all occupations, but they become expensive for complex occupations. In practice, many tests are considered content-valid if they contain verbal descriptions of job-related behavior or if they sample knowledge required on the job. A test for a police-officer, for example, might describe a typical police intervention in a violent domestic situation and require the choice of a best response from among four possible ones. Or it might ask questions about various common aspects of the law.

Job Relevance—Criterion Validity

Job relevance or validity can also be demonstrated through statistical evidence which predicts performance. Such evidence gives the test "criterion validity." A researcher usually begins by analyzing the job and reviewing previous research. He then chooses or creates some tests and questionnaires that promise to be related to performance in that job. Persons on the job or prospective job holders complete the questionnaire, and its results are compared with appraisals of their work or estimates of their performance based on content-valid tests. The correlation between the scores and the performance ratings indicates the validity of the test.

This kind of evidence of job-relatedness, which seems to be preferred by the courts, is useful not only because it is relevant to job performance, but also because it can easily be used to set cutoff points in choosing applicants. Data of this kind can be presented in a two-way distribution, as in Figure 1. In this hypothetical case, the horizontal dimension represents test scores for a set of persons (A to J) on a ten-point scale, and the vertical dimension represents their job performance on a five-point scale; the relevance of test scores to job performance is evident graphically: generally, the higher the test score, the higher the performance.

Furthermore, if it can be asserted with confidence that to be a satisfactory employee one must perform at a level equal to 3.5 or higher, it is possible to see just how much gain in efficiency of selection can be had by using the test scores. If it was decided to hire only persons with test scores above three, A,

![Figure 1](image-url)
Scores on Self-Discipline

Figure 2

B, or C would be excluded. Of those in the below-satisfactory group (below 3.5 on performance), only E would have been selected, because of a test score over three.

Out of the ten applicants, four are unsuccessful (having performance scores below 3.5), for a success rate of 60%. But if selection is made by the criterion of test scores above three combined with performance above 3.5, the group drops to six, for a success rate of 6/7 or about 86%. Thus, the test’s relevance to the job is illustrated, and the task of setting a rule for personnel decisions is made easier.

The other kind of criterion validity, instead of centering on the correlation between questionnaire scores and job performance, tries to identify persons who are generally similar to current job holders. This approach emphasizes the finding that persons who work in a particular job tend to be similar, so that jobs can be described in terms of typical characteristics of persons in the job. Furthermore, it is also known that the odds favoring job satisfaction are higher if an applicant is similar to other persons already on the job.

It is a useful general rule that where a job shows a pattern of interests or personality characteristics which differs sufficiently from that of the general population, it is effective to select newcomers with similar characteristics. For example, if we know that a particular sales group has an average score of 7.5 (on a ten-point scale) on extraversion, and that no one in the group scores below 5 on that scale, one might avoid selecting a newcomer with a score of three on that scale.

Knowledge in this realm is substantial, even though much remains to be demonstrated. For example, we know pretty well what the average scores are for more than fifty occupations, and, with slightly less confidence, the typical spread in scores around those averages. For some of these occupations the findings have been confirmed several times. But we still don't know with confidence which characteristics may be most important in assessing suitability for a particular occupation. The kind of validity data that is available may be illustrated graphically as in Figure 2. The scale is a full ten points, but occupational groups rarely have mean scores outside the truncated range between three and eight. The average for each occupation is indicated by a point approximately at the middle. Dispersion of scores around that mean is indicated by the line on each side of the name, such that about 2/3 of all members of the group will have scores within the span of that line. Thus, on the characteristic “self-discipline,” the average score for artists and psychologists is about the same, but the dispersion around that average is greater for artists. Engineers have a higher mean score, dentists even higher. The group of machine operators is highly specialized and probably not typical, but is included here for illustration. They have a very high mean score and a low dispersion around that mean. In selecting machine operators, one could be pretty confident that an applicant with a score much below 5 on that scale would represent a risk to the employer. Note the great difference between dentists and psychologists in “self-discipline.” Both occupations fall in a broad scientific category, but the material each works with is presum-
ably such as to make this characteristic a highly differentiating one. The difference is intuitively satisfying, when one considers the narrowly confined field in which dentists work, contrasted with the broad ambiguity of psychologists' territory. Hence, a candidate with low scores on "self-discipline" (other things being equal) could be considered a better candidate for a psychology program than for one in dentistry.

How Questionnaire Scores Are Used to Make Decisions

In practice, it is rare to find that questionnaire scores are used in a mechanical way to make personnel decisions, chiefly because the data are rarely tidy enough. It is also evident that questionnaires seldom have the sort of validity which might be found in another kind of test. It is obvious that answering questions about one's style of life is not related to job performance in any simple and direct way. How, then, are test and questionnaire scores justified for use in personnel decisions?

A personality questionnaire must have criterion validity to justify its use. It must be demonstrably related to the job performance in a statistical manner. The evidence can be at the item level ("I would rather be alone"), such that items are selected for a particular scale if they are typically answered in a distinctive fashion by persons in a particular job. It can be at the trait level, when trait scores correlate with performance at a useful level, or when a particular range of scores typifies workers in a particular job. It can come from what is called construct validity wherein one infers a relationship between a particular job performance and scores on some trait because of correlations between performance on some similar job and that trait. At some point, the evidence for the job-relatedness of the questionnaire has to be statistically available, if it cannot be presented from content.

Beyond the question of legal justification, in practical application there are two main ways to use test or questionnaire scores as aids in personnel selection: by statistical applications or by clinical applications.

Statistical Applications

An example of a statistical application is the one illustrated above, in which the relationship between test scores and performance on the job is carefully examined by correlating these variables. This procedure is usually found where recruitment is done on a large scale, so that it is possible to have confidence in the overall results, if not every individual case.

The object of such research is to have a validated decision rule for those using the questionnaire in hiring. "Accept persons with scores over 4 on assertiveness." "Persons with scores between 3 and 7 on sociability are most likely to find themselves comfortable in this job." "The probability of being in the top half in sales is increased markedly for persons with scores above 6 on social presence."

In my experience, one rarely finds cut-offs rigidly applied with personality questionnaire scores. Ability scores are more often used in that way. With personality, the more common application is to suggest an optimum range. Another approach is to use personality scores with known relation to performance as indicators to assist in other selection procedures such as background and interview.
However they are applied, the above rules for making decisions, all presumably based on correlational validity studies, use single trait-named scales—assertiveness, sociability, social presence, etc. Another approach, with a more behavioral emphasis, is to create special scales for particular business applications using empirical item-selection methods rather than the homogeneous content approach. In such questionnaires, items are selected because they typify, say, high performing sales persons (or whatever occupation is being studied). One usually finds scales of this kind constructed only for very common jobs, those which would financially justify the expensive research: sales positions, clerical positions, and the like.

Clinical Applications

It frequently happens that a company, needing to select a single manager or executive for a unique position, will retain a psychologist at some point in the selection process to review two or three final candidates. If the psychologist uses questionnaires to help him in this process, as many do, they are not likely to have been validated for the specific job in question because it is unique, or at least unique to that company. How are questionnaires used in situations like these? How can their use be justified?

First it should be emphasized that questionnaires in such situations are not being used in a simplistic, "red light/green light" fashion. They are only part of the information which the psychologist or personnel specialist uses. In addition, two other important sources of information are available: prior validity studies, and the clinician's own experience.

The prior validity studies are of the kind described above, showing the correlation between various scores and performance, or listing the average scores of persons in various occupations. The practitioner’s own experience can be a valuable source of information. After working for a while with a particular company and viewing the scores of persons in the company, the practitioner gets a sense of the kind of person that fits in and is successful. Questionnaires can thus be a useful supplement to observations and interview impressions.

The use of personality questionnaires in personnel selection is based on the well-founded notion that one's personal characteristics are related to one's performance and one's satisfaction on the job, as well as to how one gets along with other workers. These relationships are not only intuitively noted but can be shown statistically with regard to personality questionnaires, although the relationships are far from perfect. As an adjunct to other selection procedures, questionnaires can help both the company and the candidate make an effective choice, one which will assure both effective job performance and employee satisfaction.
Hester Lewellen

Feeding the Poor in Cleveland

All my life I've avoided the poor. They tried to contact me occasionally on the streets of New York City, but I'd been taught not to speak to panhandlers, just to shake my head "no," and move on. I walked through the city with blinders on, trying to avoid meeting the eyes of the down and out, the drunk, and the weird. What one did was donate money to the church or the Salvation Army and hope they'd take care of it, "it" being the problem of the homeless and the hungry.

Once, briefly, when I was working in New York as an actress, I was "poor." I hadn't landed an acting job for a while. The rent was due, the checking account was empty. I had no credit cards, no savings, no stocks or bonds, no IRA to cash in. My unemployment benefits had run out. But, after all, I did have an ace in the hole. With great embarrassment I wrote to my parents and asked for a loan. They sent me enough for the rent and a little bit over. Fortunately by the time the next month's rent was due, I had a contract in hand for the National Tour of "The Magic Show," which brought me to Cleveland, where I met my husband. I moved here in 1976.

It seems to me that it's much easier to avoid the poor in Cleveland than it was in New York; they have fewer tourists to appeal to. The city is divided into watertight economic regions. Aside from the obligatory donations to charity, one can remain untouched by the human problems behind the boarded-up houses in the poor neighborhoods of the city. But news coverage of the Reagan cuts in welfare and food stamp programs, along with reports of job losses in this area, led me to wonder how the poor in Cleveland, who don't have parents to help them out in a pinch, were being fed. Ever since my own experience with unemployment offices, I have had sympathy for anyone who has to deal with government services. The office workers are too busy, too jaded, and sometimes just too mean to listen, smile, or even care about their clients.

Reagan was expecting the private sector to take up the slack, and I began to feel responsible and guilty. I felt a sympathetic curiosity about hunger in Cleveland and a nagging feeling that I should be doing something to help. A friend of mine was volunteering at a hot meals center in East Cleveland, so I asked if I could tag along. And that was the beginning of this account.

There are two things you might want to know at this point. First, there are a number of hunger programs in Cleveland, mostly private; you might not be excited by the menu, but you can find at least two fresh and relatively nutritious meals a day. Second, different programs tend to cater to different classes of hungry people, as if there were an upper, middle, and lower class among the poor. These distinctions are not apparent from a distance; they only begin to appear as you move closer. When I began to look at

Hester Lewellen was born in Paterson, New Jersey, and has since lived in Hawaii and New York City. She earned her B.A. at Mount Holyoke and her M.S. (in mathematics) at Fordham University; she is currently a Ph.D. candidate at Kent State University. Her article "On a Murder Jury" appeared in The Gamut #13. She describes her profession as "math teacher/actress," and is currently practicing both: she teaches mathematics at Laurel School in Shaker Heights, Ohio and (as this goes to press) is appearing in The Cleveland Play House's production of Candida as the Old Lady. She and her husband, Glending Olson, a professor of English at Cleveland State University, met when she was touring with The Magic Show.
hunger in Cleveland, I was surprised by both the diversity of the programs and the diversity of the people using the programs.

There are three kinds of help available to hungry people in our area. There is the kind of help the government provides, which includes unemployment benefits for short-term unemployed, welfare benefits for long-term unemployed who can demonstrate need, and food stamps, again for those who can demonstrate need. To handle the bureaucratic tangle of applying for these benefits, one needs functional intelligence and a lot of patience. According to a woman I spoke to at the Welfare Department, in order to qualify for food stamps you need to show a social security number, a verified address (e.g., a bill from a utility addressed to you), a verified income (a W-2 form), the records of any and all savings accounts, and a photo I.D. (e.g., driver's license). To qualify for other welfare programs, you need all of the above plus a rent receipt and the birth certificates of everyone in the family. What if a person is a refugee from a Communist country, lucky to escape with his or her life? The woman said they still have to show a birth certificate to qualify, unless they have a family Bible showing their date of birth. What if a person is homeless—how can he or she get food stamps? They've got to have some address, she said.

A second kind of help is the hunger center or open pantry. Such centers are maintained by the Interchurch Council of Greater Cleveland and others to distribute donated foods and government surplus. Their “clients” tend to be families that have a home of some sort in which they can prepare their own meals. The families must demonstrate need, however, before they are allowed to take the food. The numbers of people using the pantry program of the Catholic Diocese has grown from 240,000 in 1983 to 365,000 in 1984 and an estimated 420,000 in 1985. (Incidentally, the word “client” may sound like a euphemism, and indeed it is softer on the ear than “beggar,” but an ancient definition of the term is a plebeian who is dependent on the patronage of a patrician, as in Rome where rich patrons kept a retinue of clients to support their interests.)

The third kind of help is a meals program where an actual meal is prepared, often a hot meal, and served to the hungry on the same premises. Agencies like the Salvation Army and the Catholic Diocese of Cleveland offer two types of programs: one is available only during the last week of the month when food stamps are running low. These centers exist “in the neighborhoods” or nearby suburbs, and they serve a hot, nourishing meal in the evening. This is the kind of center utilized by retired couples and single parents and their children, the upper class of the poor. Food is provided through the Greater Cleveland Community Foodbank, and supplemented with donations from churches, businesses, and private citizens. The Foodbank is a private non-profit corporation, one of 75 foodbanks across the country associated with Second Harvest, a national agency.

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Cleveland’s major providers of food for the poor

Catholic Hunger Fund (offers meals)
St. Vincent de Paul Society
1027 Superior Ave.
Cleveland OH 44114

Hunger Task Force (pantry) and HTF Meals Program (hot meals)
Interchurch Council of Greater Cleveland
2230 Euclid Ave.
Cleveland OH 44115

Greater Cleveland Community Foodbank
1557 E. 27 St.
Cleveland OH 44114
(accepts donations of food as well as money)

Harbor Light Complex (offers meals and shelter)
The Salvation Army
1710 Prospect Ave.
Cleveland OH 44115

The Hot Meals Program (meals in the neighborhoods)
The Salvation Army
2507 E. 22 St.
Cleveland OH 44115

City Mission (offers meals and shelter)
408 St. Clair Ave. NW
Cleveland OH 44113
that collects large-scale food donations. The GCCF is the local agency for USDA surplus cheese, butter, milk, flour, honey, corn meal, and rice. In addition they are the major channel for food donated locally by grocery chains and food brokers. They distribute over one million pounds of food per month in Cleveland among 350 neighborhood pantry programs and hot meals centers. They charge 8 cents per pound, regardless of the item, to cover employee and warehousing costs.

The other type of meals center is in the inner city and operates on a different basis. These centers have different patterns of serving food, so that the poor can obtain two or three meals a day by moving from one haven to another. For example, St. John’s Cathedral downtown serves lunch every day of the week. The Salvation Army has a soup kitchen at their Harbor Light Shelter which also serves lunches. The City Mission, another private agency, offers an evening meal every night to those who attend a chapel service. Nearby churches offer meals every Tuesday night, say, or every Thursday night. They don’t need to advertise. Hungry people tell each other where they can go for food. Inner-city clients are more likely to include bag ladies, alcoholics, drug addicts, and the mentally confused; more individuals and fewer families.

I looked particularly at two meals centers. One was at the East Cleveland Presbyterian Church on Euclid Avenue. Funded by the Interchurch Council of Greater Cleveland and staffed with volunteers from that church and Christ the King Catholic Church nearby, this center is open only six nights a month, when food stamp recipients are waiting for their next allotment. The second was the lunch program at St. John’s Cathedral, which is funded by the diocese through the St. Vincent de Paul Society.

On my first night as a volunteer server I arrived at East Cleveland Presbyterian at 5 P.M. I was taken past the sign-in desk down some linoleum-covered stairs to a small recreation room with kitchen attached. There were five long tables, each of which would seat about thirty people. The tables were set with paper cloths, paper napkins, metal utensils. The dishes and glasses were “real,” not paper or plastic.

I met the other volunteers: Clarence James and his wife, Cleo; Janine, the cook; and Robert, the dishwasher. (Some names have been changed to protect the privacy of the individuals.) Clarence was a real go-getter, moving around the room, greeting people, explaining procedures, and establishing which table would go first. A blessing was asked.

I put on my apron and prepared to serve. The buffet was varied: a cup of cold gazpacho; cheese soufflé; pork and baked beans; sautéed zucchini; pork roll in applesauce; perch—breaded, fried, and topped with a slice of lemon; croissant and butter; tossed green salad with ranch dressing; Hawaiian Punch; and a peanut butter dessert. There was also a ‘‘present’’ for each child: a package of Tostitos for the girls and a pair of jockey shorts for the boys. The food looked and smelled wonderful, but some people were shy about trying things they didn’t recognize, like the cold soup.

Most of the clients were black. There were many children and quite a few elderly people. There were a few singles, but most were families or groups of friends and having a good time. They were dressed in jeans and T-shirts mostly, some in polyester. One group of people were passing around photographs of a dance. There was almost a party atmosphere.

More people kept arriving but more hot food kept coming out, too. Toward the end of the hour, food began to run low. The volunteers eat after the guests are all fed. There is usually not much left after that, I’m told, and what there is is given to needy volunteers. I can attest that the food was fresh and tasted wonderful, especially after I had been on my feet for an hour or so.

One of my fellow volunteers, a retired black woman living in Indian Hills, told me she had seen real poverty in Mexico and in Harlem. She said she told the kids around here, “You’re well off and you don’t know it!”

After dinner I had a chance to talk with the cook. Janine was born in 1936. Her mother told her about soup kitchens in the ‘30s, and Janine was determined that she would never limit her menu to just soup and crackers as in those days. She is a private caterer who volunteers her time. She calls herself a “gourmet cook,” and she says she puts
her whole heart and soul into these meals. I cherish a memory of her stopping volunteers who were carrying serving dishes out of the kitchen so that she could add parsley to make them look pretty. Janine does most of her shopping at the Foodbank (mentioned above), but she is limited there by what is available. If she needs other items to complete a recipe, she has to go to the grocery.

Janine is the one who decided to offer a "present" each night to the clients.

The next night the menu consisted of cream of chicken soup; collard greens; summer squash; ground beef and rice loaf with barbecue sauce; fried chicken; cornbread and croissants; green salad with small pear-shaped yellow tomatoes; watermelon; sweet potato pie; and the present, chocolate Easter bunnies.

The Easter bunnies were a problem. At first I was told to make my own plan for giving out bunnies. I decided to give the larger bunnies to kids, and the smaller ones to adults. But later, I was told that kids shouldn't have that much chocolate; I had done it wrong. Another volunteer spoke sharply to the kids when they tried to trade in their first bunny for a larger one. "You take what you're given!" someone said. I said I was having trouble figuring out which kids already had bunnies and which were coming up for the first time. Two different black volunteers said to me, "Well, those kids all look alike," and laughed, watching for my reaction. I said, "Well, the kids are in families."

On this night I talked with two retired couples, one white and one black. They were both nicely dressed, the men in sport shirts and slacks, the women "dolled up." They were very friendly and happy to answer questions about how they had heard about the program (from friends), but their biggest concern seemed to be if there would be any extra bunnies.

In general I felt only marginally welcome at the center. I was told not to talk to the black families, that they would resent a white woman meddling. I felt uncomfortable with the way clients were being treated by some of the other volunteers. The worst rudeness I saw was directed by black volunteers at black clients. The adults were treated like children, scolded and reprimanded. Some of the volunteers expressed the opinion that the clients were not grateful enough for this ser-
A party-like atmosphere prevailed at the East Cleveland Presbyterian center.

St. John's Cathedral is a large Roman Catholic church in the heart of downtown Cleveland, a large complex of buildings in which it is easy to get lost. I finally found my way to the small area allocated to the lunch program. I barely had time to meet Terry Kane, the director of the program, and Constantine, the only other volunteer, before it was time for the doors to open. Constantine showed me where to hide my purse in a cardboard carton in the kitchen, and Terry threw me an apron. People were lined up outside the door at the top of the stairs. It was 11:30, and they were tapping on the door. Terry ran up the stairs and unlocked the door, and the clients hurried down the stairs and into the narrow hallway where they could pick up their coffee. They seemed nervous and agitated, as if, if they didn't hurry, someone would take the lunch away.

Terry had told me just to watch for a while, so I stood across the narrow hall from where he was serving coffee, and the clients passed between us. There were more men than women, and most of the people were black. Terry seemed to know most of them, and they were friendly with him and with me. "Hi." "Nice day." "Chilly out today." It was the first cold day of autumn, and the
men were wearing jeans, shirts, and coats. Some wore hats. Some of the men had beards, or seven-day growth. One was on crutches with his foot wrapped in gauze. One had a walker. One looked like Santa Claus with white hair and a white beard. There was one black man wearing glasses that were totally surrounded by white adhesive tape; one lens was cracked through.

There was a black woman with what looked like a burn scar on her neck. Another black woman would not look at me. Most of the people seemed to be between 50 and 70, but there was a very tall young black man wearing a plastic shower cap on his head. He seemed jumpy. Many of the people carried big plastic bags full of other bags. A few of the people smelled bad. These were the "poor" I'd been trying not to look at all my life, "up close and personal," as they say on TV.

After a while Terry told me to serve the coffee. I should put the milk and sugar in the coffee, he said. People asked for 1, 2, sometimes 3 spoonfuls of sugar. I stirred it with the plastic spoon. Constantine, meanwhile, was handing out the bag lunches. The lunch consisted of a bologna sandwich on white bread, no mustard, no mayo; a plastic container of juice; 2 chocolate chip cookies; and a serving of cottage cheese on a styrofoam plate. Early arrivals got chocolate pudding left over from the day before.

The clients seemed to know each other, and although each seemed to be on his or her own, they sat together at the tables and chatted amiably as they ate. Terry keeps a radio playing in the background to give an undercurrent of noise and encourage the clients to talk. Once he didn't bring it. The men complained. When he brought it back, they applauded.

Lunch is served from 11:30 to 1:00 every day. On Tuesdays and Thursdays there is a hot lunch. On Mondays, Wednesdays, and Fridays there is a cold lunch. On Saturdays and Sundays there is only a bag lunch handed out the door; no tea, no coffee, no coming in to get warm or use the toilet.

There is room only for 38 at the tables. The 39th person has to stand until someone else leaves. The dining room is small. The indoor-outdoor carpeting on the floor seemed damp; my shoes stuck to it. On a blackboard were the expected high and low temperatures of the day, 68 and 40, under a drawing of three crosses. The poster on the wall said, "I will not let them starve I will not let them starve I will not let them starve."

The kitchen was even more cramped, and the facilities were primitive. They have one small residential stove. The area is crowded with empty cardboard cartons. The ceiling is low, and one has to stoop under the heating ducts.

After the clients settled in, I had a chance to talk to Constantine. He is a bachelor in his seventies who began volunteering because he was bored with retirement. He comes in two days a week. He was raised a
good Catholic, he said. He had a brother who was a missionary in Africa for 25 years. He himself once thought of becoming a brother. You help people, he said. That’s the right thing to do. He said the other volunteers were mostly the secretaries from Cathedral Square, but sometimes other office workers came in to work on their lunch hours. There is a vice president of a bank who comes in, and two men from the FBI.

Constantine said he has to watch the clients very carefully. They try to get more than one lunch. At one point a man who had obviously been waiting for his chance, when all the volunteers had turned their backs, got up and moved toward the lunches. Terry turned, saw him and yelled, “No!” Constantine said Terry couldn’t help himself that time, but that usually he is quite mellow.

Both Terry and Constantine spoke sharply to clients in my hearing, but it seemed unemotional and impersonal. It was just giving orders. Constantine seemed worried that the rules wouldn’t be obeyed. Some of the clients, too, mumbled when someone cut in line or seemed to get a bigger portion. Fairness seemed to be a big issue.

Terry is in his late forties, maybe, with white hair and bright blue Irish eyes. He chain smokes. Terry said that the regular clients use this place like a club. This is where they see their friends. For some the toilet here is the only one they have. In the winter they come here to get out of the cold, and they stay until they are kicked out at 1 P.M.

Terry gets most of his food for the program from the Foodbank. He calls every Wednesday and orders for the week. The average cost of the meals is 88 cents per person. Examples of the hot meals he has served are: pork chops with applesauce and potato salad; hot dogs, peas and carrots, and three-bean salad; or ground beef stew, potato chips, bread, and peaches.

When clients need a place to stay as well as food, Terry sends them on to St. Herman’s, a Ukrainian Orthodox shelter. They provide a bed and meals and clothes. Constantine added that Harbor Light, the Salvation Army shelter, also provides these necessities.

Meanwhile, the lunch crowd had finished eating. The men were sharing a smoke, passing around one cigarette. The room had become close and smoky. A young black woman came in with a tiny sleeping baby and another small child at her knees. While Terry poured milk for the child, she told me she had a third child as well, but he was in school. The only other child in the room was a blond boy of 4 or 5.

Some clients, as they started to leave, would ask for another lunch, as if they were just coming in. Occasionally, Constantine would be fooled for a minute, then he would recognize the con and get mad. After a while he began to suspect people who were innocent, newcomers who had not been served yet. In frustration he said to me, “Well, they all look alike,” which must have been a joke, because they didn’t look alike at all.

A few people stopped and thanked us on the way out. The jumpy man with the shower cap asked Terry for cigarette papers to roll a joint. Terry said, “Get outa here” with a smile.

Three weeks later I went back. This time I arrived at noon. The blackboard said 70 the high, 50 the low, “Showers tonight.” There was a prayer to St. Francis. The majority of the people had been through the line, but individuals continued to arrive. Today the numbers of whites and blacks seemed more even, but there were still many more men than women. Terry had encouraged me to come back to talk to the clients themselves, so I sat down with two black men, Jim, 51, and Dale, mid-20s.

Dale was more than willing to talk. He talked continually, whether anyone was lis-
Frankly, I had trouble getting it down. I felt a sense of responsibility to eat it, but it wasn't easy. If you could afford to buy your own lunch, I thought, you would not eat here. I felt embarrassed at having refused the bag lunch the last time I was there, but I had to refuse it again. I had taken two of the Twix candy bars, however, and I offered the second one to Jim. He refused until I offered to split it and then he took half.

A middle-aged white man spotted me as I got up to get a cup of coffee. He started a conversation. He seemed to assume I was a fellow client, and I didn't correct him. He works as a security guard. He eats the lunch at St. John's so he can spend his lunch money to buy a lottery ticket. It's only reasonable, right? Why not take advantage? Then he noticed my wedding ring. Does your husband work? Yes, I told him. And I do, too. Well, you have to, he said. He went off still assuming I was a client, but giving up on the pickup.

In the corner was an older white man wearing a threadbare navy blue suit, a shirt and a tie. He said his name was Ziggy, and that he was 59. Born in Poland, he gravitated here via Germany and Tampa, Florida, where he picked oranges when he first arrived in this country in 1949. He speaks six languages. He named Polish, German, Russian, Ukrainian. He has a trace of an accent, not much. He has a wide and open face, cool blue eyes, a moustache, and a maybe three-day-old beard. His hair is white and nicely combed.

A victim of the recession and the technological revolution, and now of his age, Ziggy wants to work. He worked twenty years for a company that folded. He's been out of work for two years. He applies for jobs. They keep him waiting, sometimes five hours, then tell him he's too old. He used to have an apartment—four rooms for $50. He had electricity, gas, a telephone, a TV. Gradually these things had to be given up. He had to sell the TV. He had to give up the apartment, although he still gets mail at that address.

Now he lives in a secret dugout of some kind. He wouldn't tell me where, perhaps near a highway. He can see the cars go by, even the police cars, but they can't see him. There are five steam pipes that keep him warm in the winter, but it's too hot in the
Volunteer servers at St. John’s Cathedral file past candy Easter gifts for clients.

summer. Lots of mosquitoes in the summer. Dogs come by, but people don’t know he’s there. In the winter when it snows, he covers his tracks, so no one can follow him in. Six times he has been beaten up. There are bad guys who will beat you up for a quarter. He goes to the free clinic if he needs a doctor.

He spends summer days at Edgewater Park. It’s safe; the cops come by all the time. He can swim there and get clean. In the cold weather he goes to the library to get warm. He reads the newspapers. There are newspapers from all over the world. In Ukrainian, for example. He can get a shave at the library. He spends his days in the library and the churches. When it is really cold, you can get shelter at the City Mission. They give you ten days, longer in the bad weather.

To get money, Ziggy collects aluminum cans and puts them into machines that give you cash in exchange. He can get maybe $10 a week. That means he might be able to get his apartment back. But last week he put in about $10 worth of cans, but the machine was broken, and he got only 12 cents.

He shows me two photographs. In one, he is dancing with a young woman taller than he. He is very dapper in a light blue suit, the girl is in white. He says this is a wedding, a Polish wedding. He still gets invited to weddings. They know he is poor and can’t bring anything, but they invite him. He prays for better times next year.

The other photo is black and white. It shows Ziggy in an office leaning up against a counter and smiling. There is a girl nearby with whom perhaps he was flirting. He looks self-assured.

Like many of the Eastern European poor, Ziggy does not collect food stamps or welfare, perhaps out of pride. Terry says this attitude is very common. Even some of the volunteers at St. John’s have scorn for the poor who accept welfare. They will work for them, but they do not like or trust them. Ziggy kisses my hand as I leave.

Flash, who says his name is Michael, is 38. He is the young man I saw three weeks ago with the adhesive tape glasses. This time the left lens is completely covered with tape, the right lens is clear. The earpieces are clearly broken and held together with tape. He manages to look out over the left lens and through the right lens. Terry has volunteered to take him for new glasses, but Michael has refused. He refuses again today. He says he needs to get his left side straightened out first. He talks a lot and it sounds as if it should make sense, but it doesn’t. He uses words I’ve never heard, that sound like jargon. At one point he is describing a process that sounds a lot like metal-plating and he talks about the heat being the wrong temperature and the vilt comes down and the fred is crow. You nod like it makes sense, while you wait for your brain to decode the signals, but they don’t decode. Michael says no, not vilt, I mean vapor, and your hopes go up that maybe this will work. But the sentences still don’t mean anything. Michael laughs a lot, the way you do when you’re making friends, and his face does the right things socially, but his hand movements seem to describe sexual moves, and his laugh turns flirtatious and a little dirty. All the time he’s talking about metal-plating.

Just before one o’clock I see Michael taking trash out of the garbage can and stuffing it into the lining of his jacket. “It can get cold out there,” he says. I can’t see what he’s
FEEDING THE POOR IN CLEVELAND

using; I just hope it's relatively clean paper goods. Terry gives him a new plastic garbage bag for his belongings, and Michael carefully wraps up his old bag inside the new one. Michael never sits down, Terry says. The seats are too hard.

Stella, a white bag lady and a regular, is too busy to talk to me. She has an appointment. She used to work for Cannon Tailoring. Now she panhandles on the street and checks the phone booths and newspaper machines for change left behind. She is wearing layers for warmth, including three scarves on her head. Her eyes are big and blue. She seems alert. But she has no time to talk.

At one o'clock Terry wakes up the black man sleeping near me, and tells him it's time to go. The man wakes up and immediately begins spewing his story to me. "My name is Joe—I'm 49—I worked for US Steel 20 years—I didn't get my check—Look at my ankles they're all swollen—I can't stay with my aunt—She's got three rooms, but she won't let me stay there."

When he's gone Constantine says, "If he worked for US Steel where's his money? He worked for US Steel, he made $28 an hour. What did he do with it?"—with all the scorn of the European who did set money aside for a rainy day. Terry says, "Well, he had a great twenty years."

After the clients left, I spent a long time talking with Terry, trying to check my perceptions against his. Were the people I talked to telling the truth? You never can be sure; sometimes they exaggerate, sometimes they out-and-out lie. Why are they unemployed? They may be drug addicts, alcoholics, old and unskilled, mentally disabled. Some of them would be employable if jobs were available. What do they do when they're not here? They walk around. They panhandle. They sleep in churches until they get kicked out. What about human dignity? They may be bored and beaten, but they retain their pride.

Since my experiences in the hot meals centers, I've been asking myself some questions: If there are "poor," "poorer," and "poorest" substrata within the lower class in general, is there a "poorest" in Cleveland? The answer has to be "no" if there is to be any comparison to the situation of those literally starving in Ethiopia and other African countries. I saw no faces to match the gaunt fly-covered figures we have seen on television, the eyes staring and beyond tears, the skeletal arms cradling a dead child. The "poor" and "poorer" here have access to food, shelter, and even services. Although their future may be bleak, they are not dying.

Does that mean that the system for feeding the hungry in Cleveland is a good one? It's hard to say what a "good" system would be, but this well-meaning tangle of local agencies has certain advantages: 1) In combination they manage to serve two daily meals to the hard-core inner-city poor as well as help out the borderline poor in the neighborhoods on a regular basis; 2) Each agency draws on a different constituency for financial support, so if any one of them should fail, as the ICGC hot meals program nearly did last fall, the others could probably fill the gap; 3) Unlike the government programs, these meals centers have no restrictions on who can come in and eat. Although many of the centers have a religious affiliation, I saw no active proselytizing; only at the City Mission is it required that you attend a chapel service to get a meal.

Are we managing to take up the slack that President Reagan mentions? How big is the problem? Some facts:

In 1980 the Federal Budget allotted nearly equal portions to defense and human services: 28% and 29% respectively. In 1986 the percentages are 34% and 16%.

There are 71,000 fewer people employed in Cleveland today than were employed here in 1979.

Between 1973 and 1983 twenty-eight percent of the manufacturing jobs in Cleveland disappeared.

Eighty-five percent of the unemployed adults served by the ICGC pantry program had worked previously. Half of these had worked three or more years in their last job.

Roughly forty percent of the people served by the ICGC hot meals programs are children.

The average cost of a meal at one of the ICGC centers is 60 cents.

I would like to thank Karen Kordisch, Stephen Wertheim, and Dana Irribarren of the Interchurch Council of Greater Cleveland and Terry Kane at Cathedral Square Meals for their help in obtaining information used in this article.
The Gamut laments the demise, last February, of the New Mayfield Repertory Cinema where, since 1975, film enthusiast Sheldon Wigod provided movie buffs of the Cleveland area with a steady diet of the best in cinematic art, from the classics of the past to the off-beat of the present—often introduced by his own ebullient remarks. To memorialize this passing, we present a fictional reminiscence by Michael Samerdyke, now a graduate student at Ohio State University, who says he spent many undergraduate evenings spellbound at the New Mayfield. His story evokes some of the fusty atmosphere fondly remembered by many of the theater’s former patrons.

Michael Samerdyke

Spellbound at the New Mayfield

As he waded into the familiar darkness to find an empty aisle seat, George marvelled at the size of the audience. The New Mayfield Repertory Cinema hadn’t attracted such a crowd since Strangers on a Train, but then this too was a Hitchcock night: Spellbound and Rebecca. Hitchcock always pulled people in.

He wondered if Sheldon would speak before the movie tonight. He hadn’t seen the eminence grise of the NMRC when he bought his ticket, so maybe there wouldn’t be a talk. Too bad. George liked Sheldon’s talks. They seemed to give the New Mayfield audience a sense of community.

"I hope Sheldon doesn’t talk tonight," a bored, middle-aged male voice declared behind him. "We came to see the movie, not him."

"I know," a bitter, middle-aged female voice agreed. "We know the movie is good. That’s why we’re here. He doesn’t have to tell us the movie is good."

George identified the voices. They only came to movies made between 1934 and 1950, and even then they never saw anything they really liked. The woman in particular hated Olivia deHaviland, and George could never think of Captain Blood without remembering “Bitch, bitch, bitch” hissing from the darkness behind him.

To take his mind off the voices, he observed the people entering the theater, trying to see anyone he knew. That rarely happened. Maybe three times a year he’d see someone, usually from John Carroll University. Tonight, after looking at two score heads, George decided it wasn’t one of those times.

At least the movies would be good. That was the main thing—the movies. He liked practically everything: Singing in the Rain, The Seven Samurai, Hitchcock, Fassbinder. Why not? At least things happened in movies. Things didn’t happen in real life. In movies, boy met girl and they fell in love or tried to kill each other for the insurance. In real life, George asked girls out and they said they were busy or couldn’t go out with boys who weren’t
In movies, men were private eyes, gunfighters, or the Marx Brothers. In real life, George went to John Carroll, then after graduation got a job as a word processor operator. Maybe it wasn’t as bleak as that, he admitted. For a few months he did have a girlfriend. (God, how pathetic.) It fell apart because of her parents, who never told Brenda when he called her and she wasn’t there, or said she was out when she was home. He was the wrong religion and “weird” on top of that.

As he thought about that episode, George realized it proved how movies were superior to life. If the story of George and Brenda had been a movie, he would either:

1. Go to her parents’ house and kill them (Scorsese)
2. Save somebody’s life, and since he was a hero her parents would approve of him (Capra)
3. Forget about Brenda and find somebody else (Huston).

But life wasn’t a movie, and George had to wake up every morning and realize that Brenda was married to a business major.

Change the subject, George warned himself. He began to count the people sitting in the darkness, got up to seventy, and quit. It depressed him that he didn’t know any of them. He came to the New Mayfield at least twice a month, and the only people he knew were the “voices.” He decided not to look at the new crowd of people acclimating themselves to the theater.

“It’s so dark,” a man protested.

“There are some seats,” a woman suggested.

Despite himself, George turned around and made out Brenda’s face in the dark. She held the arm of a nondescript-looking man in a business suit, who kept turning his head to shower disapproving looks around the theater. It didn’t match the mental picture George had made of Brenda’s husband, but the short, energetic, curly-headed woman leading him to a seat was certainly Brenda.

Suddenly color splashed across the screen and sound poured over the theater. George reluctantly turned back to the screen to see the trailer for King of Hearts, a film he had no intention of seeing. Finally, Spellbound began, and he placed his imagination in the hands of Alfred Hitchcock.

He had seen Spellbound before, so the plot didn’t require all his attention. His mind, annoyingly, kept skipping back to Modern Drama, the class where he first became aware of Brenda. He remembered taking notes and sneaking glances at her quiet smile and blue eyes. Then, one day before the prof arrived, some of the students were discussing The Iceman Cometh.

Gregory Peck was becoming hysterical at the sight of parallel lines. Ingrid Bergman sat and listened to a self-important hotel detective. The audience chuckled at the man’s wrong conclusions.

George said that Hickey wasn’t crazy but pretended to be to avoid realizing that he hated his wife. He noticed Brenda looking at him and seriously considering his words. He felt wonderful.

By now, Gregory Peck and Ingrid Bergman had reached her mentor’s house. The wise Central European gentleman was sure to solve the mystery of Peck’s behavior, if Peck didn’t kill him first.

Over the next few years, George had dated Brenda a few times, but it was largely worship from afar. After graduation he heard that Brenda had married an accountant. Movies were better than life.

Peck now revealed his childhood trauma. The audience gasped in horror as a little boy hurled down towards the spikes of an iron fence. George suspected that if he turned around he would see Brenda gripping her husband. He watched as Ingrid Bergman talked Leo G. Carroll out of killing her.
The film ended and the mass exodus to the restrooms and the refreshment stand began. George stood up to give his bottom a rest. Giving in to temptation, he turned around to see Brenda joining the crowd. Her husband remained seated. George, trying not to be too obvious, looked at him.

The darkness prevented a first class look. Of his face, all George could see was that he wore glasses and had dark hair. He still had a look of disapproval on his face. The business suit told George that he made a good living. He looked as if he kept himself fit.

George shifted his weight from one foot to the other and waited for Brenda to come back from the refreshment stand. Maybe she wouldn't recognize him. Maybe she would, and they'd talk a bit. He would like that.

Holding a soft drink and a cup of popcorn, Brenda started down the aisle. By now George was the only person standing in his part of the theater, so Brenda naturally looked at him. George smiled.

"George," Brenda exclaimed.
"Brenda," her husband snapped, angry that Brenda had walked past their row.
Brenda smiled at George, then turned around and walked back to her husband. She sat next to him and gave him the pop and the popcorn.

That was that.

George turned around and sat. If this had been a Preston Sturges movie, he thought, Brenda would have dumped the pop over her husband's head and run away with George. If Scorsese were in control, George would go home, arm himself, and "rescue" Brenda.


George smiled, watching the Hitchcock film while a Scorsese film that Scorsese would never make played in his mind.

Mrs. Danvers seemed rather aloof. The black and white photography banished Scorsese from George's imagination and summoned the spirits of Notorious instead. Cary Grant, Bergman, and Claude Rains were caught in an obsessive triangle just as he, Brenda, and Whosis. George would go to their house and find Brenda on their bed. He would explain to her that her husband was poisoning her and carry her out of the house to safety.

The costume ball at Manderly turned out to be a disaster. Joan Fontaine discovered that Rebecca was really an evil woman. (No surprise to George, who had seen the film three times.) Laurence Olivier cleared himself of the murder charge while Manderly, Mrs. Danvers, and the embroidered pillow went up in flames.

George sat for several minutes as the audience left the theater, to give Brenda a chance to leave without him seeing her. He walked out into the cool summer air on Mayfield Road and walked up the hill to the parking lot. The aroma from the doughnut shop came to him, and he instantly turned his head.

In the brightly lit window of the store, Brenda and husband stood, deciding what they would buy. For an instant George felt as if he were watching a scene from Manhattan. They were in a movie, and he, as usual, was watching.

He turned away, and as he walked up the hill he comforted himself by remembering that next week the New Mayfield would show A Clockwork Orange.

He'd be back.
LETTER TO THE EDITORS

To the editors:

Wow—cheesecake on the cover of Gamut! We have entered a new era!

I am responding simply to the cover, as I have not yet read the article, but I have been a Gamut fan for a long time and expect to enjoy the whole issue as usual.

Dwight Brown

P.S.—Took a quick look at the article (about torrid romance novels) and find some of the observations very sobering. Faithful to the facts, I am sure, but sobering.

The Reverend Dwight Brown, who is the minister at the First Unitarian Church of Cleveland, has subscribed to The Gamut since its beginning, and claims that he recommends our journal from the pulpit.

ERRATA

Mr. Robert Cluett, author of "The Fall of the House of Cruse—the Politics of Wine" in The Gamut No. 17 (Winter, 1986) has written to point out several errors in the printed version of his article. The editorial staff regrets these errors, the result of human frailty compounded by the slowness of the mails between Cleveland and Toronto.

P. 44, col. 1, lines 35-7 should read: "... it seems difficult to pursue 'good' economics and the public health simultaneously" (incorrectly printed "economics and public health").

P. 45, col. 1, line 16 should read: "Chateaux Lagarde and Smith-Haut-Lafitte" (incorrectly printed "Chateau Lagarde").

P. 47, col. 2, line 30 should read: "June 28" (instead of "June 18").

P. 49, col. 1, line 22 should read: "of tax laws" (instead of "of the tax laws").

P. 54, line 1 should read: "this article had been in preparation ten years before I undertook it ..." (instead of "one year").

The author also points out errors in the biographical note on p. 42. The sentence beginning "In Toronto, where he lives with his wife and three daughters ..." is incorrect. Mr. Cluett writes, "I do have three daughters—ages 27, 25, and 23—who are no longer either resident or dependent." And he adds, "I am the coach emeritus of the York women's squash team."

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What If . . . ? Winners of our futurological writing contest
Mail Art: Artists who give their work away
Education in China today
The Thermometer: turning point in technological development
Stress in Holocaust survivors
Ethnic patterns in neighborhood settlement
Fasting: for the good of our souls?
SPECIAL SECTION on the Great Lakes: geology, environment, and economics

Look for all this and more in forthcoming issues.