

**SPEAKING OF DESIGN**

SCHOOL SHOP MAGAZINE

PROFESSOR OF DESIGN

by **AAREE K. LAHTI**

"you don't have to agree with me, but..."

## Speaking of Design

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

As a way to introduce these magazine articles, I (Ahde Lahti) am adding a story that Pop (Aarre K. Lahti) wrote about his father John Aikia Lahti, back in May, 14th, 1965. This story was not published in *The School Shop Magazine*.

I have also added photographs that were not in the original articles or stories, as a way to better see the actual items he was talking about, or similar items. All of the illustration were done by my older brother Aarre Aleksis Lahti. Many of the items and carvings were done by Aleksis, Pop or me. Pop wrote these wherever he went, the portable typewriter was always clacking.

He volunteered to write these for his good friend, Ollie Hanninen, who was the editor for *The School Shop Magazine*. To create the articles he acted as the editor, asking the questions, to be answered by himself. That way he could just send in the copy each month.

### "The Legacy"

Returning to the United States during the worst of the depression was a bitter reality to face. This bitterness was made even more grinding by the contrast of a return to a Michigan Upper Peninsula mining town from leisurely fellowship travels in Europe. My training in art, truly "long hair", had prepared me for creating epic murals, peaceful well groomed landscapes and portraits of haughty individuals. This, however, I must say for the depression; the artist and the public had achieved economic equality - now we were all destitute.

Shortly after my returning home, my father had managed to under-bid other contractors for the privilege of painting Civilian Conservation Corps barracks buildings. During this Job our shacking in an abandoned hay loft (we called it The Grand Hotel) was nightmarish. However, it was here and under these circumstances that my father opened my eyes and mind to what the art school ("The largest in the World") had failed to do. Absorbed in my own turbulence, I had not noticed that my father was aware of my aimless turmoil. Though as an orphan his own education in Finland had terminated with only a few years of public school, he had nevertheless acquired a philosophy and developed an insight adequate to cope with youth in revolt, and I must admit, his son was revolting in more ways than one. I can clearly



recall the evening after we had finished supper on the patio of The Grand Hotel when he said, Kuuleppas Aarre, osaatko velstaa lusikan?"

The reply, from one whose laurel leaves were still damp from a sprinkling of European culture was a definite "Yes"!

Late the following evening I presented him with my completed effort. He received my carving with a quietness in keeping with the stillness of the enclosing night.

He examined what I had made, turning it over in his hands with the same tenderness with which he had held me as a child, but here was no play or smile in his feelings. He had offered no criticism and recall no comments as we retreated from the mosquitoes to our net covered pads.

The following evening, after a hurried supper, he led me to the edge of the clearing and after peering patiently into the woods, pointed to the fork near the top of a birch tree and said, "From that will come a good spoon." He cut off the tree below the crotch of the fork and then trimmed the branch ends. He carried the "tarvis puu" back to the "hotel" and in the warm light of the late afternoon sun his axe quickly roughed out a form. His ax cut into the "green" wood as though it were cheese. A bowl emerged from the tree portion of the wood and a handle from the thicker of the two fork tines. Next with long sweeping strokes of his knife removed long shavings and after concentrated effort, furrowed brow and pauses in his breathing and deep breathing following (the chest was used as an anvil against which the work was pressed) an elegant, yet simple compound form emerged. This form took into consideration the essentials utility of the spoon, its





feel in handling, the nature of the tools available and even the efficiency of working the material "green". The view from the top and the view from the side countered thick and thin. While the top view merged from a wide flaring bowl into a very thin shank and again to a wider handle tip[, the side view in contrast started from a pointed bowl tip to a maximum width, where the top view was thinnest, and gradually thinned to a delicate handle end. The front, from side, followed the grain of the wood and resulting in the bowl and the handle being at an angle with each other, an angle about that, when the arms of a clock are at nine five.

Now I understood my father's silence. My carving had been a picture of









a metal spoon carved from a piece of two by four.

Later he taught me how to skin long continuous strips of bark from birch trees and to roll them into balls for future use. But, even the balls had acquired an elegant traditional ovoid form, a form requiring a feeling for the complex geometry of making a ball from flat bands. During the winter evenings the bark from the balls was unrolled, trimmed to weaving width and dampened to restore the necessary pliability. I then learned to weave pack-sack baskets and even slippers. Yes, we do build edifices and monuments to heroes and villains, for conquerors and the exploited but, to me, the simple wooded spoon is at the heart and root of what is Finnish. In this age when everyone seems to be concerned with status, with propounding systems and with playing God; the basic humility, which is needed to understand humanity, might only be achieved by a willingness to face reality, examine our roots and produce with a humbleness not requiring monuments, obvious signatures or bronze plaques. Possibly, the sweat on the brow, the dark damp spot on a shirt between the shoulder and the calloused hands, are

the base upon which the American Finn now stands.

My father's greatest legacy to his children was his statement, "Yos yoku elava ihminen voi sen tehda, nii kylla minakin!"

I think it means: "If anyone can make it, I can"

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

*School Shop Magazine, Editor Ollie Hanninen, September 1961*

*Q. Many industrial-education teachers feel that since they are not "art" people, design is not in their province. How do you feel about this?*

A. "I think that if we look at design as problem solving, and forget all about the hoc-us-pocus that is associated with it, design becomes reasonable. Let me say that my primary concern is with the sensory aspect of design. In other words, how does a look, how does it sound, how does it feel, and, even, if I were designing a metal spoon, I would be concerned with the taste and the smell of the metal."

*Q. Let's talk about a real design problem - a picture frame - and some of the design factors that are involved in designing it?*

A. "The picture frame has to trim the edge of the picture. It has to be a transition between the picture and the wall, a structure for holding an assembly which might consist of a glass, a mat, the picture, and the backing paper, and to hold this assembly so that you can hang it from a wall.

"Here are some of the design factors I must consider, The relationship between the picture, the frame, the wall, the room, and the space. Now, the picture comes first, not the frame, so you have to keep in mind that it is a picture that you are showing and that the frame is secondary. I would like to make that frame as inconspicuous as possible."

*Q. How would you design this frame?*

A. "Now, first, I am a lazy person. I do not like to fuss. I don't like to get special set-ups, special tools. I want to make the thing as simply as possible.

I feel that if you use the simplest tools and simplest materials, the chances are you will get a better design.

"Now, for materials I would use pine, basswood, poplar, or any material that is easy to glue and material which is printable. I would not make a picture frame out of attractive natural wood because in most cases it would attract too much attention to itself. You can't control its color and the darkness of it so that it does a job of becoming a transition between the wall and the picture. So, I would use these simple, easy-to-use materi-



als and paint the frame to suit my purpose. As for materials, I would use 13/16" materials.

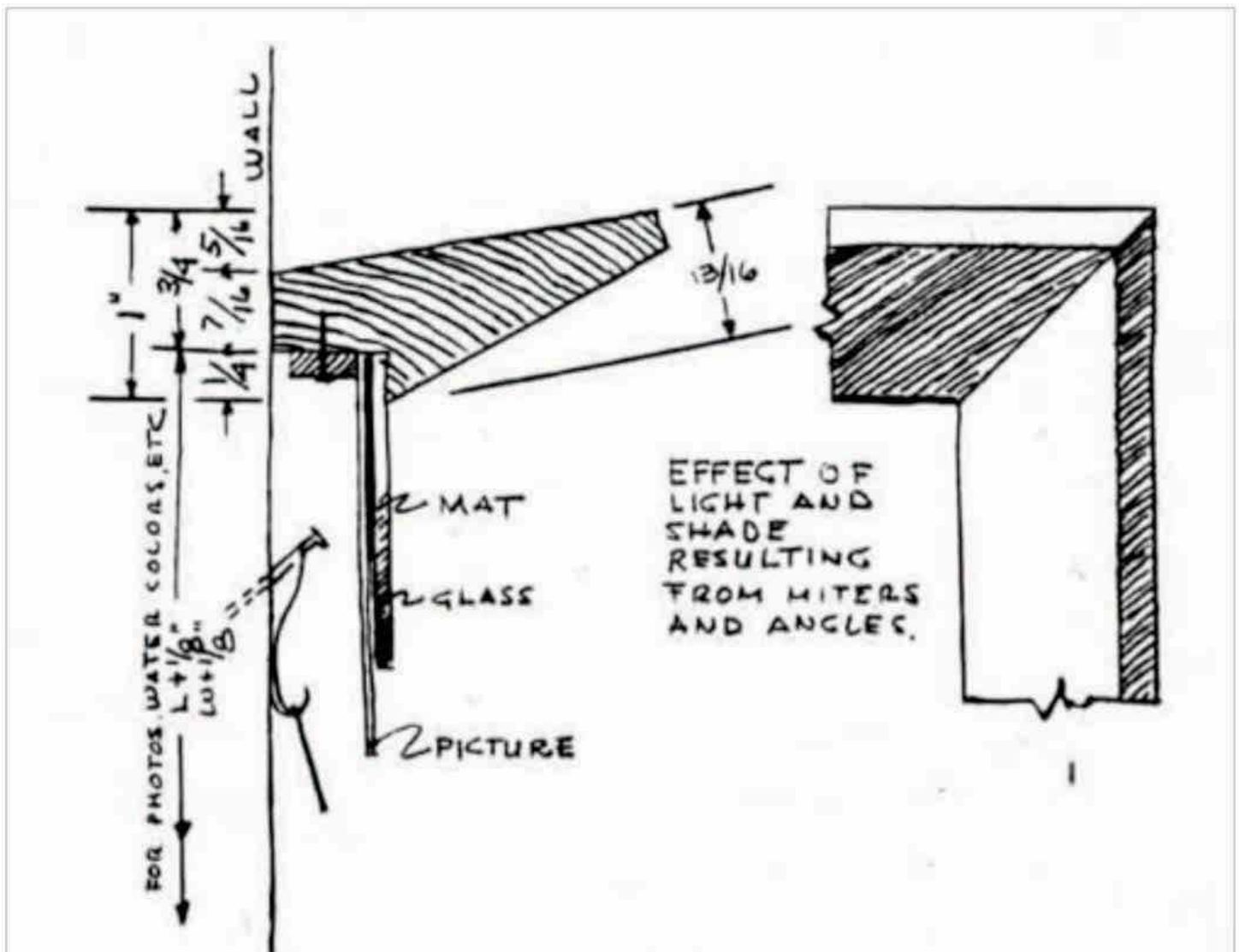
In other words, 1" dressed stock. I wouldn't bother with thicker materials, but I would design that frame so that I could get it out of that thickness of material. This kind of material is less expensive, more available, easier to use.

"And, as for tools, I would use a circular saw with a hollow-ground planer blade. This way I can get a smooth cut that I do not have to plane. I would use no dado heads. I would use no shaper knives because it takes too long to get them set up and then you fall into stereotypes.

"In gluing, I would use the old-

Fashioned string-and-drum method of tightening and not bother with clamps.

This does an excellent job - and quickly. Furthermore, you do not have to have special tools.



"As for glue, I would use waterproof glue because I do not want to have two or three different types of glues in the shop. I want one kind of glue that I can use inside or outside, and, incidentally, I never order interior-grade plywood - only exterior. I don't want to mark scraps of plywood as to whether they are interior or exterior.

"Now from the freehand drawing I made, and most of the time I make my drawings freehand because getting the tools out for drafting means that you have to fuss with more equipment; then pretty soon you are straight lines because your tools make straight lines, and you make 90° angles because your tools make 90° angles and you make 30° because they make 30°. You will note I would set the picture far enough into the frame from the back so that the picture can lie flat against the wall. If it is for a water color, the depth need not be more than 1/2". If it is an oil painting on a stretcher, it would have to be greater. If the picture is a water color or a print, I would see that the opening is about 1/8" larger than the picture because few pictures are exactly square.

"If it is for an oil painting, I would make the opening 1/4" larger than the length or width.

"I would not make the outer edge of the frame 90° to the wall for the reason that most of your woodwork comes out 90° and, therefore, the frame begins to compete with the woodwork.

I would make it just a little less than 90°, and in this way, the frame becomes a bit perky and sassy. It seems to be just slightly free of the wall. If you made a flat frame against the wall it would look too much like a bathroom mirror frame.

"The view below shows the shade effect created by the various planes, with one dark area playing against another area at the corners." \*

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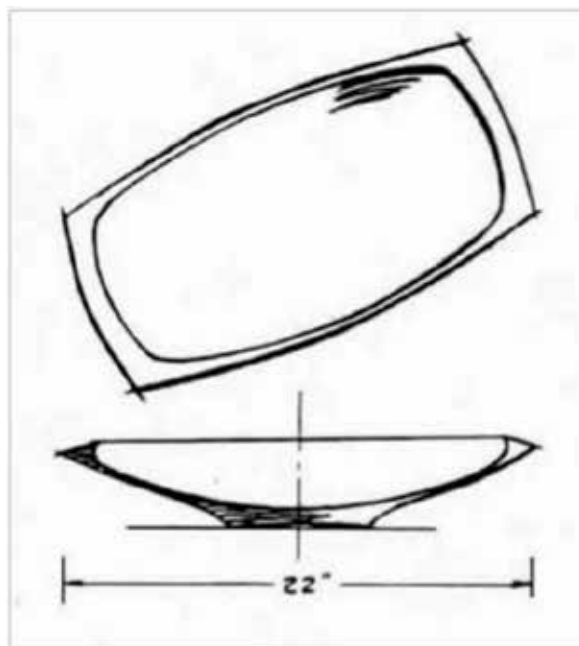
October 1961

*Q. In the September issue of SCHOOL SHOP we talked about designing a picture/frame. Now let's talk about designing a wooden bowl. Would the considerations differ in any way?*

*A. "Yes, they would. In the picture frame we wanted to play down the importance of the frame and to emphasize the picture being framed. Since we knew the function the frame had to serve, this was possible. The uses of a wooden bowl, however, are quite unpredictable. Since we cannot determine just how, where, and when it would be used, or exactly what it would contain, I would design the bowl as a center piece an accent - and make the design rather dramatic."*

*Q. What do you mean by dramatic?*

*A. "By being dramatic, the bowl should be sufficiently different, distinctive, and eye-catching in its form to call attention to itself, yet preserve an appeal for the observer. However. I would want the "dramaticness" to come from the bowl and not from tricky use of materials or a display of woodworking skill. The form is more important and significant than the materials."*





*Q. How would you go about designing and making such a bowl?*

A. "The possibilities are numerous, yet two approaches seem expedient. I could turn the bowl on a lathe or carve it by hand. Since I am thinking of only one bowl, I would settle for carving. The decision to carve in no way implies that hand work is superior to machine work.

We must remember that each tool and each material has its own potentials and that a good design is one that makes the most of these factors.

"Though I keep thinking of a circular shape, I would reject this for the present. A circular shape lends itself best to turning and I would rather take advantage of the freedom of forms which carving offers. In fact, this freedom, and the relative absence of limitations, presents problems because I cannot resort to the limitations of the lathe as a crutch.

"A rectangular shape appeals to me I possibly because there is an association with the rectangular shapes of lumber), but I would have to do something to this basic shape to keep it from being cold and mechanical. "Personally I like thin bowls, and the harder the wood the thinner I would make the bowl. As you can see from the diagonal section, the rather strong and dramatic edge permits me to have a howl with a very thin feel. Incidentally, since wood lends itself to this kind of edge treatment-metal does not-this is one way to use the characteristics of the material. Because I would want people to pick up this bowl to pass it around, I would want the form to feel separated from the table, a feeling which the narrow base helps to create. I want the form to be open and inviting.

"I would want the base to result from a slight transition of form, not just as a result of a flattened bottom. Yet, I would not want this transition to be so great as to suggest a separate form.



"I would use wood gouges only. I would let the final finished surface of the bowl be the result of the tools used in its forming and preserve the beautiful, subtle, flecked surface which only hand carving can produce. The least bit of sandpapering would destroy completely the character of the design." \*

Above are two bowls carved with a chain saw and chisel finish, carving on the tradition of the craftsman.

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## Speaking of Design

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Professor of Design, University of Michigan, Ann Arbor

December, 1961

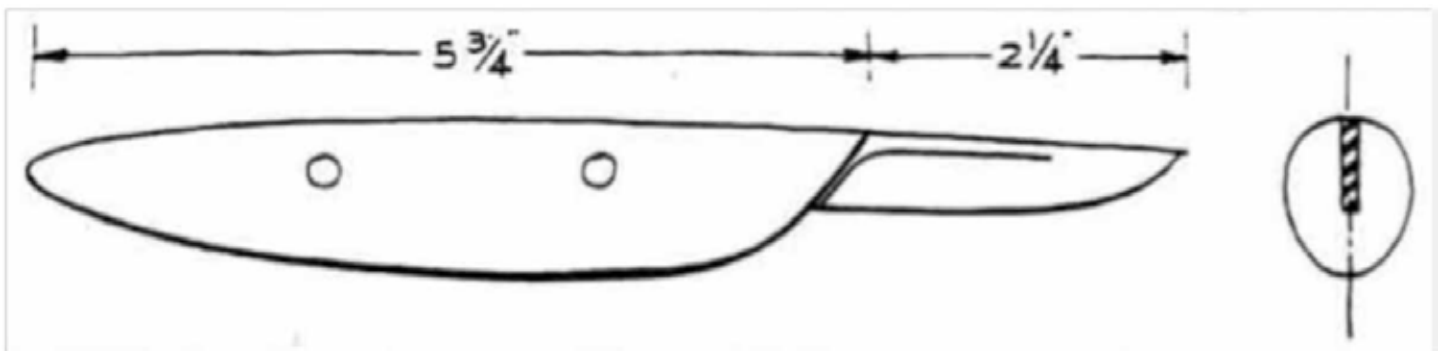
*Q. Thus far we have discussed the designing of things generally not considered to be utilitarian. What would you have to say if we were to consider the designing of a tool?*

A. "Off hand, it could seem that tools would have little need for those aspects of design concerned with appearance, feel, etc. Yet, some of the very best designing has evolved in hand tools. For our specific example let us consider designing a shop work knife. It may come as a surprise, but there is no such tool available on the market.

"Our first hurdle will be to rid ourselves of knife stereotypes. Among these are the 'he man' hunting and butchering knives, the homey potato peeling knife, kitchen knives, and romantic 'Black Forest' daggers."

*Q. Well, what design factors would you consider?*

A. "I would have to begin by considering what this knife must do. But before I start, let us digress for just a moment and discuss the basic is-



sue that has already been postponed for too long. I am a believer of this: Only functional design can be good design. However, we must not fall into the trap of thinking that function exists beyond man and his culture.

"The design for a knife, as well as everything else, must fulfill three basic functions: One of these, the mechanical function, demands that the blade have a proper wedge for cutting, a shape for straight whittling, a curve for hollowing, and a point for digging and scribing. Also, it must cut wood, cardboard, paper, stencils, and I must confess, remove aluminum

burrs.

"Then there is the physical function, requiring that the handle be sufficiently long to reach diagonally across the palm. The handle must be a balance between one that is sufficiently thick to distribute the strains of cutting over enough surface of the hand and be thin enough to communicate the 'feel' of the work being done.

"The cross section of the handle must be other than a circle because one must sense the direction of the blade. Remember: Your hand is more accurate than the eye when it come to whittling. Squarish sections, sharp corners, and blisters are 'old buddies'.

"Finally there is the third function, and possibly most important function, because the knife is being designed for use by humans, the psychological or cultural function. The knife must look sufficiently like a knife to be recognized as one: New designs evolve to new forms and shapes. You should grasp how to use a knife by just looking at it. The blade must seem sufficiently strong and seem adequately attached to the handle, it must not look like a scalpel blade tucked into a pickle. The blade and the handle forms should be so well integrated that they create the feeling of a single unit though composed of separate parts and different materials".

*Q. How would you make such a knife?*

A. "Again, I would use the simplest and easiest approach. I would make the knife from a file of good quality, grinding one end for the blade and shaping the remainder for the drank. I would do the slowly enough to save the temper. Since I would attach the blade to the handle with rivets, I would have to anneal the shank for drilling. 'This can be done by bundling the blade portion in wet asbestos while heating the shank'.

"Though there are hundreds of ways of making work knives, there are but a few that will require less than an hour from start to finish. Yes, I must admit we break a knife such as this once in a while, but a tool is to be used and not cherished." \*

Here are some that were of the same design, made years later.







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## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

February 1962

*Q. In the past we have talked about the designing of a picture /frame, a bowl and a work knife. Why couldn't we just go ahead and make them? In other words, why design?*

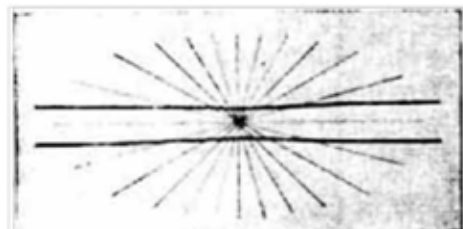
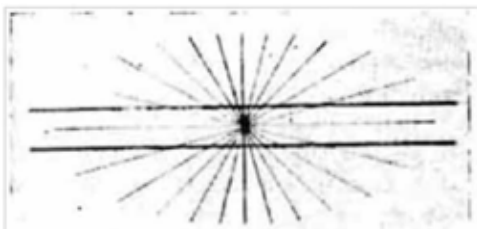
A. "Anything we make takes on a form of some kind and, as humans, we are concerned with wanting to produce a form which is suitable or 'good.' Let us discuss the appearance of objects."

*Q. I thought you objected to thinking of design as "appearance design?"*

A. "I most certainly do, but to illustrate a point, let us ignore the other sensory factors-feel, sound, smell, and taste."

*Q. Taste?*

A. 'Yes, even this factor is the designer's responsibility. After all, brass may be a good material but not for a teaspoon. Getting back to design, we might say that design is communication-communication on an emotional level: We give an object a form which we feel makes the object seem to do what it was intended to do. In many ways, design is an 'as though' situation.



"Let me illustrate what I am driving at. I want to communicate two lines parallel to one another. These lines will be over a star-like background cluster of other lines. I do this simply by drawing these parallel lines as shown in the drawing below.

"The result is annoying and disturbing and the observer becomes completely involved in the illusion, and this is not what I wish to have him do, nor is it what I wish to communicate. I have failed completely in communicating straight, parallel lines. Who would believe me that they are parallel? Would you?"

"Let me do this over again, but this time with mother pair of lines.

"Now, from the drawing above you can readily see that I am communicating straight lines, but with lines which in themselves are not straight.' Do you see it?"

*Q. How could you apply what we have experienced here?*

A. "There are innumerable applications. First, straightness is a man-conceived idea. There are no straight lines in nature. Straightness has become a standard for workmanship, quality, and capability. When we feel straightness we have a feeling of satisfaction as though things are as they should be. For example, by planning the edges of a rectangular table to a very, very slight curve, we acquire the feeling of straightness and the rectangle has a subtle, mellow, human feeling to it." \*

By sighting the two drawings, you will see that one set of lines is parallel and the other is not.



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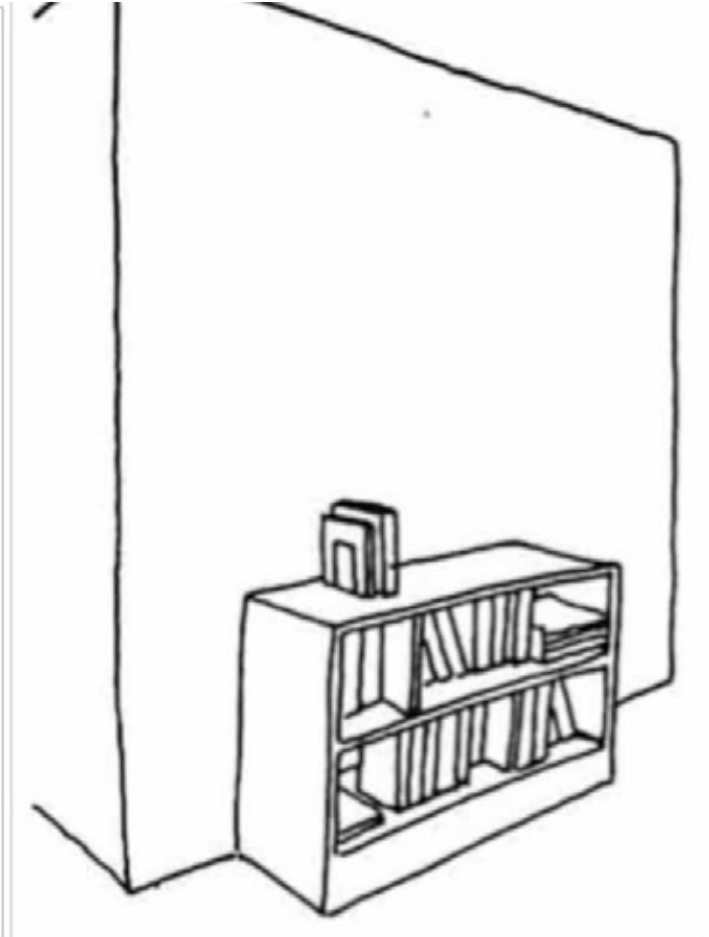
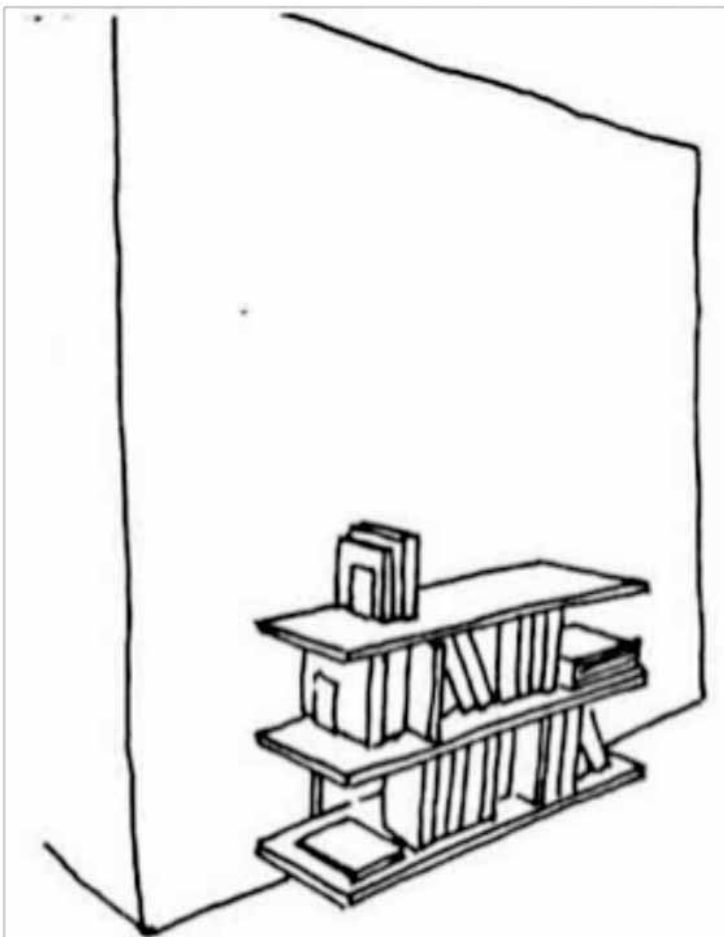
**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

September 1962

*Q, Off and on you have talked about "positive" and "negative" space as design considerations. What do you mean by "positive" and "negative"?*

A. We have all learned to think in terms of things, how to make and design them; but rarely do we think of the space surrounding the objects. The space we are discussing here might be the space out of doors, the space inside of a room, or the blank space on the paper of drawing, or even the blank space on this printed page. Very often—all too often—we overlook this space and neglect to consider how it should be designed. So, we in design talk about the design of positive and negative areas. We imply no qualitative difference between the two words.



*Q. Would you cite an example?*

A. Yes. Just recently a friend of mine had some hook shelves installed in his home. He chose shelves in preference to a book case. I think this was a sound choice, because the shelves helped to preserve the feeling of space in a relatively small room.

The bookcase would have become an object with an apparent volume, a volume which would have been unconsciously subtracted from the volume of the room by anyone viewing the scene. The shelves, on the other hand, are merely planes or slabs in space. Your eye would tend to seek the wall, and this wall would be the clue to the space. The sketches accompanying this report illustrate this point. Some of you may have at one time or another noticed how an upright piano seems to make a room look smaller. A grand piano, on the other hand, does not seem to subtract as much space. Were the sides of the grand to be brought down to the floor-well, I guess you can imagine what a monstrosity would result. The same is true of furniture. Consider two upholstered chairs: one with a drapery skirt tying the volume of the chair to the floor; the other open underneath with exposed legs. The first chair would make the room seem much smaller than the second. The reason that preserving the feeling of spaciousness is so important in design is that our personal possessions have doubled or tripled within a lifetime. But the size of our rooms have increased only slightly. We are suffering from space starvation. You must remember that man is a horizon-watching hunter, and he learned to read only "yesterday." \*

Below is a WPA project Prof. Lahti did: Not published in School Shop Magazine



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## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

October 1962

*Q. Our discussions about design and designing certainly have made it obvious that even minimum competency in this area comes only after years of training and experience. Now, how are those of us who have not had the opportunity to study art or design going to resolve our inevitable design needs?*

A. This is a predicament and a serious one for which I have no simple or sure-fire answer. If it is of any comfort, the design field is in the same quandary. We are not alone. The problem is universal. For example, the very backbone of design is in the understanding of the culture, the society, and the individual. Though these areas are being vigorously investigated by the anthropologists, social scientists, and psychologists, they are still in their infancy. Should we, then, modestly hold back until such information is provided? Certainly not! We must continue to solve problems with an even greater emphasis on integrity, sensitivity, and imagination. I have noticed that the non-designer's major error comes in his attempt to incorporate "art" or "design" into his projects as a compensation for his design deficiency. Such compensation invariably ends up in just picking up gimmicks, "isms," and fads of design. Many years ago when I first visited Boston and had seen the Old North Church and Faneuil Hall, I was left with a vague feeling of something missing from the venerable structures. The buildings had no corner stones. Today, even a comfort station must have its corner stone and pictures of its dedication in the local newspaper. The people who settled Boston came to resolve a problem, and not, self-consciously, to make history.

*Q. And, so?*

A. This long ramble may seem a bit out of context but the point I wish to make is that whenever a designer or non-designer approaches his problem, whether it be building a piece of furniture or making tools, that he try to solve it in the very simplest possible way. We should exert every effort to get the most out of our materials, tools, and energies. Through such an approach, the non-designer could and would produce an object of far better design and greater beauty than if, in his insecurity, he attempted to make it "beautiful." So, if in your project you solve the problem with as much ingenuity as possible, using your tools, materials, and your energies to

the optimum, and resist the temptation to exploit and display skill, you may, as did the Shakers\* in their furniture, produce design superior to that provided by many practicing designers. \*

\*Shaker Furniture, Edward B. Andrews and Faith Andrews, Yale University Press. 1937.

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## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

February 1963

*Q. During this past year we have discussed creative activity and designing in particular. Do you feel that every industrial-arts student should be designing?*

A. No, I do not. But I do believe that every student should have an opportunity to design and that he should be exposed to creative problem solving.

In fact, recently I have been spending quite a bit of time mulling over the whole problem of creativity, and I am almost ready to conclude that perhaps we have been making a mistake—a mistake which is the reverse of the one we had been making in years past. I'm almost of the opinion that perhaps we have arrived at a point in the swing of the pendulum at which we are putting so much emphasis on creativity—in times past we permitted none of it and that, too, was a gross error—that we are overlooking our responsibility for developing discipline, skills, and other essentials.

I would not be thinking along these lines if I were convinced that our creative activities were truly creative. I have a sneaking hunch that all too often activities coming under this category are more pleasure motivated and oriented than genuinely creative.

We may have to face our problem and in all frankness admit that not all people can be creative to the extent where this should become their goal.

I am also afraid that a far greater number, many more than we dare to assume, would be unwilling to accept the anguish, the uncertainty, the doubts, and the self-discipline that creative activity demands.

I fear, too, that while attempting to press creativity out of those who do not possess either enough motivation or capability, we may be developing, among those who do not have what is called for, frustrated and guilt-laden individuals who no longer are even willing to follow the leadership and guidance of others.

*Q. Can you illustrate this point?*

A. Yes, I believe that I can, provided you'll pardon using myself as a case in point.

My junior-high-school and senior-high-school period was one of great



personal turmoil. During that period, when I was developing physically and glands were popping to the left and to the right and me not knowing which end was up. I doubt very seriously now whether I could have done anything very creative.

Generally, however, I was considered very "artistic" at that time by my peers and by my teachers.

I had an art teacher at the time, fortunately, who was able to teach me perspective. Other teachers taught me drafting, woodwork, a little metal work, and science. I was able to learn a little bit of a foreign language, and my fiddle playing improved.

How well I can remember the great personal satisfaction and sense of accomplishment I felt when I understood and could use perspective. Later, at the professional art school and at the university, I found I did not have to waste valuable time in learning perspective, drafting, and the other skills essential to my field. I had these basics and the use of them during the intermediate years.

I feel, therefore, that this critical adolescent period may very well be best utilized acquiring skills, whether a student likes it or not. Even today, I wonder now if I could survive day after day of just creative activity. Perhaps I need the frustration of chores and committee meetings to build up a sufficient head of steam to really plow into some creative work. Our school day might best be used, then, by allocating a part of it to learning (even rote learning) of essentials and the other part to creative problem solving, which is really what designing is all about. Each portion would create a hunger for the other. One would provide an escape from pressures arising from structured conditions and the other a relief from the uncertainties of the burden of freedom. \*

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Generally, however, I was considered very "artistic" at that time by my peers and by my teachers.

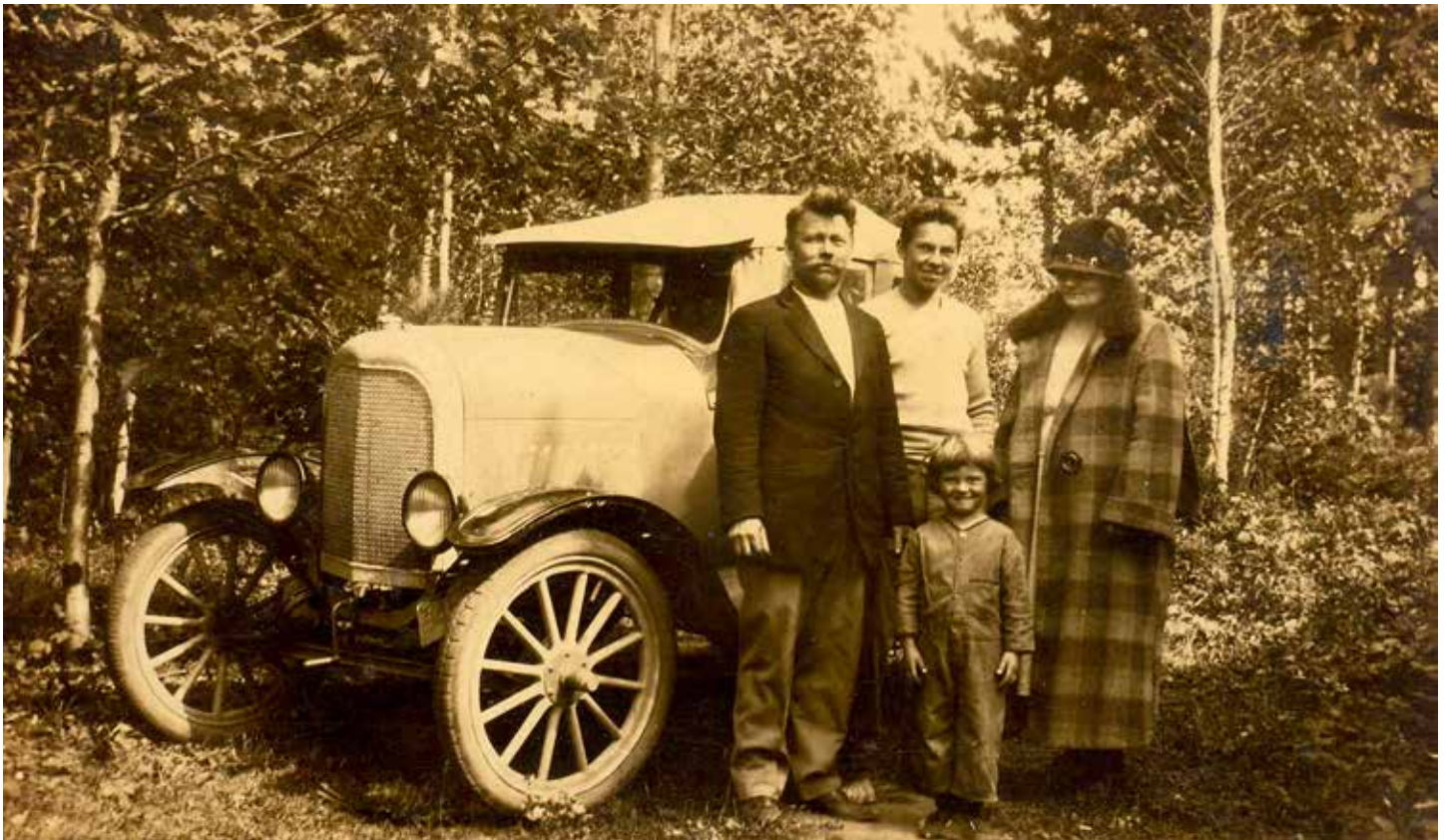
I had an art teacher at the time, fortunately, who was able to teach me perspective. Other teachers taught me drafting, woodwork, a little metal work, and science. I was able to learn a little bit of a foreign language, and my fiddle playing improved.

How well I can remember the great personal satisfaction and sense of accomplishment I felt when I understood and could use perspective.

Later, at the professional art school and at the university, I found I did not have to waste valuable time in learning perspective, drafting, and the other skills essential to my field. I had these basics and the use of them during the intermediate years.

I feel, therefore, that this critical adolescent period may very well be best utilized acquiring skills, whether a student likes it or not. Even today, I wonder now if I could survive day after day of just creative activity. Perhaps I need the frustration of chores and committee meetings to build up a sufficient head of steam to really plow into some creative work. Our school day might best be used, then, by allocating a part of it to learning (even rote learning) of essentials and the other part to creative problem solving, which is really what designing is all about. Each portion would create a hunger for the other. One would provide an escape from pressures arising from structured conditions and the other a relief from the uncertainties of the burden of freedom. \*

Pop with the car he and his dad built (John, Aarre, Uolevi & Fanny):



*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

June 1962

*Q. During many of our discussions about design and creative activity, you have expressed views which are highly personal. Do you think it is fair to students to have highly personal views foisted on them?*

A. I am very aware of this personal element that has entered our discussions, and my answer to your question is "yes" and "no." As a matter of fact, I was asked this same question by a group of art teachers from Birmingham, Mich.

To answer your question, let me talk about the "yes" part first. I believe that the single truly creative achievement is the personal philosophy that we develop while we go about living. I disagree with the idea that the manipulation of materials and the exploitation of skills (or "anti-skills" as in some so-called "art") is a creative activity. The use of skills and materials is simply a means of communicating and expressing our personal insights and philosophies; a means to an end.

On the other hand, if I were a student's only teacher I would say "no" to your question. In other words, it depends on whether you are teaching a group of students or if you are teaching only one student. If there is only one student involved, I would do everything within my power to refrain from expressing my highly personal views simply because that one student very likely would have contact with too few teachers and different viewpoints. The objective of teaching, beyond that of providing the student with the necessary verbal, oral, graphic, and technological skills, is to encourage him to grow and develop his own potential in line with the future needs of society. It is not our purpose to indoctrinate him with one limited view, even if it's mine.

If, however, a student has several teachers, as they most often do in classes in our schools, then I would say that a teacher has the right to express his highly personal views. Consequently, with many teachers—each expressing his honest and personal viewpoint and philosophy—the student will be exposed to a broad range of values, which are the very bases of a democratic society. It must be made very clear to the students, however, that the viewpoints are personal to the teacher.

I have great respect for the basic intelligence of our young people. I am convinced that if our young people are exposed to a multitude of philosophies they can and will evolve a personal philosophy from this exposure. I am equally convinced—and I would rather be naive than senile—that their

creations would be more objective and meet more needs than those which prevail. Time, I am certain, would prove them more right than wrong.

Our young people are sharp. Occasionally a horrible thought enters my mind and it is this. If I tried, I am sure I could fool a student or two once in a while, but a class of 20 or more would be beyond even Barnum.

As it is, teaching my students as honestly as I can, they have me pegged to a "T" in a matter of weeks. How they regard me as a teacher leaves me torn between the delightful curiosity of wanting to know what they think and the possible dread of actually knowing. It's an awful feeling.

*Q. Has it ever happened that you have come to learn how you are regarded?*

A. In a way. During the summer of 1961 I was on Baffin Island, in the Canadian Arctic with the administrators of Eskimo affairs at Cape Dorset. I had known that the Eskimos would pay no attention to the name that I have and that they would give me one that would be more descriptive. Some of the names they give people are very revealing. They're just that way.

Well, after having worked with the Eskimos for several days, the area administrator told me what I was being called by the natives. They were calling me "Ugdjuk," their word for the bearded seal. I was relieved, and humored, because the seal is an animal the Eskimos regard with great respect. Incidentally, I was immediately thankful for the frustrating days of forced waiting for transportation at Frobisher Bay which I'd experienced earlier and during which I walked off with a lot of fat. Otherwise, they might have called me "Aiverk"-a walrus.

Since our students do come in contact with many teachers, I feel it is best that we frankly and honestly express our views regarding design, or whatever, and let the students accept or reject them in whole or in part. Expressing our personal philosophies is a very sensitive area in teaching, and, admittedly, it is not nearly as simple as it might appear. We must exercise the greatest possible judgment and discretion.

We cannot as individuals survive without a philosophy. To be completely noncommittal is not effectively different from advocating a single, rigid view. \*



*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

April 1963

*Last fall you told me you had started playing your violin again. Are your cats still climbing the door as they did when you started?*

It came to the point that all I had to do was touch the violin case and the exodus was on.

*Has your playing improved?*

Quite a bit. The cats seem more receptive to culture which seems like an indication of my progress or then it could be the ice, snow and cold outside. I also started taking lessons.

*You're taking lessons, at your age?*

Yes, and it's a rather disheartening struggle. The junior-high girl, whose lesson is just before mine, plays better than I do. If I weren't so naive I would give up. On the other hand, I am better than the five year old who comes after me.

Taking lessons has caused me to learn much about teaching. Although I took lessons over a half century ago I was never taught the importance or the proper use of the bow and it is the bow which creates the tone quality. I've had to break deeply established habits and start from the beginning.

*Are the lessons helping?*

Definitely! But last Tuesday evening was a revelation. I attended a junior high rehearsal for recitals. I attended the boys and girls played violins, violas and cellos. For a starter, nearly all of them played better than I do, at least their selections were more complex. To see their concentration, courage, and drive to control themselves and their instruments and to hear the quality of their music left me with no lack of confidence about our future. The significance of the evening's experience was that by watching and listening to the young people I learned more about violin playing in a short time than I could have any other way. What I saw and heard reinforced the instruction I was getting. I could now see and hear the results of a student doing or not doing what had been proposed. Because they did not have the subtlety of a professional, their shortages were obvious. These young people held a mirror for me, and from my vantage point I could see what I was doing or failing to do properly.

I have attended violin concerts and listened to thousands of recordings, but this one evening of watching and listening to my peers taught me more than all the concerts and recordings I've experienced. The professional performs with such apparent ease that the quality he creates is a product of a reflex. The students, on the other hand, could not integrate and assimilate all the factors, the struggle could not be concealed. A professional's movements and interpretations produce a unified whole, it's like watching a beautiful woman.

*In what way?*

What can you say about her besides "wow!" Whistle or, at my age, be philosophic. If she were unattractive plenty could be said, faults could easily be singled out. I am convinced that if our students had more opportunities to observe the struggle of their peers they would absorb more of what they are being taught.

Oh! The proof of this experience was that my playing next morning improved.

*Why all this excitement about the violin?*

I've always had a violin, I like the music which it can produce and it's a challenge. I have also thought that when I retreat northward I could join others who enjoy participating in musical activity and good fellowship. The other day I told Aleksis, my elder son, of my hopes and he said, "Pop, that's wonderful! You can call yourselves "The Cedarville Recycles".

\*







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## Speaking of Design

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

April 1963

*Q. This issue of School. SHOP is devoted to the theme "Shop Environment: a setting /or learning." How do you feel about the part that design plays in our total environment?*

A. In one word, I feel "strongly" about design and environment. But, I must qualify this feeling by saying that design and environment affect one another. They "feed" each other continually. Though many of us consider ourselves highly individualistic and that we want the freedom to do as we please with design, we must, nonetheless, recognize that design and environment are inextricably interlocked, just as we as people are inextricably interlocked with our culture.

There are, on the one hand, those who are deeply concerned with the study of cultures, and the evolution of those cultures, who feel that man is a slave of his culture. On the other hand, there are those who feel that man is a creature of free will.

And, where do I stand? I certainly disagree with the free will attitude and neither do I believe that man is a slave of his culture. I believe that man is a product of his culture.

In other words, though our antlers may be locked in a mortal struggle with our culture, there is nonetheless an interaction. And, during this struggle, our culture is nudged a little this way, a little that way, and eventually it takes a slightly different form or direction.

The nudge from any single individual is not enough in itself, but the nudges of thousands and thousands of individuals have brought us to our present stage of development. Now to get back to the specific problem of design and environment, there is a relationship between culture and environment. Design has done much to change the sensory aspects of our environment. I cannot conceive of any period when taste was at a lower ebb than it was during the 1920's. It may very well have been lower during other earlier periods, but I was not present to personally experience it. However, during those earlier periods, man-made environment was but a small part of the total environment.

Speaking of experiencing, I have often considered an experiment that might permit experiencing the sensory and philosophic poverty and vulgarity of the so-called "Roaring Twenties"; and then jump back into this decade

and view 1963 through the "eyes" of that earlier period.

*Q. I suppose I should be the "straight man" and . . .*

A. Thanks.

I have tried to imagine what it would be like to isolate one's self on an island where no consumer products, magazines, newspapers (New York City has beat me to it!) nor communications devices would be available, except the publications, movies, recordings, etc., of the 20's. After months of exposure to those things exclusively, one just might regress to that level. Real insight would be gained into this business of man-and-culture and design-and-environment if one would then suddenly-and I mean suddenly-be returned to the present to be faced with today's tastes and sensory environment.

One would quickly see how design has simplified and refined the form of things, colors and color relationships of our environment, textures, sounds, yes, and even the flavors of our foods.

*Q. Flavors? You're /kidding!*

A. No, I am dead serious. Compare the "booze" of the 20's with the intoxicants of today, for example.

We've made progress, but not enough.

I heard a story not too long ago, which might serve to point up what I am trying to get at in this discussion about design and environment.

It seems that a wealthy New Yorker- she could've been from Chicago or Timbuktu, for all I care personally, and I hope the New York readers won't take offense at having her be from New York - wanted her apartment "done up" properly. She engaged a decorator to do the job. As soon as he arrived to interview the lady, he asked her if she would prefer the interiors done in Louis Quinze or the Empire period. She answered, "I don't care. Just so when my friends come over they should drop dead."

There will be the time when we invite people over to come and visit us: not to see our new furniture, drapes, or newly made piece of handicraft, but to come and see us.

*Q. So, what has all this to do with design and environment? Particularly, shop environment?*

A. If on entering a home, you first notice the furniture, rugs, and other possessions, there is something wrong with the design. You should first notice the people. It is the people who live in that home that are important.

The same holds true for the industrial education shop. It's the students learning and the teacher teaching that really count-not fancy lighting fixtures, beautiful color combinations, machinery, work benches, etc., although who am I to say these things do not contribute. \*



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## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

September 1963

*Q. In our past discussions we have rambled quite freely over the landscape.*

*We have discussed design, touched on design criterion, and even your personal philosophy.*

A. We certainly have. Personal viewpoints are to be questioned, but they do help to give others some inkling of the kind of kettle their fish are coming from. When Dr. Menninger was interviewed for the "Twentieth Century" television program, he said that no one has adequately defined a normal person, that we are all in the grays. There is no black and white. One's personal philosophy is at the foundation of every evaluation. However, to make the evaluation more objective, if one is judging the works of another, it is necessary to bring into the consideration the other's intent. If his intent is not taken into account, the evaluation or criticism will merely be a measure of how well he has pleased the instructor and not how well he has solved the problem. The evaluation, without incorporating the intent, would be valid if both individuals were one person.

*Q. Speaking of intent, do you think we could or should structure our discussions a bit more?*

A. Yes, I think it is about time. It might be best to discuss the phases that designing goes through. Since I know so little about the industrial-arts complex, I would rather discuss designing from the industrial-design standpoint.

The number of factors to be considered, when deciding on a suitable problem, are infinite and ever changing. To find any kind of fixed pattern or formula is impossible. The problems assigned can range from those that are highly structured to problems in which finding a project is part of the problem. The projects can be for the individual or for the whole group—they may be for teams or the whole group may become a team. Despite the countless variables, I have found one element which has been productive to creative problem solving. This is designing for a future date-line. If the design is for one, five, or 10 years from now, many of the restricting, inhibiting, and hindering stereotypes of the present will fall by the wayside. Though this approach may seem futile, impractical, and questionable

to those who have not tried it, I have found it more workable and practical than I ever imagined before trying it in my own classes. Designing anything for the present is so beset with confusions, stereotyped limitations, and prejudices that neither the student nor the instructor can see the problem for what it really is. It is amazing how clearly we can see a solution for 10 years from now. For example, some day we will have a world government and fighting between nations will be as rare as lighting with a neighbor. But a world government for tomorrow? Impossible!

As soon as the student begins designing something for, let us say, live years from now, he cannot help but start wondering, questioning, and visualizing what the world and its people will be like, and, by then, what they will be doing. As I mentioned in our earlier discussion ". . . designing is predicting," it is always concerned with the future, never the past, and the present is gone.

This does not mean that we should ignore the past; we should know as much about the past as possible, for it provides the foundations for insights into the future. And the present, like the rim of a turning wheel where it touches the ground, provides the fleeting pause for activity.

*Q. What will we discuss the next time?*

A. Let us consider some of the factors when introducing a problem to a student group. \*

Prof. Lahti designed this outdoor fireplace and it is still in use 2017.



*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

October 1963

*Q. Last month you mentioned that you would discuss the assignment of a problem. Is there any one outstanding factor that you consider critical?*

A. Yes, I would say that discussion, and very thorough discussion at that, between the students and the instructor, is of the greatest significance. In fact, if the problem is sufficiently complex, and some of our seemingly simple problems may very well be our most complex, inviting instructors from related areas to participate in the discussion is of great value. The discussion should be aimed at understanding and clarifying the problem, not at solving it.

We once set up an experimental designing session with two similar junior-high student groups. One, however, had the advantage of the home-making and art teachers, beside their industrial-arts instructor, during the discussion and, the other group did not. An hour later, the designs for a "flower box" were collected, put on exhibition panels, and rated by a group of teachers who were uninformed of the mechanics of the experiment. The tabulations clearly showed that the student group with the extra teacher participants did far better. Incidentally, it was brought up during the discussions that the words "flower box" were a damaging and hindering stereotype designation. The concern was not for a "box" but for a container for flowers, whether on a window sill, a stand, or hanging from walls, ceilings, or stands.

*Q. How would you convince students, and possibly some teachers, that free group discussions are vital to problem solving?*

A. Experiencing, in my opinion, is the best method. To put this idea across, I have set up simple experimental sessions in which students participate. I divide a class into three groups (usually it worked out to about 10 each). The students in one of the groups are not permitted to discuss the problem, after it was assigned, but start working individually and immediately toward an answer. The other two groups are each sent to their own areas to discuss the problem freely among themselves. After 15 minutes, the time allotted for finding an answer, I have each of the students from the group without discussion state his solution to me privately. I then have one member, as a representative of his team, state the team's solution

before all of the students.

I have used this device a number of times and have always had similar results. The groups having had the benefit of discussion always had the right answer, but only one student from among those who worked without discussion would have the right answer. In a team with free discussion, all that is needed is one individual whose experiences or associations would trigger a chain reaction leading to the best solution. The problem was one I concocted after having witnessed the great interest the Scandinavian people have for their outdoor theaters. I posed the following hypothetical problem:

A group of American business men, after traveling in the Scandinavian countries and seeing the interest and response to outdoor theater, wondered if a modified form of the American drive-in movie night he worth considering. Since they have fewer cars, seating, etc., would have to be provided. The problem is: Should these business men invest in such a venture for Tromso, Norway, a city above the Arctic Circle?

The answer, of course, is "no." It does not get dark during the summer nights.

After the students have participated in such an experiment, I do not have to further impress on them the value of discussion. The impact is terrific. \*

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# Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

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*Q. In November, we more or less tried to get an industrial-arts teacher started in designing. At least we tried to encourage him to make a start at it. Now, let us assume-as heroic as the assumption may seem-that we have all of School, Shop's readers designing, or at least wanting to design. Their big problem is to pass this desire on to their students. In other words, how would you go about, then, getting students started in designing? Would you just tell them, "Design something"?*

*A. Most certainly not, and I made that mistake some years ago. I naively assumed that every student was just burning with desire to get started on some pet project. Even our university design students, we have found, have great difficulty deciding what to design. It is too demanding.*

*Q. How then would you get youngsters started?*

*A. As uncreative as this might sound, I would assign a project; but it would be a project sufficiently free of mechanical involvements so that it would provide more time for considering "appearance," "feel," "visibility," and "accessibility of controls."*

An assigned project will save the student hours of frustrating search for something that needs designing, and even if he were to find a project, it would invariably be too involved and complicated for school facilities and the amount of time available. There is, however, the "exception," and when the exception "happens" or "comes along," everything should be done to take advantage of the motivation and energy unleashed when that exception is doing what he really wants to do.

*Q. Wouldn't an assigned project end in merely a rehash of something already done?*

*A. To some extent, yes. But we must remember there is no such thing as complete and total originality. At best, our innovations are but small changes.*



I fear we have put such great emphasis on originality that we have brought about a cult of "difference for the sake of difference." Remember: An original design conception grows out of resolving and integrating mechanical, physical, and attitudinal requirements.

*Q. How about an example?*

A. A clock project might serve as an example. The project would be primarily concerned with the designing and construction of a case, an enclosure, a support, or a gimbal that would hold the mechanism, hands, and dial. I would limit it to an electric clock with its relatively few mechanical considerations.

The "works" of an electric clock are inexpensive to buy, but most homes have old and battered electric clocks with mechanisms that are still good for many years. Since an electric clock mechanism works at any angle, design flexibility is possible. (Of course, there is always the ever present cord, an example of our technological primitiveness.)

A tentative "use" (how the clock is to be used) commitment would bring about design ingenuity. The clock might be for a wall, it might not be for a wall, or

It might be meant to hang freely in space from the ceiling. The clock may be for a mantle, a dresser, or a low coffee table.

Each "use" commitment would demand its own considerations for lines of sight, accessibility of controls, dials, etc.

The criterion for an appropriate and "good" enclosure would vary with each person. We might question whether an enclosure is necessary or whether the enclosure could be transparent, or just an elegant wire structure leaving the works exposed.

I must admit that despite the accuracy and convenience of the electric works, I miss the intriguing spring-operated mechanisms with their gears, levers, and escapements which are always hidden and which are a constant temptation for ten-year-olds of all ages.

Finally, I would again stress the necessity of "playing down" the design and the resisting of temptation to make the design conspicuous through a display of skill and tricks of a trade. In my own experience I have found that if I simply go about solving the basic problems and attempt to improve on what has been done, I usually end up having enough originality to satisfy my creative self, whatever that is. \*

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## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

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Professor of Design, University of Michigan, Ann Arbor

11\_1964\_01

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# Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

12\_1964\_02

*Q. During our last discussion. You stated that drawing is the very core of designing. Towards the end, you left us high and dry, but with a promise to suggest something which might help our drawing deficiency. Have you had any "brilliant" ideas since then?*

A. As much thought as I have given to this problem over a long period of time, I am afraid I haven't come across anything new. I have no short cuts to offer.

The obvious answer would be: Teach freehand drawing. But, even in our university, the preparation in drawing, as it is offered in our basic program, is far too limited. Those of us responsible for industrial design find it necessary to start at the very beginning to better prepare our students for the kind of drawing we need for our problem-solving activity. However, I can elaborate on a point I touched during a previous discussion.

*Q. We're still holding you to your promise, so go ahead.*

A. Well, drawing is a language. In writing we use words as symbols which, through usage, have acquired a workable general meaning and with which we convey complex ideas. Drawing-using point, line, area, value, and color as its ingredients-has been unable to develop a symbolism with which it can communicate beyond the "communication through pictorial-ism." We have learned to interpret an area-enclosed by four lines of equal length meeting with equal angles-as a square. On the other hand, we have also learned to interpret a trapezium, with no two sides parallel and no angles equal, as a square viewed from an angle. Drawing may serve as: self-expression; communication to oneself; communication to those trained to interpret a specific kind of drawing (drafting, etc.); and communication to the general public.

The rare, good drawing combines most, or all, of these aspects. Of course, it is easier to be concerned only with one of them. I have no objection to specialization, but there is the tendency, and most times it is more than a tendency, to assume that this limited area is the "one and only."

When I draw for self-expression, I draw what I feel and as I feel. Even at those times, when I think I have expressed myself successfully, I would be very naive to assume that others would respond as I do to what I drew. However, since most of us are the products of a common culture and have acquired the same stereotypes (during my gloomier moments I often wonder if most of what we call education is not just the distribution of stereotypes), some communication does take place through empathy. Whether we admit it or not, there is a basic human need and desire to be understood, and when we do not succeed, rather than question ourselves and our inadequacies, we tend to class those who do not understand as morons and elevate our failures to an "ART."

Though there are times in problem solving when I need only communicate to myself, most often I must communicate with others. Frequently it is with those with whom I have a common language, such as drafting, but most often it is with the untrained.

With the general public, perspective drawing becomes the most workable device. Due, in part, to the hundreds of daily reinforcements we receive through photography, reproductions, publications, motion pictures, and television, perspective is today an even more effective means of visual communication than it was in the past. We humans do not just automatically see. We must learn to see\* and in our culture it so happens that the principles of perspective coincide with this learned seeing.

*Q. Would you say that perspective drawing should be taught as a part of industrial arts?*

A. No. The industrial-arts teacher already has enough irons in the fire. But, it should be a part of every art program. After all, it does coincide with the way we see and forms a necessary and valid starting point for later departures. Incidentally. You would be surprised at the satisfaction and reward a student gets when he learns something he can put to use.

*Q. What do we do?*

A. You can't wait. But, since the industrial-arts student has learned to draft he can effectively use this language for designing, but only if he draws freehand. Tools become tyrants. As soon as we pick-up a T-square, we start drawing straight lines and parallel lines, even though we have no need for them at the time.

A rule compels us to start measuring and using increments of inches long, before we are ready to be concerned with size, material, thicknesses, etc. In fact, despite all his struggles for originality and freedom, Frank Lloyd Wright was a slave to his T-square, 30-60 degree triangle, and the compass\*\*.

As important as freehand drawing is in designing, however, it is still only a means with which to narrow the vast galaxy of potential combinations and solutions to a workable number. To consider designing as completed at the end of sketching is as serious a mistake as to assume it ends with a set of working drawings.

The designing must continue during drafting, during the model or mock-



up stage, and right on through to the making of the prototype. The time to make a complete set of working drawings is when the project is complete and its production is to begin.

A very serious mistake made in industry — a mistake precipitated and necessitated by the limitations of time, the unlimited technological complexities, and human shortcomings — is that the working drawings become the authority, even before production, and all that the clay modeler, model maker, or prototype maker can and is permitted to contribute is his skill.

\*People who have been blind since birth and whose eyesight was later restored must learn to see. Though they receive the sensation of light, they do not know what it is that the light represents. Individuals whose eyesight has been restored very late in life may never learn to differentiate a square from a circle.

Those of us who wear glasses may remember our discomfort and frustration until we relearned to see  $90^\circ$  as a right angle. We learn to see objects as we know them. For example: if you were standing directly in front and near the center of a long wall, at right angles to your line of vision, you would see the top and bottom edges of the wall as straight lines. Yet, if you were to do sighting measurements against a vertically held rule you would find the height of the ends less than the height nearest you. The eye receives the stimulus as being bounded on top and bottom by two gradual curves, but because we know they are straight, we persist in seeing them as straight lines.

We are beginning to see an overhead jet vapor trail as a sweeping curve. The first photographic lenses showed straight lines as curves, but they were soon "corrected" to make these lines coincide with what we want to see. The first Cinerama films (taken with three synchronized cameras and projectors, which also fused the edges of the three projected images to form a single, wide-screen picture)

were taken through these "corrected" lenses. The result was a failure. A line which should have been as one turned his head from side to side, was seen as three straight lines coming together at an angle at the fused juncture. It was now necessary to "un-correct" the lenses so that what we knew to be a straight line, was photographed as a long gradual curve.

\*\*He did eventually breakdown and use a spiral in designing the Guggenheim Museum in New York City, which resembles a beer barrel half. \*

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

Aarre K. Lahti, Professor of Design, University of Michigan.

14\_1964\_03

For this month's design discussion, I'd like to depart from our usual practice of you asking me a question to start things rolling. This month I'd like to make some comments about the "Checkerboard for the Blind" article that appears on page 24 of this issue of SCHOOL SHOP.

Let me begin by saying that the checkerboard look a little wind out of my sails. For the past couple of school years I have been professing and preaching about problem solving, and this article shows that someone is actually doing something about it.

*Q. Was the project done along the lines you would advocate?*

A. It certainly was. Messrs. Overeem and Vroom have used and exploited some of the very basic elements in designing. They were able to arouse student interest and motivation by doing a problem for which there was a definite need and not just something concocted (as we all have to do so often) to provide a framework for an experience in problem solving. An objective criterion, an evaluation, by those who will use it, determined whether or not it served its purpose. Furthermore, the students who designed and made the checkerboard had more than just the tastes, likes, and views of the instructor as their standard. In other words, pleasing the instructor was not the point.

It was also a problem which brought the students in contact with outsiders, and they learned something about probing for information. They also learned to understand the needs, desires, and aspirations of others, while evaluating their reactions.

Had it been possible, though, the blind students should have been brought into the project at its very beginning.

Oh yes, and it brought the industrial arts potential to the attention of the community.

*Q. So, you approve?*

A. Yes, by all means. It was genuine designing. In this case, the emphasis was on the physical factor of touch, and the designing had to function in this area. The students had to overcome the stereotype of taking vision for granted and become aware of other senses.

Yet, it is interesting how persistent stereotypes are. One that remained throughout the project was that of a checkerboard as a solid panel. If a slight shoulder had been left on each of the "men", and the holes drilled all the way through, the board would have been easier to identify, even when upside down, and it could have been used from either side. Naturally, I would think of this because my "laziness concept" would have kept me from doing anything more than was necessary; to obtain the most from a minimum use of materials, time, and fuss. The board would also have been easier to keep free of dust and lint, because indentations lead to nasty corners. It would also have been more in line with the game, I believe, to have maintained the making of a "king" from two "men." The textual cue could have been maintained, and the kinds and number of pieces would have been lessened, while allowing flexibility when pieces got lost. But, as the old Finnish proverb says,

" . . . People on land are wise when a disaster occurs at sea."

So, it's a "BRAVO!" To the teachers and students, of Paterson, N. J., Technical and Vocational High School, for coming up with their "Checkerboard for the Blind": a neat, tidy, well-executed piece of designing in the best sense of the term. \*

*"you don't have to agree with me, but..."*

# Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

Professor of Design, University of Michigan: Aarre K. Lahti

15\_1964\_04

April '64

Your dropping off the newspaper article\* about the Ulm School of Design in Germany set me off on a string of reminiscences and conjectures.

*Q. Are you acquainted with the school?*

A. Yes. I visited the school about seven years ago when I traveled through Europe on a sabbatical leave from my university chores.

The remarkable thing about my visit at the Ulm school is that it took me but a few minutes, after my arrival, to sense a seething internal conflict (those of us in education are highly attuned to such phenomenon). Nobody there seemed able to tell me if Mr. Max Bill, the school's director, would be coming in that day or even the next. The industrial design instructor, however, took me on a tour of the school and told me of their educational objectives.

After seeing their studios, shops, and their excellent and abundant equipment, I felt again - as I had felt after nearly every visit to a European design school during that long trip - that as a design teacher in an American university, we are, by comparison, something like "poor country cousins."

Later, one of the secretaries found us and whispered something to my guide, who, in turn, told me that if I did want to see Mr. Bill that he had been seen going into his office. After reaffirming my wish, I was shown to his office.

I knocked, heard a voice, went in, presented my card, and introduced myself. I told him that I had heard him speak at one of the early Aspen (Idaho) design conferences and had looked forward to visiting with him during my tour of European design schools. Speaking with a voice reflecting tension and pressure, he immediately informed me that he had just resigned as a result of conflicts in educational objectives.

What I have just related was my introduction to the school, which at first had publicly stated that it was the "New Bauhaus" and later changed this statement to that of ". . . carrying on the Bauhaus objectives."

The history of the original Bauhaus – which had as its objective, as has been stated somewhere or another, “to create forms which symbolize the machine age” – was one of conflict from its very inception. The Bauhaus objective of integrating skills, technology, crafts, art, and design with products – graphic as well as painting – met with opposition from every source. Quoting from a Bauhaus statement, I think you’ll get the picture.

The quotation follows:

“The shortsighted attitude of the craftsman’s organizations in Germany was one of the greatest obstacles the Bauhaus encountered. Instead of recognizing the Bauhaus as a natural link between craft and industry, they fought it and feared it as a new factor likely to accelerate that decline of the crafts which had resulted from twentieth century industrial development.” Later, the Bauhaus came into conflict with the municipality of Weimar and moved to Dessau, Germany. Hitlerism – and that’s a long, long tale – was its terminal enemy. But, back to our discussion . . .

About a month after my visit to Ulm, I visited the London (England) County School of Arts and Crafts and had a series of \*meetings with Mr. William Johnstone, the principal of the school. During our conversations, I learned that the inspiration for the Bauhaus had, in part, come from this very school and that, prior to the organization of the Bauhaus, a team of German design educators had visited the London school and were greatly impressed by its educational objectives and their progressive design.

All of this, now, takes us back to William Morris, who in 1861 organized a “revolt” against the poor quality of design in British crafts and industrial products. This “revolt” stimulated and ultimately led to the formation and organization of the London County School of Arts and Crafts.

Though the “revolt” was justified and indirectly resulted in great forward strides, William Morris’ remedy of returning to the hand crafts was doomed to failure. Design never exists in isolation from a culture. A change in course, such as our so-called contemporary design, did not just spring from the blue. As with mankind it is an evolutionary phenomenon, with long tenuous veins (or a rib, if you prefer). The important point is: At whatever stage design may be today, it is there because of the interaction of national, international, political, economic, personal, and social turmoil’s. William Morris wrongly attributed the regression in design to technology and the use of machinery. He should rather have placed the blame for had design on individuals who were greedy for excessive profits and achieved these economic gains by defaulting on design and manufacturing costs. The concern for integrity and quality was pushed aside so that the machines could squeeze out every bit of profit from the children, women, and men who were poverty-chained to the machines. During the industrial revolution angry mobs attacked the factories and destroyed the machines, just as many today would destroy automation.

*Q. If the London County School was already in operation and, as you said earlier, had progressive objectives, why didn’t it, instead of the Bauhaus in Germany, become the leader of the new movement in design?*

A. After World War I, the British were too well off and too set in

their ways to accept or to bring about any drastic changes in the order of things. The Germans, on the other hand, after their stinging defeat and the resulting economic and political chaos, were in a better position to experiment with new ideas. In fact, the Germans had no other choice. The Bauhaus, I maintain, therefore, was indirectly an outgrowth of William Morris' crusade, British affluence and conservatism, and, finally, German ambition and motivation – plus the war's destruction of tradition and status and the country's economic and political instability.

*Q. What, specifically, was the Bauhaus after?*

A. Looking back from the vantage point of the present, the Bauhaus proposed something so natural and simple that it is difficult to understand why there was all the fuss. The Bauhaus was simply concerned with the integration of technology and design. Does that sound radical? Isn't that what industrial arts is about, too?

Yet, when we consider that all of this took place between 1919 and 1929 – 35 to 45 years ago when "manual arts" was at its most rigid, segmented; and authoritarian "set" and industrial design was still an unborn field—the objectivity and foresight of the Bauhaus founders is truly amazing.

Despite the lapse of these many years, we still have our problems. We still cling to notions that only hand-made things can be of good design and quality; that machine-made products are of inferior taste.

We still think of designing as applying decorations. Even our architects, while professing that a design must grow from the inside, still call in the interior designer after the building design is completed and construction started.

We persist in thinking of projects as wood projects, metal projects, etc. We are disturbed when we cannot work alone and must share credit with others.

We squander our intellectual and technological potential in ego building. Finally, when we realize that all but a few of our citizens—in our present space age – live in housing built without the benefit of architecture, without the utilization of the technological potential of mass production and significant new materials, it makes the fact that the Bauhaus was ever established even more impressive

\* "Ulm School Carries on Bauhaus Aims," George O'Brien, The New York Times. Feb. 2. 1964.

\*\*Bauhaus 1919-1928, edited by Herbert Bayer, Walter Gropius, and Gropius. New York: The Museum of Modern Art. 1938. P. 92. \*



*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

School Shop Magazine, September 1964, Editor, Ollie Hanninen

*Q. During our last conversation several months ago you said something about having been at Marquette, Mich. What was that all about?*

A. Yes, I was at Northern Michigan University where I had an opportunity to meet several members of the industrial-arts stall' of that school. Though my visit was shortened to just a few hours because of bad weather and canceled flights, we did manage to exchange a few ideas regarding design.

One of the men questioned the validity of shifting from copying "traditional" to "contemporary" pieces which he said has happened when design was made part of making a project. I think this point deserves some comment.

*Q. From what you have said earlier, I believe you would object to this practice, would you not?*

A. I would. If for no other reason, and this is very fundamental, copying is not designing. Copying can be of educational and informational value, however, if it is recognized for what it is: merely copying and nothing more.

When I consider, the added demands made on the energies of the industrial-arts staff when design is incorporated into making a project, and then pile on the limitations of time, space, and class sizes, I cannot, in all fairness to my friends in industrial arts, be the "purist" I might wish to be. But, if copying is to take place, I would insist that copying of contemporary pieces would be far more beneficial than copying traditional items.

If contemporary pieces were under consideration, the student would have to do his own measuring and construction analysis (or has some eager-beaver publisher already taken care of this matter?) Rather than resort to tiles of pre-digested drawings. I am strongly opposed to just following the drawings of others merely to produce pieces which can only provide skill in meeting dimensional requirements.

There is much to be learned from one's own analysis. In fact, such a project-in itself-might be very enlightening.

*Q. Sometimes I wonder about you. I thought you would certainly blow your top over copying, no matter circumstances. You seem to change your mind as easily as a woman.*

A. Always remember: I stand on a platform that advocates equal rights for the male minority!

As for copying, the reason I do not take a "purist" position on copying contemporary furniture is that most contemporary pieces are more logical in concept and are a direct product of production processes and material utilization than are traditional pieces, although I must admit that not many are much better if utility, comfort, structure, and price are considered. As a matter of fact, I am critical of the furniture industry for thinking of themselves primarily as a woodworking industry and, secondarily, as producers of good furniture for consumer use. They tend to place their material and tooling commitments above consumer needs. The so-called period pieces (almost all junk today is either "period" or "antique" and some even "art") are machine-made copies of pieces designed to be produced by craft or custom production. These pieces are not furniture but three dimensional pictures of furniture. The shapes and forms of many of their components have little to do with the nature and structure of wood and could just as well be cast from some sawdust composition. Most traditional pieces have evolved into an unbelievable number of parts and pieces employing molding on top of molding to camouflage poor quality control. And, so it goes.

*Good design, you must always remember, is an optimum solution.*

*Q. Come now, enough of these generalities. Give me a specific example?*

A. You're not your usual pleasant self today! Too much "vacation," perhaps?

*Q. No, we had a "summit" meeting at home.*

A. In our house we call it dynamics. Sounds much more intellectual and socially acceptable.

Right after the war (Two, if you please), I was involved in a furniture research project for the veneer association. Our objective was part of an effort to thwart the inroads of metal office furniture into the wood office furniture market. Our analysis of a wooden desk drawer, for example, revealed a total of 21 pieces in a typical drawer of that time, if nails, glue block, etc., were counted. We ultimately designed and produced rectangular drawers requiring only three pieces, including the fascia panel which also served as the handle.

*Q. How were they held together, by wedlock?*

A. Well, four parts if you include the adhesive. The parts could be gathered, glued, assembled, placed in a jig, and clamped in nine seconds. This was possible only because the sides were from one continuous piece of ply-

wood with multiple "V" cuts permitting 90° bends at the corners. The continuity of the sides also made the drawers self-aligning and self-squaring, These drawers were lighter and stronger than conventional drawers.

Now, if it came to a student copying such a drawer, he would learn a great deal about the nature of plywood, economy of parts, time, and materials.

No matter what, I will always place the problem far above any copying or reproduction. I would rather see a project end up as a pile of sawdust, than playing it safe for a sure-fire, finished, end product. I am afraid we are still too concerned with furniture appearance, its appearance as a picture rather than as an outgrowth of purpose and the sensitive use of materials. "Taste" is conditioned, and there is too great a tendency to want the false serenity of the good old days when, really, instantaneous communication did not permit the world and national happenings to become part of everyday living.

*Q. All right, so what would you do about designing a coffee table?*

A. Can we take that up the next time?

*Q. O.K. But what happened to the drawers?*

A. Nothing! After we presented a half dozen prototypes of desks and their drawers, I never heard about them again. \*

*"you don't have to agree with me, but..."*

# Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

19\_1964\_09

October 1964

*Q. Last time we got together we talked about designing a coffee table. We talked about the use of the table; its relationship to other pieces of furniture; the preservation of the feeling of spaciousness in the room; as well as the stability of the table, toe room, shape, etc. You left us high and dry, however, as far as the material we would use to make the table.*

A. That I did. Years ago we would have had no need to discuss materials. It would have been obvious to everyone, except the designers of American patent furniture and the wire-soda-fountain chair builders, that wood was the material. Using veneers was even considered questionable. Today, with the greatly increased variety of materials, the designer and builder face a paradox: While the choice and potentials for designing have multiplied, the demands on the individual designer's and builder's exposure, knowledge, and use of these materials, not to mention the techniques and skills that must be developed, have become discomfiting and at times discouraging. In English that means, we have so much to do with so many different materials and in so many different ways that it all adds up to having so much to do in so little time, and that's what's making us "uncomfortable" and "discouraged." It's the information and knowledge "explosion" transferred to the design field.

Since each material has its own potential and limitations, it would, therefore, be avoiding the responsibility of designing to accept wood as the material for our coffee table without considering other materials. We should consider metals and plastics (resins, solids, and laminates), to mention just a few. Furthermore, wood itself has changed from solid lumber to the complexities of veneers, printed surfaces, plastics, and veneer surfaces underlined with aluminum foil to prevent surface scorching. Some of the materials, such as particle board, can be coated with a clear, or tinted, or slightly translucent epoxy coating which permits the character of the core material to show through.

We should also consider aluminum because of improved welding processes, and if your budget can stand it (mine can't), give stainless steel a thought. If iron were used, it could be plated, painted, wrinkle finished, or plastic dipped. The metal surfaces could be polished. Satin finished, or ground

multi-directional.

*Q. A while back you said something about a paradox. Could you cite an example, please?*

A. Here goes. The introduction of fiberglass into the boating industry will make a good example, I believe in the burden the "materials freedom" imposed on the designer.

Up to the time of fiberglass, the restraint, subtlety, and dignity of small boat design resulted not from some wise policy but from the limitations of lumber and plywood. With the new freedom that came about from being able to "lay-up" fiberglass into any form that modeling clay or plaster might provide, with only such minor limitations as avoiding sharp corners, flat surfaces, and complex, many-part molds, all - broke loose. Boats soon became pictures and for want of some objective or criterion, they began to imitate cars in their appearance. There has been recently, and fortunately, an awakening of some self-imposed restraints by designers and builders.

*Q. Let's get back to the coffee table. There still are some natural materials to consider, are there not?*

A. Yes there are. However, many of the "natural" materials have undergone a transformation. For example, some time ago when I was involved in consumer research the leather industry became very upset by the encroachment of plastic upholstery materials into the automotive market. To combat the wide range of colors available in plastics, the leathers began appearing in more colors. Plastics people claimed their product would shed water. In a short time leather was covered with a waterproofing plastic coating. The result was that leather lost its unique "breathing" quality. In no time at all, it became nigh onto impossible for all but the very expert to distinguish between leather and plastic upholstery. The Question then: Why should the consumer pay a hundred dollars or more for leather if the difference was that subtle?

*Q. As a designer, you must surely have had a suggestion to offer.*

A. Naturally. We suggested using sued or the rough back of leather, because it communicated leather and had no imitators. When we got nowhere with this suggestion, we descended to a low recommending branding the leather. And from there, we went even lower. We finally suggested they leave the tail on the hide and let this tail hang out the window or through the crack of the door so that the prestige of having paid a hundred dollars more for leather upholstery would be obvious.

*Q. Now, once again: what about the material for a coffee table?*

A. My suggestion is that whatever materials are considered, they be the least expensive. Here's why. As the cost of materials increases, the willingness to experiment decreases. The investment in the material becomes the determining factor and not

the design. In my own work involving a new design, I invariably make the prototype from the cheapest available materials that meet the structural requirements. After this phase, I will use materials of necessary quality and finish.

*Q. Didn't you use this same approach when you built your cruiser?*

A. Yes, I did. in 1954 I designed and built an outboard cruiser. I started the designing about the first of September of that year. By Christmas vacation time, the boat was in the Atlantic Ocean. At the time I started this cruiser there was little or no information available about outboard cruisers, and I knew that the first one I would make, regardless whether I spent three months or three years at it, would be unsatisfactory and that we would have to acquire the information about construction and performance from use of the boat. During the initial use of this cruiser we learned we could not use warped plywood planes, because such surfaces would always pound. Nonetheless, our general structural approach, though extremely light, was sound. Three years later I started the second cruiser, which required a year and a half to build.

*Q. Is this the boat you and your son navigated from St. Paul, Minn., to Key West, Fla., via the Mississippi River and the Gulf of Mexico? If it is, did you sell the first boat?*

A. It's the same boat and we didn't sell the first one either, because we wanted a genuine claim to snobbery: We are a two-boat family. \*



*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

Feb 1965

*Q. It occurred to me recently that our discussions about design have been most often concerned with wood as a material and some sort of a furniture item or household idea. At other times, we've centered our visits around design generalizations. Let's talk about machines and tools this time. Do you mind?*

A. It may seem paradoxical for one trained in art that my first genuine awareness of the beauty of man-made objects should come from seeing a machined part. During my high-school days, two of us went on an excursion to Duluth, Minn. and took the inevitable moonlight harbor cruise. Though I can recall little else. I do remember the impact made on me by the huge, massive, oil-and-work-polished, steel shaft that rose and fell as it worked the walking beam high above the superstructure. I can remember saying to my friend, this is beautiful!"

Having an appreciation for the beauty of man-made objects does not mean that I do not have an appreciation for nature. But, nature is without scale, and scale is established by man and his products. Were there fields on the floor of the Grand Canyon gorge, all who visit this spectacle would be better able to comprehend the scale of nature's design incompetence.

I greatly regret that our young people no longer have the open doorway of an engine room at which to tarry to watch the beauty of the forms of the monumental-sized stationary steam engines and their multiplicity of motions.

Once these giants were awakened by the mild, code tinkling bell, one could feel the shudder of the "coming to life" and could watch with utter fascination the grand, sweeping strokes of the huge, polished, connecting rod, gliding on its way, but frustrated by the off-centered persistence of the timing shafts. All of this was serenely supervised by the governor.<sup>1</sup>

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<sup>1</sup> It is still possible to see huge, steam-power units in operation in the Industrial Arts Section of the Henry Ford Museum at Dearborn, Mich. These compressed-air-driven steam units are only operated, however for groups. Requests for this service must be made in advance by contacting the Curator of Communications so that the museum can schedule a steam engineer for the occasion.

Though I had been aware for a long time of the beauty of man's machines. I had not noticed his tools until I was forced into laying brick in adding a room to the old schoolhouse we had purchased shortly after coming to town.<sup>2</sup>

I needed a mason's trowel and found one that to this day would be an example of outstanding design. Unfortunately, I could not afford the one I admired, though in the long run it would have proved to be the most economical.

The trowel had a blade and shank forged into a single, unbroken unit. The shape of the blade had a subtlety of curves that are rarely seen. The blade tapered from its longitudinal spine to thin resilient edges.

Not long ago I bought a new wire-metal gage, but only as a replacement for the old one that the hardware store had had for ages. This old gage was not stamped from a sheet of steel but had been forged so that the center around the hole was thicker than the rest of the gage. From this center, it tapered on a curve to a thin edge that had a fringe of cuts and holes around its circumference. The holes had been chamfered with a sensitivity of form and not just to "cut" the edge.

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*Q. You sound as though tools were works of art. Is this true, in your opinion?*

*A. In a way, I suppose, I am a traitor of sorts to my art indoctrination. I have seen more beauty in our tools and machines than in most of our so-called "works of art" or "arts and crafts."*

We falsely relegate to "decoration" the drawings on the walls of the caves from prehistoric times; the same with the engravings of reindeer and bison on the spear thrower, the murals on the walls of basilicas. African

<sup>2</sup> The building was not purchased for sentimental or historical reasons. It was the only thing available for \$300 down and payments for the rest of my life. It also provided a testing ground for man's perseverance. For the final few months it was a question of who would stay: We or the rats.

sculpture has suffered the same fate. These worlds were not made to decorate or to fulfill a whim. They were made for a purpose: the simple purpose of helping to survive in a hostile environment. They were made to assure good hunting, to assure that the spear would find its target, to glorify an institution and to seek favor in the hereafter, or to frighten and thwart evil spirits. Today, as a result of our affluence, we can afford decoration.

On the whole, when man strives to solve his problems, whether they be mechanical, structural, physical, or cultural (psychological and sociological), he is at his best. When he is merely reacting to his lot and to his environment, he is in all but a very few and rare cases merely another glob of protoplasm reacting to an irritation.

It is the mind of man that creates good design and beauty. It is his hands, his tools, and his machines that communicate this potential through the substances they work. \*

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

March 1965

*Q. The last time we met we talked about the beauty of machines, tools, and metals. Apparently you must enjoy working with metal. Am I right?*

A. Yes, I do. Metal requires a precision which, when it is achieved, can be very satisfying. However, to produce a design for metal work, a degree of planning, three dimensional visualization, and drawing skill are demanded that is beyond the capabilities of most craftsmen. Frequently, while struggling with a design, and its seemingly endless drawings and alterations, I envy the potter. The potter needs to concern himself only slightly with the pot's ultimate form. After wedging his clay, setting and centering it on his wheel, he is free to let happenstance and the feel of the material lead him. The whim of a reaction of the slippage of a tool may suggest a better direction for his form, if the thrown pot does not please him, he can return it to a lump, with little loss of time, energy, materials, and tooling, to begin again. This freedom from premeditated planning and drawings is one of pottery's great attractions. I am only afraid that some day our whole continent will be covered by pots.

*Q. Does designing and working with metal, then, demand a complete set of drawings?*

A. In some cases it does, but in most cases not as complete a set, nor as total adherence to them, as we might assume. If I were to design and produce a coffee server, I would have to make about 50 quick sketches before I could arrive at a design idea. From the best idea I would produce a working drawing.

But, this drawing would serve only as a starter for the major form. Though the body of the coffee server may be raised from a disc or reshaped from a prefabricated cone or cylinder, there is quite a range of freedom remaining for the subtleties which accompany hand work. If the body were to be spun, and since the chuck need not restrict the shape of the lip, rim, exact height or the contour of the top, I would leave this decision until the body was sufficiently formed to remove it from the chuck for examination and study as a hollow form.

I would look at it from all directions and handle it to get the "feel" of its weight and the scale and proportion of its size and shape. At this stage, even the chuck could still be reshaped to some extent and the form

re-spun over the altered form. Since the rim can be spun in space, and afterwards trimmed to almost any contour, there is little reason to slavishly adhere to the original drawing.

*Q. I thought working drawings were the law?*

A. They are in industry, but only when your design has to be turned over to another person for fabrication. But even in that case there should be opportunity for communication between the designer and the fabricator.

*Q. What about knobs and handles?*

A. These are the real annoying and challenging problems of design. However, I would use these as I would the small sliding weight on a scale arm. Despite my drawings, I would make several mock-ups of wood, styrofoam, or some other easily worked materials. I would never use clay or plasticine because they have texture, weight, and "wetness" that are completely deceptive to touch and appearance.

I would hold my mock-ups to the form, or attach them with tape or "stickum" so I could be free to study the relationship of the handles, knobs, and the body, from all angles. Forget specialized fitting handles such as the pistol grip. I've heard of pot shots, but never anyone being shot by a pot.

*Q. In other words you would hold the design open to the very last?*

A. Definitely! Even when considering such things as the felt pads that may be needed under a bowl to keep the base from scratching a table, I would consider these a part of the design and not just as something to avoid scratching. You may find that by using a brightly colored felt, and tripling its thickness, that the visible color may add a great deal to the sparkle of the bowl, and the felt becomes a deliberate element instead of an afterthought.

Or, you may find that adding white plastic tabs may create a contrast and your metal attains a subtle brilliance that a harmonizing material could never produce. However, with this amount of contrast you may find that you will have to introduce the white elsewhere as well. It must not seem an afterthought, but something that was intended in the first instance. It must seem "as though it belonged."

*Q. When about: the metal finish?*

A. I intended to cover this area, but since finishing suffers from the stereotype of dulling and shining, it will demand a whole session by itself. Finishing is a valid and essential part of the design and the form, and it must not be overlooked as just a cleaning operation. \*

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

April 1965

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

*Q. You terminated your last article on working with metal with a promise to continue with metal finishing.*

A. I did. In fact, I prepared that article so long ago that I had to go back and reread what I had said.

*Q. Still believe what you said?*

A. I do, although I must admit I hesitate to reread anything I have written.

*Q. By finishing, do you mean polishing?*

A. I guess I do include polishing, although polishing to me is almost a dirty word. Finishing of a metal surface is far more than cleaning or shining. Finishing is an important element of design.

My first awareness of this question arose many, many years ago after having visited two silver shops: Tiffany's in New York (this was before they served breakfasts) and the Kalo silver shop in Chicago. At Tiffany's they showed me three coffee servers: one of hand-wrought sterling silver; a second also sterling, but machine formed; and a third, also machined formed but plated. To my surprise, I could see no difference. I felt there had to be something basically wrong in the designing if such great differences in materials, tooling and finishing did not somehow or other display the potentials and limitations of each production phase. Well, this remained a rather troubling question for a while (I was new at teaching then and had not acquired the quick, speedy, fast-on-your-feet rationalizing, dodging, and cover-up of a professional).

One day while walking south on Chicago's Michigan Ave. a hand-wrought sterling silver bowl caught my eye. It was on display in the show window of 60



the Kalo silver shop. I immediately knew it was solid silver. I could tell by the beautiful, subtle vibrant fleck of its surface that it was formed by using hand tools. However, it was the finish that struck me!

I could have sworn that had I blown into the bowl that a cloud of silver dust would have risen. This was a finish that could not have been used on any but solid metals, whether silver, brass, copper, or steel, but never on plated ware.

*Q. Was the finishing done by machines?*

A. In this case it was, but the same finish could also be achieved by hand but with a lot of "elbow grease." The character of the finish came from the use of coarse abrasives. Although they used a coarse pumice powder any other fairly coarse abrasive would do. The basic principles involved were: the use of coarse abrasives; lessening the contrast of the reflecting metal surface; and the directional and organized way in which the cuts of the abrasive were applied.

A mirror reflects the whole range of contrasts—from the reflection of a shining light to black shadows—yet the mirror does not in any way reflect the silver that is the reflecting surface. A highly buffed metal surface (solid or plated) would be no different from a mirror. In fact, if I see a highly buffed mirror-like surface, I immediately assume the product is plated. Only a non-buffed surface can bring out the color and character of the metal. Remember how beautifully pink and coppery a freshly pickled piece of copper looks?

In the bowl I mentioned, the abrasive was used directionally to emphasize and enhance the form. The abrasive was not indiscriminately rubbed in all directions. Some of the most beautiful metal finishings I have ever seen have been on the backs and gears of pocket-watch movements. I can still remember the scolding I got for having opened my father's pocket-watch back. On the bowl I mentioned earlier, the abrasive cuts, on the inside and outside, were concentric with the edge of the bowl and gradually spiraled to its center. The resultant highlight flashed across the abrasive cuts, creating slim-curved triangles running from the rim to the center.

For a comparison, you may have noticed how the highlights on the surface of a turned metal piece run the length of the cylinder and across the cuttings. The length of the cylinder, in this case, is accented.

*Q. Do you mean that the surface finish affects the form?*

A. Yes it affects the apparent form. For an example, let us assume that I have formed an elliptical bowl. Though I may already have decided to use a fairly coarse abrasive, #80 or #90, I would still have to determine what I would want the highlights to do to the form.

If I went concentrically around the bowl, the differing lengths and widths of highlights created on an elongated form would be distracting. Since I made the bowl to be elongated, I would want to accent this feature. I could make the abrasive cuts run along the width of the bowl thereby creating a highlight running, like the sheen of a star-sapphire, the length of the bowl. This highlight would make the bowl appear longer and narrower than it

did before.

If the bowl seems too narrow, then I would make the abrasive cuts run the length of the bowl and the highlight in turn would run across the width, and by placing the accent on the width, the bowl would appear wider and shorter. The direction of the highlights have a decided effect on the apparent form of a bowl.

Supposing a bowl had a cylindrical upright metal base, if the abrasive cuts went around the form, the base would appear higher. On the other hand, if the cuts ran up and down, with the cylinder, then the base would appear lower and the highlight itself would be much duller since the cuts do not go with the cross section of the form.

*Q. What are we going to talk about next time?*

A. You just wait and see.

\*

May 1965

Q. I stopped by the other day and learned you were away on a held trip. Anything new?

*"you don't have to agree with me, but..."*

A. Yes and no. My design students and I visited two office furniture factories; one made steel furniture and the other used wood. The steel plant was progressive and highly productive, the woodworking plant was nostalgic.

## Speaking of Design

Q. How is that?

By Aarre K. Lahti

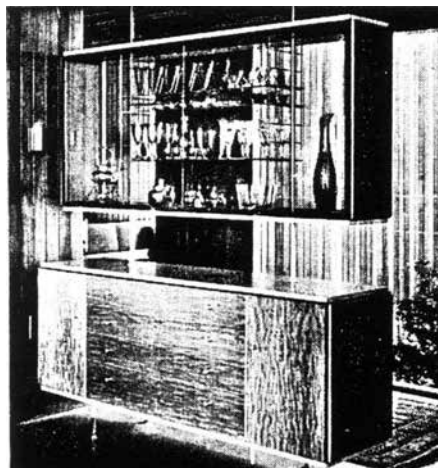
A. Nothing had changed. I was involved with veneer research in 1945. (See "S<:no0L Snot", Sept. 1964, pg. 60-64-.) Going through the plant was like stepping back into history. Of course I am exaggerating a bit for there were carbide-tipped tools, improved adhesives, urea foams, stretch fabrics, and other innovations but these were minor, not basic steps forward. However, if I felt a nostalgia at the wood plant I felt an apprehension at the metal-working factory.

Q. Since you are never really happy with anything, which would you prefer, nostalgia or apprehension?

A. Apprehension, I guess. Nostalgia is a subconscious admission of a lost cause. The reason I felt apprehensive at the metal plant was that in five years many of the men at the presses will have been replaced by automatic loaders, feeders, and gatherers.

Q. Our last three discussions would indicate that you would be prejudiced in favor of metals. How fair do you think you were in your evaluation of both plants?

A. I did try to be as objective as possible. However, as optimistic as I may have tried to be I can see little hope for most of our woodworking industry as it is presently solving its design and production problems. During this visit I again saw the multitudes of small discontinuous wood pieces being handled and moved again and again. At the other extreme, I saw heavy executive desks being wrestled side over side by a single individual



who was applying the finish.

The reason I was disheartened was that I like wood but to see a material and its tooling, many times amortized, dictate a product and its design spells doom. However, one positive factor was being considered and that was the appeal that wood has for most people. The design and production methods I saw made for units so costly that they eliminated all ordinary consumers except those purchasing agents buying with other peoples' money. Only a few top-ranking executives could have the pleasure of wood office furniture. There is nothing wrong with placing the emphasis on wood for, in our highly competitive business world, the appeal of wood commands a large segment of the market. The order of importance should be first the product, then the materials, and finally the tooling. I am afraid in this case tooling came first, then the materials which the tooling could handle, and finally the product.

*Q. How would you have designed for such a situation?*

A. I can best answer your question by discussing the case goods I developed and have produced over the past ten years. I too wanted to exploit the appeal of wood. I knew that wood, especially when laminated, had many advantages and permitted low quantity production with only the simplest of tooling. I also knew its limitations, its weakness at joints if sections were small. I knew of wood's instability, its time-consuming fitting, and the awkwardness of finishing fully assembled units. As a result of these factors, I relegated the demands for structure, dimensional stability, and precision to metal and the appeal and appearance to wood. I also decided that finishing of the wood had to be done "in the flat" before the panels were assembled. From these considerations a very successful system developed. This system consisted of a metal frame of rolled sections welded, spot welded, or brazed together. The finished frame could be of any suitable metal and finished by brushing, grinding, polishing, plating, or painting. The veneer panels were edged with vinyl, frankly admitting that the panels were not solid lumber. The prefinished panels were finally attached to the prefinished frame from the inside. No attempt was made to conceal the metal frame and, since the panels were always separated from one another by the corners of the metal frame, there was little need for extreme dimensional accuracy from one panel to the next.

*Q. What would you say is your system's most significant contribution?*

A. I would say that, beyond reducing the requirements for precision and costly fitting and the pre-finishing of all components before assembly, its greatest contribution is in its design flexibility. I can use the same system, or to be more specific the same frame, and by changing only the metal runners and hardware I can assemble it into a shelf unit (open from one, two, or more sides), with or without doors (swing, slide, or roll) and have access to the case from front, back, ends, top, or almost any combination without having to change its structure. The panels can be plywood of any desired quality and thickness, or they could be of plastic, glass, or perforated metal or even cloth. See photo.

*Q. Were the units economical to produce?*

A. Yes they were. The system, through its flexibility, could be used to produce inexpensive or luxury case goods without demanding any but small changes in tooling. \*

*"you don't have to agree with me, but..."*

# Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

November 1965

*A. Because of you I almost missed our discussion!*

*Q. How come?*

*A. You know "how come!" I saw the devilish glint in your eye when you brought The Cruel Sea to our house. Paper back novels are dangerous. I knew better than to touch it, but like Eve I succumbed to temptation and got hooked. One really has to shield oneself from emotional involvements.*

*Q. But you were the one who claimed that the power in art and design is in its communicating through the emotions of the observer.*

*A. Yes I did and I still would say it. However, although the emotions are the means for powerful communication, I draw the line when the emotions are exploited to create emotionalism. Paradoxically, it is seldom that rational ideas can be communicated through rational channels.*

*Q. How can that be possible?*

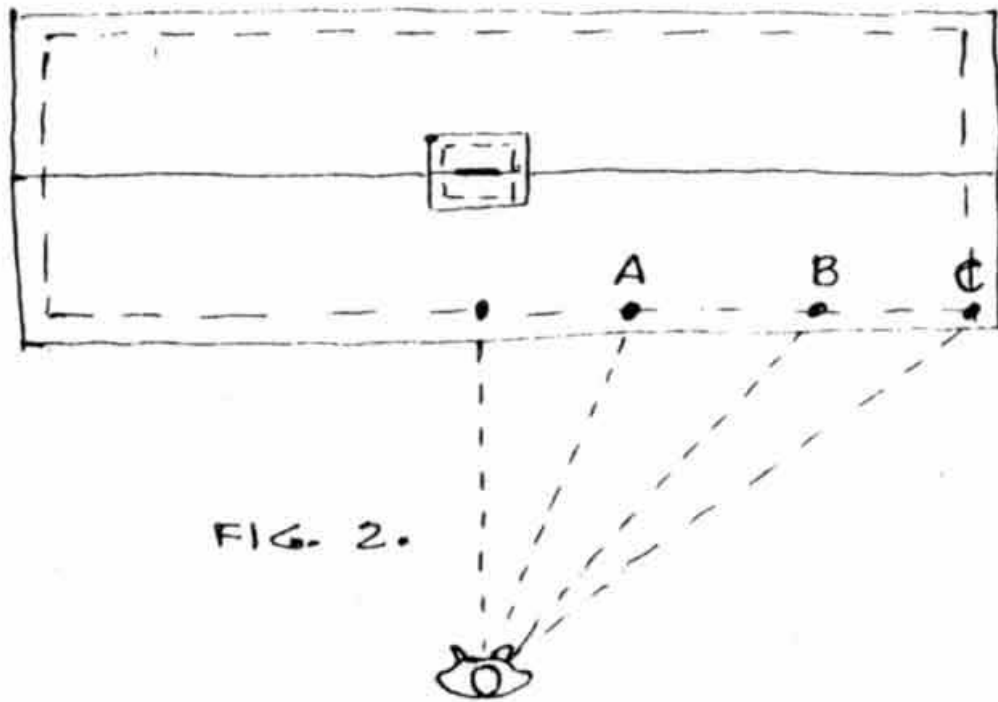
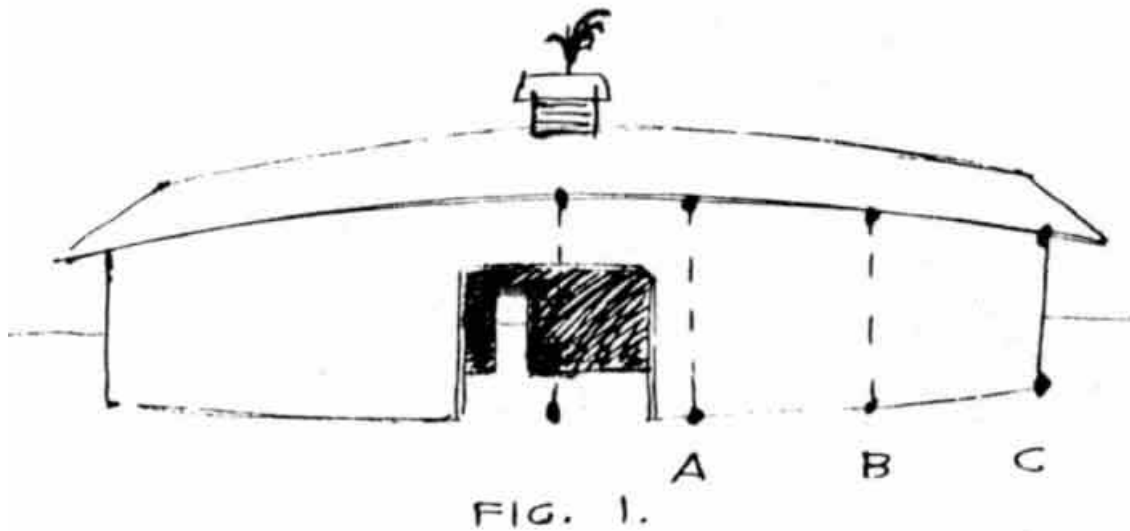
*A. Using the visual world as an example, we primarily see only what our culture has taught us to see-then again our vision is subject to a multitude of illusions and finally our concepts, experiences, and knowledge, right or wrong, of the wall nearest to the observer would appear tallest. At A the wall would appear a little less tall, still less at B, and shortest at C. If the tops of these verticals were joined with a line, the line would be a curve. The same would be true of the base which is below the eye-level.*

*Q. I guess it sounds reasonable, but why do I not see the line between the ceiling and the wall I am facing in this room as a curve?*

*A. It is due to the physiology of our eyes. The part of the eye, the fovea, which can discern details can see no more (even this is with an effort) than an area of 4" square at a distance of 8'. If I asked you to look 66*



at the black square (Fig. 3) and then the black disc you will discover that it would be quite impossible to keep your eye from moving. Now, since our cone of sharp vision is so slim and as a result you can only see a very short section of ceiling and wall junction line without moving your eyes, and since you know the line is straight, you will persist in seeing the curve as a straight line.



*Q. So, what has this to do with art, design, or problem solving?*

A. It means that, in order to communicate with others, it will be necessary to take into account how we see, what are the illusions, and what we have experienced to successfully put across an intent. We must, to succeed, emphasize, alter, and even distort what is truly there. Had I used curved influence how we see.

*Q. You had better have a reasonable example or drawn in metaphysics.*

A. I wish I knew what the word meant, but let me try. Let us assume that you are standing and facing a long building such as a barn. The true appearance of the barn would be that as shown in Fig. 1. However, this interpretation, though rational, would be objectionable and strange, and fail to communicate the form of the building to others.

*Q. Rational? It looks like some thing seen through the bottom of a throw-away bottle!*

A. That's true, but it is the building's rational appearance. Let me try to show you why: We have learned through experience that when some objects (despite their being the same size) appear smaller and some larger it is because some are farther and some are closer-this is the phenomenon of visual perspective. Let us look at the plan layout (Fig. 2) of the barn and the observer. The height (parabolic) lines to accurately communicate the right picture of the barn, I would have failed in communicating my intent. Very seldom can a visual truth be communicated with a fact. \*

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

Sept 1965

*Well, what did you do this summer?*

I became involved with a piece of land on an island near Michigan's Straits of Mackinac.

*Any designing needed for this venture?*

Immediately! On the way home from our second visit to the island and the real estate agent land after having made the down payment and the agreement to make monthly payments for as long as we live), I designed a knock-down, prefabricated shelter. We needed a shelter of some kind in which to keep tools, cook, and have a place when the weather got bad and, if necessary, for sleeping. We did not have to worry about sleeping quarters for we sleep on the cruiser which I designed and built some years ago. Do you know, I am still not quite certain if we got property on an island merely to justify having a boat.

The next day after our return, I made the drawings and picked up the materials. And now I've come to a very vain conclusion.

*This is the first time?*

Most people are doers and not problem solvers. Creativity is problem solving. Creative activity and designing are but one phase, paradoxical in that it's like swimming upstream. It seems: you must not leave well enough alone; if others have solved the problem, you have to do it all over again; when there is an obvious solution you must seek the devious; if a given material has always been used, use something else.

I do feel, however, designing requires a sense of humor, a playfulness. There have been times when I have deliberately tried a ridiculous approach and found that, although I could not use what I tried, its impact shifted my thinking toward a new direction.

*Did you apply any of your "ridiculousness-theory" on the shelter?*

As ridiculous as it may seem, not a bit. I was so dead serious and efficient that it was amusing.

I wanted to make a knock-down shelter that had no framing, no studs; I wanted it all skin, the least material and the most space. Since I was in a hurry, I could not seek new materials which would have to be ordered (I couldn't afford much anyway after that down payment) and wait for delivery. I had to use what was locally available and work with the tools I had at home.

*Now that it is up, what does it look like?*

Irma calls it the "birdhouse." It is an 8'-diameter cylinder with a very low conical roof, topped by a ventilator. I took six sheets of 1/4" plywood (I was going to use 1/8" which, though adequate, was not available and would have cost more than the 1/4") , cut a 12"-hole in each panel for windows, and by overlapping the edges 3" I was able to make a continuous plywood panel a little over 22' in length. The long panel was then bent around the circular floor and the two ends attached to the door frame, completing the cylinder. After I had made the rest of the parts and painted the assembled structure, it was taken down, the panels separated by unscrewing the seams, and packed on the roof carrier of our station wagon. Irma and I set it up on the island.

*Has it worked well?*

Yes, very well for its purpose. Besides, cleaning should be easy, since there are no corners.

*Would you recommend cylindrical designs for home?*

Not at all! The gains resulting from the efficient enclosure of space by a cylinder (or sphere for that matter) are lost in that everything has to be specially made and nothing standard fits.

*Well, you certainly surprised me with your ability to be matter-of-fact.*

Oh, I forgot. I also had to build a "john" which was also a cylinder but only 30" in diameter, requiring only two panels. To the real craftsman it might provide some comfort in that the roof is of solid walnut. My brother offered me some walnut veneer scraps from his hi-fi speaker manufacturing and I now found a use for them. I made a shaggy, shingle pagoda-like roof. \*

*"you don't have to agree with me, but..."*

## Speaking of Design

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor



November 1965

*You were certainly flippant during our last discussion of your circular, knockdown, summer vacation shelter. I hope your feet are back on the ground.*

It takes but a few days of teaching to neutralize the effects of the ozone gathered on our Great Lakes.

*Do you still like the shelter after a summer's use?*

Yes. It proved to serve its purpose very well. However, I must admit it was an easy design problem. Its purpose was direct and clear; I had only to be concerned with what we needed and liked. If I had to design it for quantity production, the designing would have been as agonizing as any other in which one had to be concerned with others. If a product is produced in quantity it has to have a wide base of consumer appeal. This brings me to one of the greatest paradoxes a designer faces: the "I like - you like" conflict. I gave the whole question of paradoxes a great deal of thought this summer. Paradoxes encompass the age-old conflicts of the self and others, the individual and the society, the irrational and the rational.

It is the mind-body problem, although no longer under the intellectual cloak of disputation, it persists as a deep rooted personal emotional turmoil. The "I like - you like" paradox is not as much of a problem in art

as it is in design art, as it is presently sidetracked, is authoritarian (with wishful dreams of a mystical elite) and quite unconcerned with anything more than personal self-expression. In fact most of our so-called art activity is more therapeutic than creative. Design, on the other hand, is problem-solving and although it too is an expression of the designer's values and philosophies, its concern is with the problems of others. Design is art democratized.

*Do you mean that the designer's responsibility is to provide people with what they like?*

No, I do not. The designer's responsibility is to provide people with what they should have. Designing is solving a problem on energy, physiological, and cultural levels. In all but a few rare instances, the layman is unable to project himself into the future and envision a new design which as yet has no physical existence. Even a designer has difficulty materializing his solutions until he starts putting them on paper. It is for this very reason that his competency in drawing is so vital. A non-designer has had neither the experience nor the training to critically analyze and evaluate his needs. What he thinks he likes is based upon what he has had, seen, and experienced. A new design, which to be new must be predictive, is beyond his capacity to envision. In fact, what he thinks he wants and likes is a residue of his dissatisfaction with what he has had, used, and seen.

*Boy! I don't think the ozone is neutralized nearly enough!*

Well, let me try to draw a parallel. The designer-layman relationship is, or should be, much like that of the doctor-patient (gosh, I just remembered I have another installment due on my dental payments). The patient can only state the nature, location, etc. of his troubles but he cannot prescribe the remedy. The remedy is the doctor's responsibility and which may need to be drastic enough to jeopardize the life of the patient. A creative designer will solve the problem without permitting his concern for the laymen's likes or dislikes to sidetrack his solution; however, a truly great designer will, through his great ingenuity and insight, produce a design that has broad acceptance.

*You mentioned creativity several times again today. We should go into it in greater detail.*

Let's do it the next time.

*Maybe with a little less ozone? \**

*"you don't have to agree with me, but..."*

## Speaking of Design

By **Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

December 1965

*Well, I guess this is the day you promised to discuss creativity.*

It should be, but I saw the galley proofs for an article by Don Kinaman on wood mosaics to be published in this issue of SCHOOL SHOP. The article provided such an excellent example for discussing a critical design problem, that I would rather discuss this and hold the creativity discussion for another session. Although I have not seen the completed projects in anything but black and white photographs, I know they are handsome. Wood has a deeply changing moiré flash, a deep glow, and a subtlety of color no imitation wood laminate has thus far succeeded in copying. The use of wood for mosaics resolves one of our basic problems and burdens in design for most amateurs and many professionals. We are burdened with an affluence of materials, textures, colors and finishes; an affluence so abundant that only those designers with the soundest design philosophy and the greatest self-discipline can exercise the necessary restraints demanded in creating designs of unity, simplicity, and dignity worthy of being classified as good design. Can you recall how the freedom of form, made possible by Fiberglas\_ produced a vulgarity in boat designs never experienced before? `

*I should say so! They were like cars with their tail lights in the water.*

Exactly. But now a self-imposed restraint has evolved and our boats, on the whole, are becoming more beautiful than they were before.

Up until recently, our design quality was largely the result of the limitations imposed by our natural materials. Solid wood, wools\_ silks, and leather were bulwarks of quality. Solid metals, natural finishes, vegetable dyes, stained glass, and so on were aesthetic bench marks. Even in water color and oil painting the pigments which were considered permanent (invariably the less brilliant) subdued our color mixtures and produced a harmony. Today it is almost impossible to distinguish leather from plastic upholstery materials. I remember when the leather industry. in order to compete with the plastics started coating their leather with plastic fillers to stop the leather from getting soaked by rain and thereby losing the porosity the "breathing quality" which was one of the few remaining claims leather could make. Of course they also started providing a range of colors in leather beyond that of any self-respecting rainbow. I am only glad

that they could not dye the cows before butchery; imagine what our pastoral scenes might be by now.

The reason I was able to imagine how handsome the wood mosaic projects published would look was that years ago a student of mine made some wood mosaic panels for table tops. However, instead of using grout we used a clear, thinned polyester resin<sup>1</sup>, not only to fill the spaces in between, but to cover the tesserae with about 1/16" plastic. After the plastic had set the surface was ground flat and then directionally polished to a clear glass-like surface. You can imagine the richness. It was like looking at an underwater display of coral. Another student used tesserae of varying thicknesses creating a three-dimensional quality that, I am afraid, knocked one's eyes out. However, there are drawbacks to using resins: they are costly and a rigid discipline has to be imposed or the whole building becomes sticky.

*Plasticine-covered door knobs are bad enough. Shall we make any more promises?*

Let's wait for the New Year. \*

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1 To keep a fairly thick layer of poured polyester resin from cracking and crazing, it is necessary to thin the resin with styrene and reduce the quantity of accelerator so the setting time is no less than 12 or 18 hours. Now that epoxies are available they provide a plastic which does not crack if poured in fairly thick layers.



*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

March 1966

How is your student self-instruction film program progressing?

Very well! In fact, we received a small grant for materials and student help. This will be the first significant step towards resolving the bottleneck of skills instruction that I have been able to institute.

How come? You've taught for a long time and I thought you did at least a passable job.

I may have, but all the approaches I have tried have simply been no more than slicing the same sausage different ways. Basically the problem is one of the learning process. Just a few days ago, in discussing the learning process, the old familiar learning curves were introduced. It is surprising how persistent stereotypes can be. The old standard learning curve, with which everyone is so familiar that a diagram is unnecessary. Is a very neat, orderly and, I assume, comforting conditioner for senility. The more realistic diagram (the one that looks like the edge of a badly torn piece of paper toweling) is still a diagram for a linear approach to problem solving despite its disturbing ups and downs.

Years ago, I, too, assumed that to produce a design the approach was an orderly one from rough sketches, to more complete visualizations, to models, mockups, working drawings, and finally the actual construction. Only a few years ago I was surprised to see, in a case study from one of our country's most outstanding schools for craftsmen, that the student was held to the working drawings of his design despite being in a position to benefit from the feel, the shape, and the reality of the three-dimensional object he was Professor of Design, University of Michigan, Ann Arbor creating. He was being restrained from growing with the new experiences and the learning which was taking place while working with the material itself.

It was not until I wanted to design and build a trailerable, lightweight outboard cruiser in 1954 that I became aware of a fallacy in the linear learning curve. Although I had designed and built high-speed step-hydroplanes for small inland waters, I had had no experience with designing lightweight boats for large bodies of water. Up to that time very few trailerable cruisers were in existence. Incidentally, it has not been until the last few years that any course in small-boat design was offered by naval architectural departments. If you look about you, you will see that ar-

chitecture, too, is concerned almost exclusively with institutional buildings while the vast majority of our people live in "builder" or leftover housing.

Due to the lack of reliable information and the lack of personal experience, I tried the direct and naive approach. Between the first of September and the twentieth of December, I designed, built and trailered the cruiser to Miami. The boat is ugly, rough in workmanship, but serviceable. This boat immediately pointed to the fallacy of a hull design generated by a warped plane for rough water use.

Had I not made this "instant" boat I could very well have spent a year and a half building a handsome boat that, in time, would pound itself to pieces. Four and a half years later I completed another outboard cruiser. The success of this second boat was due entirely to what I had learned from designing and building the first one.

This reminds me of a passage from a Lin Yutang book (I believe it was The Wisdom of China and India) in which he compared the attitudes of American and Chinese engineers. He said that the American engineers in building a tunnel start from both sides of the mountain, as do the Chinese, but that the Americans are very disturbed if the meeting center lines are the least bit off while the Chinese could care less-for two tunnels are better than none.

And what has this shaky bit of scholarship to do with our discussion?

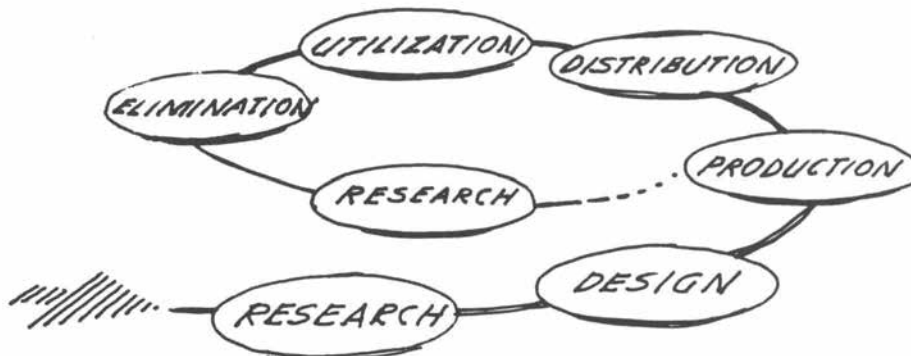
Ours is a three-boat family!

But back to the learning curve. The model cannot represent linearity, it should represent a series of spirals, each representing a development cycle.<sup>1</sup>

The model for the learning curve would then be like an uncoiling but tangled spring.

It looks like the spring from a rolling window shade.

And just about as hard to untangle as reconstructing a creative idea. \*



1 The Development Cycle was originated by K. Lonberg-Holm and C. Theodore Larson

*"you don't have to agree with me, but..."*

# Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

April 1966

*I hear you got caught with an overly large class of beginning design students.*

Yes, I did.

*What did you do about it?*

I made out my entire "fund drive check to Planned Parenthood.

*No! I mean the class.*

Oh!

An assistant was appointed to help me

How do you feel about our young teachers?

Very good. In fact last semester, during a luncheon meeting of those of us responsible for the teaching of the beginning three-dimensional design course. The young teachers provider] a very revealing insight into teaching cycles.

*The kind of cycles we discussed last time?*

In a way, but in this case more like the swinging of a pendulum in a moving vehicle. This insight was one of reaction and counter-reaction.

*I'm curious.*

You may have sensed that teachers tend to categorize each other into three age groups. I was surprised when I first had become one of the old fuddy-duddies. (Not even running up and down school stairs displaces this image.) At this luncheon meeting we had our three "categories" represented: the new, the intermediate, and the ripe. The meeting was called to discuss the objectives of the beginning three - dimensional design course, with many sections and many instructors it had become necessary to have some consensus of objectives. Since the course involves three dimensions and

some construction (you just can't paste things on space) one of the items included in the agenda was skills, an item which I had succeeded in having included in the course a couple of years ago. Some day we may just jettison the class into space, place our lines, spots, and forms where we want them and, while suspended, take photographs and return to earth for a presentation.

*The ultimate in teaching machines! Do you have the space program planned?*

Not yet, it took me three years to get gas and air lines installed into our design area.

Although, in years past. I had clearly slated that to me skills were no more than means for solving problems and not ends in themselves, I had great resistance to introducing a few elementary skills necessary for three-dimensional design and it took years before they were incorporated into the course content. Now that we were having a meeting for the first time in years, I was prepared for the old hassle. And, just as I feared, it started as soon as the list suggesting skills and materials was distributed, member of the "intermediate" group said that such a list would stifle instructor creativity, bring about regimentation, etc., etc., etc. I was already bristling, as I waited for the newcomers to join the "intermediates."

*How unscholarly!*

Well, you can't make an attaché case out of an old tarp! To my surprise, the newcomers pounced on my colleague with all four feet. They insisted that skills are essential and must be included.

*How would you rationalize this phenomena?*

I was gloatingly perplexed. Finally it dawned upon me that these were the very people who had been students at the most chaotic, laissez-faire, and irresponsible (invariably called "freedom") period of design teaching and that they now realized how handicapped they had been simply from the lack of basic skills. One individual said. "Why didn't someone see to it that I got the experiences when I needed them?". Another, "Why do I have to wait until I am near the end of my graduate work to get a necessary experience?" Here were only a few examples of an overly permissive teaching philosophy which in itself was a reaction, a pendulum swing, from past authoritarianism.

*I guess you could be pleased.*

Someday I would want to be on the popular side! As the result of this reaction, although a healthy one, we must now guard against the return of a stage in which skills are an end in themselves. I am disturbed, it is already starting. \*

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

May 1966

*How did you like our first day of spring?*

It was wonderful! It was clear and sparkling but just as cool as a warm summer day at Baffin Island.

*That's right, you were there during the summer of 1961. Now, what about their design?*

I had admired Eskimo sculpture long before I went to the Arctic. As it happens I saw my first exhibition of Eskimo sculpture in Munchen, Germany, of all unlikely places. I was immediately struck by its simplicity and quiet power. When I had the opportunity to go to Baffin Island I also had an opportunity to see more Eskimo sculpture at Frobisher Bay and Cape Dorset. I spent most of my time at Cape Dorset, the very village from which a large share of the Eskimo art had originated. I was among the very people who had created it.

I genuinely liked the Eskimo. In the evenings, I would go for walks. The low sun would cast a warm side light making the scenes even more dramatic and the rocky path seem even rougher. Within a mile of walking I would have a group of 10 or 15 Eskimo children walking with me. They just came along for the walk. We carried on no conversation, the children just smiled and once in a while teased one another in the language of their people. I am certain that every once in a while there was a comment about me as well. I was provided a name by the Eskimos, mine was Ukjuk, which is Eskimo for bearded seal.

One evening I gave each of the children a bird call imitator. These were the little half-moon shaped leather and membrane devices which one thoroughly soaked in his mouth. By forcing air between the device, held against the roof of your mouth by your tongue, you could, with practice (and spit) create a fantastic array of chirps and twitters. You can imagine what it was like with a dozen boys and girls sputtering, drooling, and giggling while trying to make sounds. Every once in a while someone would hit pay dirt. The next day in the village an ornithologist would have doubted his educational foundation or his sanity.

Seeing an Eskimo on his way to seal hunting, walking over the rocky shore to his canoe (equipped with a small outboard motor) with a Primus in one hand and a gun or a harpoon in the other, it dawned upon me why their

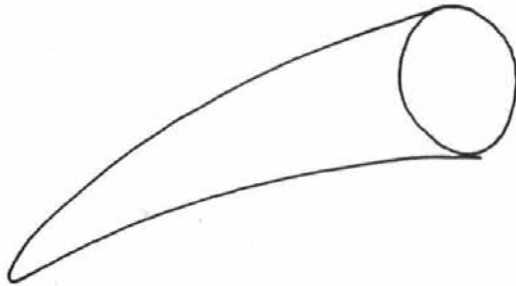
sculpture has quality. The Eskimo stalked, waited, harpooned, struggled, lifted, and, while carrying his burden, apologized to its spirit for having found it necessary to take its body for his own survival. He then skinned, butchered, smelled, and ate the mammal he had caught. No wonder their carvings are not just what remains after a gouging of a piece of soap-stone. Their forms are full of muscles, viscera, power, and the necessary sleekness to swim through the ocean. Besides, Eskimos have the dignity of not labeling themselves as "artists."

Tut,\_tut!

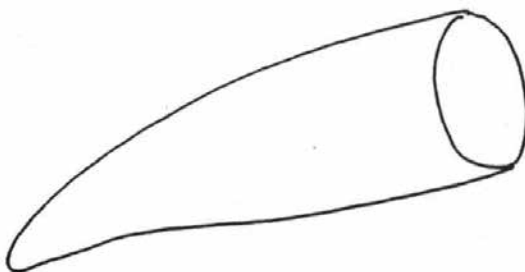
I can't help it. I feel strongly about anyone who is so sorry for himself that he must escape and look down upon mankind. The Eskimo is not a pessimist about life. He is a realist. He is happy to have a "go" at it. He has the dignity to live as long as it is physically possible and worth living and death is hut an unfortunate happening to avoid until it is time to lace the reality of old age and obsolescence. People like this are not afraid to look at life, nature, forms, and at one another. They are not afraid of sentiment nor are they afraid to admit that there is beauty about them.

Getting back to design, could you illustrate your point about drawing and understanding what you are drawing?

Yes, were we to draw a walrus tusk we would invariably draw it as a bent cone.



If we understood the tusk we would draw it to show its strength and form.



To the Eskimo, it is a powerful tool for sustaining life, for defense, and especially for keeping his-goodies.\*

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

I rather enjoyed our Eskimo discussion last time. What was your reason /or going to Baffin Island and especially to Cape Dorset?

It was because of the white man's gift to the Eskimo, tuberculosis! During all the years of contact with the white man, the Eskimo has been unable to develop a resistance to this disease. In fact, when I was there that summer, the amount of coughing I heard was worse than any I've heard here during winters. Every time a group visited the area, the visit was followed by a minor epidemic of respiratory problems. This is one of the reasons why tourism is not encouraged. This may have been the reason, although I can think of others, why the group of about twenty museum directors and art critics were housed and fitted in tents on an island about three miles away.

I was there for two reasons: first, to do something about improving public bathing in the village and second, to improve or replace the igloo. This is an area of the arctic in which the igloo is still used in the winter when about half the Eskimos in the village must spread out over a vast region to find food. However, bathing was our only objective for the present.

Knowing your background . . .you didn't?

Yes I did.

You mean you suggested a sauna?

Yes. We built the heat exchanger for it in Ann Arbor, Mich., and I took it with me on a plane to Cape Dorset.

You are kidding?

No, I am not. Of course we did not take the rocks with us.

They needed the most economical means of bathing that could be provided. We fail to realize what life is like when every drop of water used for cooking or washing in the winter must be melted from ice. This is a region 81

where the water temperature is so low that all the ice does not melt even during the summer. There is no wood or coal to burn. Kerosene is used for heating and gasoline for power.

The heat exchanger had to be a completely enclosed system to permit the use of a large kerosene-burning thawing torch.

It was thought that improved bathing would help in the control of tuberculosis.

We take bathing for granted. Had we not been indoctrinated since our very first day to taking baths and developing a guilt complex about not bathing, I doubt if anyone could get us to start sitting alone in a cold room in a tub of water or stand under a dripping shower head. This was a part of our concern. The Eskimo had no such indoctrination. However, we felt that since the Eskimo is a very sociable individual, sauna bathing in a group would have a sufficient appeal to bridge this gap.

You claim a sauna is economical. Just what is it that makes it economical?

As you know from your physics, it takes more energy to heat water a given amount than it does to heat air. In the sauna the bathers sit in an overheated, though quite comfortable, room. However, the throwing of water on the heated rocks will raise the humidity which provides the sensation of heat. More water can increase the humidity to a point of driving everyone out--yet the temperature of the room has not risen. The bathers sit on tiered benches, the higher the hotter, and, while gossiping (you and I would discuss philosophic issues), begin to perspire. It is the perspiring that does the cleansing. All that is needed is a little soap and about a half-gallon of water and, it is believed, you will be cleaner than if you had taken a shower or a tub bath -- especially if you had to save water or if yours was the last turn in a tub.

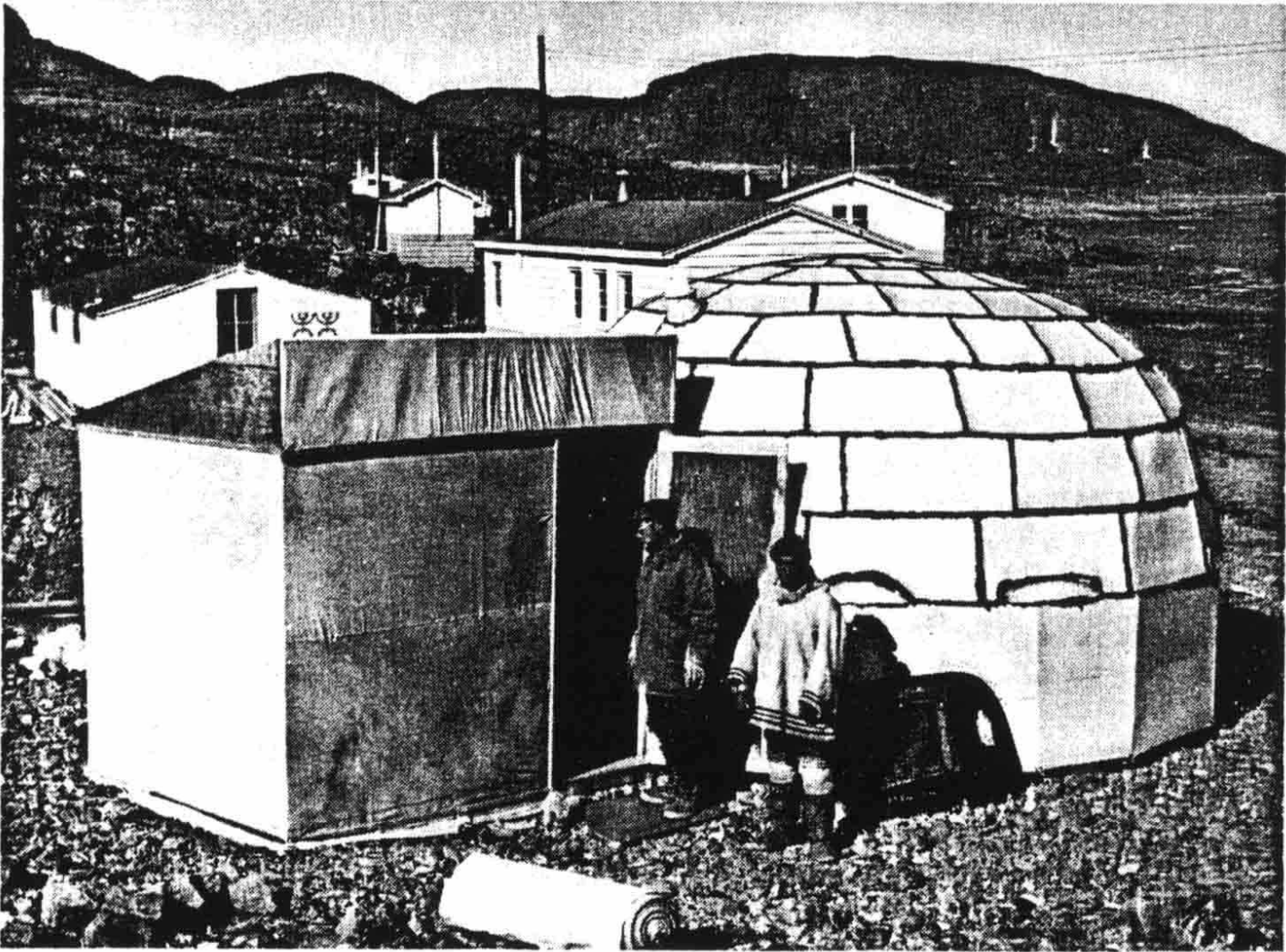
Into what kind of a building was the heat exchanger installed?

Some years ago, they had built five experimental igloos of Styrofoam. We used one of these for the sauna.

I had heard much about the skills of the Eskimos; I now had an opportunity to witness them in action. Takiasuk, an old Eskimo was assigned to do the necessary rough carpentry work. We could not speak one another's language so I had to gesture, point and wave my arms. After I tried to tell him what I needed tent; Takiasuk suddenly left. I thought he may have taken offense at some of my gestures, you know how it is with a foreign language. However, he was back in about fifteen minutes with an armload of tools. He had even remembered a drill.



**This single-level Styrofoam igloo designed by Professor Lahti for Eskimos on Baffin Island features an attached sauna.**



"you don't have to agree with me, but..."

## Speaking of Design

By **Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

06.1966 Morning Mail

Dear Sirs:

An industrial-arts teacher in one of my project schools called my attention to Mr.

Lahti's article, "Self-instruction the Need and the Tools" (September 1966) . . . I found it most interesting and forward looking . . . It is refreshing to see that all areas of the school are thinking and making positive contributions to make teachers aware of the problems facing good instruction today.

We have in our project a new union high school that has a curriculum design incorporating vocational education within the frame work of a comprehensive high school. Therefore, I am particularly interested in having all teachers become aware of exciting ideas that will develop a totally integrated school.

John G. Herlihy,  
Director, Cooperative Project for Curriculum Development  
Bennington, Vt.

(Editor's note: This letter is but a sample of the immediate and enthusiastic response

Mr. Lahti's article received. For additional reading enjoyment, watch for his column,

"Speaking of Design," appearing monthly in *School Shop Magazine*.)

with which to make' the opening hole for his coping saw and a crowbar with which he could pry up the insulation floor slab so there would be just a little space between the rocks and the bottom of the slab for the tip of his saw. This was quite unlike the conventional plumber story.

Any observations?

I guess I am just a genius at communications.

Yes, dear Lazarus.

However, I was not always as successful. I had prepared drawings for the supporting members for the tiered bench to be set up inside the periphery of the igloo.

Oshaweetok, the carpenter, took the drawings and a day or so later came back with a throne-like high seat, one resembling the kind used by tennis judges or lifeguards. Eventually he understood that the supporting assemblies were to be spanned by planks and that a total of five assemblies would be needed.

Oshawcctok had made some of the best Eskimo sculpture I had ever seen. Although I had not seen the originals, I saw the photographs of a few of his pieces.

One was of a quality that in my opinion has not been excelled. However, he can no longer afford to do sculpture he is a good carpenter and he can now make a living doing this rather than spending his winters hunting.

Any more problems?

Not really, but it was here that the differences between their ways of constructing and ours became evident. I had assumed that he would cut all the pieces for the live structures, assemble them as sub-assemblies in the carpentry shop, and tie them together in the sauna with the planks. Instead he brought his materials and tools and started by cutting one piece, toe-nailing it to the floor, cutting another and after more toe-nailing and more cutting and nailing he had one support completed and standing like a lone monument on the floor. He then started the second and so on until all five were up. Finally. He brought in the planks, cut them to fit and fastened them in place. To think in terms of pre-cut members and sub-assemblies was not within the needs and experiences of the Eskimo. They have not had the luxury of working with standard shapes and sizes of materials. Theirs was a situation of make-do. When an Eskimo builds the frame for his boat, he uses driftwood pieces, bone, caribou ribs. Or whatever he may have or find. But, he does not let the lack of not having the right material keep him from making what he needs. \*

The key to self-instruction is making it possible for the students to work on individual projects and have access to the skill demonstration or field trip when they need it. Sound films, used or books, permit this, Lahti says.

Draw closer together, as do our mutual problems. Our first responsibility as teachers is to encourage learning. We must establish learning as a process that is vital, basic, and a rewarding behavior applicable to every activity and every aspect of living.

I have witnessed fantastic learning as I have witnessed failure to learn. Attitude and motivation are, in my opinion, the most significant factors involved. In those cases in which learning was successful there was a great personal interest and a deep involvement in the project. Projects, which originate with the student, can provide the greatest motivation. However, I must confess that I have learned through bitter experience that only a few students have the insight and drive necessary to originate their own projects. The rare few who have this capacity must be given this opportunity and receive every encouragement and assistance.

Our stressing of creativity raises a serious and paradoxical question. Could it be that with our enthusiasm for creativity (and I am among these) we are pressuring many who have neither the motivation nor desire to question, change, and originate? Could it be that we are in turn indirectly creating a group of unhappy, frustrated, and guilt-ridden individuals who might otherwise have been content to follow orders and provide a needed service in doing what they can with proficiency?

The inclusion of design will shift the emphasis within the project from skills, materials, and processes towards human needs, desires, and aspirations. This shift, while providing a greater potential for creative problem solving, adds an additional burden on already overly burdened industrial-arts teachers.

It is the generalizing and the integrating function of design, especially industrial design, which creates my dilemma. Industrial design is a phenomena of a democratic society, a society which provides for individual choice. Industrial design must incorporate and utilize our most advanced technologies to provide optimum solutions to problems arising from our culture.

Years ago when life was simpler (and definitely less democratic), design criteria grew out of limitations. These were the limitations of natural materials, simple skills, craft technologies, and even that of animal and human energy. The limitations became the determinants for design honesty, integrity, and aesthetics.

Today's vast store of natural and man-made materials places unprecedented demands upon the designer's judgment. The range of materials, their textures, colors, properties and potentials, and the processes for their shap-

ing and forming are beyond the comprehension one single individual-yet we wait. To utilize our technologies to their optimum, our designer is dependent upon sophisticated tooling the cost of which can only be recovered through mass production of vast quantities, which demand a mass market. And, it is no longer enough that we select a material from among those that are being manufactured and are available; we can now specify the properties and qualities required and have a new material created to specifications. Beyond the skills the industrial designer needs to perform his specialty, he must have a comprehension of skills, technologies, and processes of production. For this purpose field trips are important. However, were each city surrounded at its city limits with production facilities; we would not have enough class hours in our total industrial-design program for just the field trips. Despite our predicaments and the temptation to resolve them by greater structuring, industrial-design teaching is shifting more and more towards individual student projects. How will it be possible for us to keep abreast?

Books are awkward, slow, and inadequate for our needs, and if graphic, they're disjointed. Our audiovisual approach is cumbersome and lacks flexibility. Television does not lend itself, as it is used today, to individual creative efforts.

I am convinced that self-instruction holds out a great potential.

#### Portable Projector Aids Self-instruction

Since 1953 I have been seeking, suggesting, and requesting a seemingly simple piece of equipment from the audio visual-products manufacturers both here and in Europe. A decade later this piece of equipment, a key to self-instruction, materialized. The device is a portable, desktop, rear-projection, film projector showing 8mm cartridge sound films.

When visual stimuli with its color, movement, and sequences is combined with sound our students can acquire a skill on their own. The viewing, however, must be simple, uninvolved, and foolproof.

I am now launched on a program of making teaching films with the help of our university's Center for Research into Learning and Teaching. As we complete a film for a greatly needed skill, we discontinue the lecture and demonstration of that skill. As soon as a specific field trip is filmed or excerpted from existing 16mm films, it becomes a part of our field-trip library and the actual field trip needs no longer absorb our time and budget. Through self instruction a student will be more free to work on individual projects for he will be able to get his skills, demonstration, or field trip when he needs it. He will not need to wait until the class, the film, the room, the instructor, and the equipment can be scheduled.

Our experience with the films we have made thus far shows great promise. At this time we have only a few films. The how-to-do-it films, such as "Soft

Soldering." "Silver Soldering," "Work Holding," "Annealing of Metals,"  
"Plaster Mold Making," "Reinforced Plastic"

# Speaking of Design

October 1966

35-1966-10

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

*Did you do anything new this summer, or did you just spend your time in sylvan idleness?*

It was one of the busiest summers I've had for some years. Of course it took me more than a month, after classes ended, to catch up with my paper work and to bring my self-instruction film-making program to a usable stage. For our home, I had to build a stairway between the old building (the first school house in Ann Arbor, built in 1838) and the addition I put up some years ago. One side of the stairway had to meet a modular system while the other had to conform to more than a century of expedient compromises. It was like attempting to apply an IBM system to a woman's purse. I also taught a one-week's design course for graduate industrial-arts students at Pennsylvania State University.

*Did you get to your island after the teaching session?*

Not until I had built and set up over 200 square feet of book shelving. Of course I left the painting to Mrs. Lahti. Oh yes, I had also become a grandfather earlier during the summer.

*Back to your trip east, did you gather any design observations?*

Indirectly I did. Since the industrial-arts shop was in one of the engineering buildings, I was struck, while nosing around the buildings by the acres of floor space absorbed by machinery, tools, and equipment. The situation was overly dramatized by its summer emptiness since only a few engineering classes were in session. But, it dredged up my own worries about the future space needs for adequately teaching industrial design. With design as a problem solving activity moving more and more towards individual student projects, we will directly or indirectly be involved with nearly every piece of equipment I saw. Yet, as our teaching progresses it must become more and more efficient and our use of space must improve. Of course, my first problem here at the university is that I need some space to improve upon.

Years ago we taught weaving at our college. Each of the upright looms consumed about 30 square feet of floor space and was scheduled for six contact hours per week. Due to our ever increasing crowding, we made the mistake of discontinuing weaving and giving away the looms rather than face and solve our problem. We should have redesigned our looms so a student could remove her work with the reed, rollers, and harnesses from the frame and make the

frame available for other students.

The space use could have been increased sevenfold. Besides, most of the weaving could have been done on vertical looms.

As our industrial-design students progress they become responsible for seeking and formulating their own projects. The resultant variety of projects can provide the instructor with many sleepless nights. For an, example of a simpler project, every once in a while a student will select the design and forging of a prototype set of silver tableware. The ordinary metalworking tools are certainly not in the condition they should be for silver work. Yet it must be the project and not the equipment, which determines its acceptability.

I am planning and hoping to construct a prototype unit for special processes not frequently needed. The unit would be completely enclosed and on heavy casters. It would open easily, making available the workbench, drawers, tools, materials, chemicals, etc. Couplings for gas, air, and electricity would be part of the unit. The unit would be rolled into the work area, wherever it may be, and quickly opened and set up for use. If this unit becomes a reality and proves to be practical we can design similar units for our clay modeling, model making, small spray painting, etc.

*It sounds possible.*

Yes it does, but we are in a six-story building without an elevator.



# Speaking of Design

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

**37-1966-12**

*I stopped by the other day to make arrangements for another discussion session but learned you were away on a consultant job. Do you really feel qualified as a consultant?*

I do. The definition of a professor is one who professes and I am a professor. I am qualified to advise people on business matters since years ago I failed in the restaurant business. I am an expert. I have been referred to as an arctic expert, although in the arctic they told me that an arctic expert is one who, at 40° below zero, can heed a call of Nature without fear of frostbite.

*I regret I brought up the whole issue.*

*I am afraid of what Virginia Woolf has done to you! I hope you have something more worthwhile to discuss!*

Well I do. In fact, I am quite anxious to comment on our first tentative results from using films for self-instruction. In the September issue of SCHOOL SHOP I wrote about our program of making skill-teaching films for self-instruction. Now I have some tangible evidence and the results far exceed my past hopes.

*You've always been a pessimist.*

Yes, I have. If I hadn't, I would have shot myself a long time ago; only a pessimist can be continually and pleasantly surprised by things not being as bad as he had thought them to be. Thus far, we have needed and used the following films for my beginning basic-design section: "Soft Soldering," "Silver Soldering," "Holding Your Work while Soldering," and "Plaster Mold Making."

I have had an opportunity to observe these films being used in place of the usual demonstrations and lectures. My section of 13 girls and three boys is composed of 10 freshmen, five sophomores, and one junior. As a result of an experience with a student last spring I found it necessary to supplement each film with a checklist. The checklist is not intended to be a test but to be a device to focus attention on the critical points and factors that tend to be overlooked. The students took to the film viewing without hesitation and no hounding was necessary to get the checklists completed. During the film viewing I had time to circulate among those students not viewing the film to discuss their designs or clarify the objectives of the problem. The projector ran almost continuously at first, to the extent that I knew there must be repeats. As a result, I added a new item to the checklist for the next film, one requesting the student to state the number of times he viewed the film.

The results showed a minimum of two and a maximum of four times. Returning from lunch one noon, I was rather surprised to hear my voice coming from the studio and to learn I had been working with two students during the

lunch hour. Incidentally, the equipment and films have been working without a hitch.

*Any clues concerning the quality of the work?*

There are a few. This semester's workmanship is better than that of the same section last semester. I also had an opportunity to compare the soft soldering done in my section with those of another section in which the demonstrations were performed as in the past. I might add that our shop supervisor did the demonstrations for both the film and the section I just mentioned.

The joints made by my section were better. The films are being used only in my section, for it is the experimental group for studying the effectiveness of Self-instruction. The results of the plaster mold making film have been especially gratifying.

Previously, I had had to spend a minimum of two hours demonstrating this skill and now the film does a complete job and in the proper sequence in less than 12 minutes. In the past, regardless of how I thought I had emphasized the sequence in mixing plaster to the water and the time when it can first be stirred, I had failed to get these points across to all the students. This semester I have yet to find anyone who has not done the mixing properly.

*Besides looking smug, why don't you draw a few conclusions?*

I am convinced the potentials are fantastic! The students take to the viewing and to the filling in of the checklists. The first apparent successes might stem from my having a brighter group of students than before or that my demonstrations of the past were really poor. However, I am certain that the success thus far stems from the student getting the information when he needs it, getting it when his motivation is high, and being able to view the demonstration as many times as he feels it is necessary.

# Speaking of Design

By Aarre K. Lahti  
Professor of Design, University of Michigan, Ann Arbor  
38-1967-01

*You must be deeply involved in something or other not to have\_ taken me up on the "sauna" invitation when I called you.*

I've been struggling with designs for a planning catamaran hull. I want to have a half-dozen vacuum-formed lust hulls ready for testing this coming vacation.

*Aren't you out of your field?*

*Shouldn't you leave such those matters to the naval architects?*

I should but, until recently, the concern of the naval architects had been only with ships or yachts for the economic aristocracy. If I had waited until they took note of the little guy's desire to get on the waters I would be as dry as a student's bicycle chain. The same goes for architects. I would still be living in an unbelievably frustrating and inhibiting, used house or then in a housing development busily trying to conceal my cruiser and its trailer or trying to camouflage it as a brick barbecue mausoleum.

You I must admit, however, that the naval architects are passing the architects in their concern for the user.

*You know, it's funny; I can't raise a single issue without your turning it into a federal case.*

Oh, I meant to get to my point right away!

I've drawn boats ever since mother and I missed our passage on the Titanic. Father started building and I started designing our boats. My brother and I even got the Ford Motor Company to sponsor a boat-building project, which I consider to be quite an achievement!

There is no problem-solving activity; I know of, that better illustrates the positive aspect of compromise. In boat designing and building, there is not an idea or a decision that is free from compromise. If you add a bit of material for greater strength, you add weight, which cuts down your speed. To bring the speed back would require either more power or more sail which, in turn, demands stronger structures and so on and so on. It's almost like a family "discussion."

I wish we could all look on compromise as a healthy, constructive ingenuity, creating reality. After all, problem solving is compromising. I don't consider compromise a dirty word; compromise and relativity are apposite. If man, materials, tools, processes, and information could be perfect and true, then compromise could be avoided. But, until such dreams of purity come true. We could waste our lives waiting the right moment. The right thing, the right person. Too often, our students are rigid in the deep freeze of absolutes.

*What about ideals?*

Ideals are mankind's most precious possessions. But these ideals, the aspirations of man, must be balanced by a healthy awareness and understanding of reality. We must learn to live with the paradox of keeping our heads in the clouds and our feet in the mud.

What you're suggesting would leave us extended and stretched to a snapping point.

*How, if I can believe that you practice what you preach, have you been able to keep yourself together?*

I wear suspenders.

# Speaking of Design

By Aarre K. Lahti  
Professor of Design, University of Michigan, Ann Arbor

**39-1967-02**

*What's on today's schedule?*

I had planned to discuss a fantastic piece of Negro sculpture I saw at the Field Museum the last time I was in Chicago. It was a Secret Society mask of the Mende people of Africa. I ordered a photographic print of the mask but it did not arrive in time for our discussion.

*Anything to take its place?*

Yes. I've become greatly concerned about our lost capacity to appreciate curves!

*Boy, are you . . .*

Hold it, the corny remarks are in my department.

I have observed design after design in which the designer has become a slave of the straight edge, the base line, the compass, and the radius. The sensitivity to freehand curves-generated, reciprocating, compounded or reversed curves-is missing.

Not long ago\_ my industrial-design students and I visited one of the largest industrial-design studios in our country. As we were passing a framed rendering of a medium-sized cruiser, one of my students, knowing of my obsession for boats, intending to please me with his remark (or maybe apple-polishing)\_ said. "That must be your boat. Professor Lahti." I replied. "I wouldn't be caught in the same picture with a boat like that." The shear line, that is the deck line, was a dead, dull, clumsy, straight line, straight out of a straight edge.

I detect an emphasis on "straight."

Although the rendering showed the boat in proper trim, I could imagine what it would look like with the beer drinkers forward and the fuel tanks empty.

I don't get it.

An oceangoing ship or a large yacht is sufficiently heavy alone that its trim line (the amount that the bow or stem sinks into the water) is not affected by the movement of people on board. However, a small boat is seldom in proper trim except in the advertisements. When I completed the hull of

the cruiser I designed for our family and had turned it right side up and had drawn a straight shear line on the side in preparation for cutting, I held back cutting because somehow or other it just didn't look right. Finally I wiped off the line I had drawn and replaced it with a long gradually sweeping curve. Suddenly the form became a graceful hull and the feeling of a boat rather than a convertible was created.

That must have been the insight of an artistic, sensitive genius.

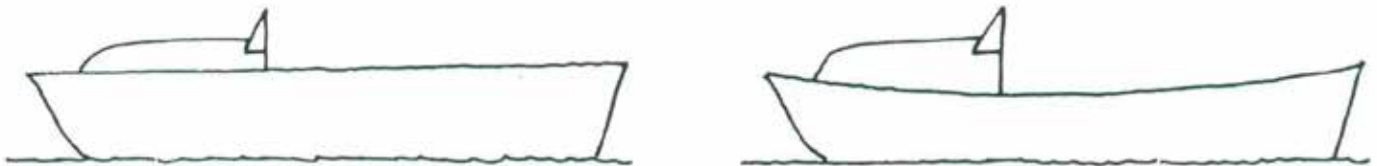
Thank you. I think I might have left the straight shear had I not also been struggling to get the free-board low enough at mid-ship so a person could reach the water when standing in the boat and high enough at the stern to be able to enclose the outboard motor under a hatch. The curve resolved my need for a high bow, a fairly high stern, and a low free-board at mid-ship.

I must admit I do like the way your boat looks when it is in the water and when it is running.

I do too. But, do you know, it was not until several years later that I understood what the real value of the curve was visually? My brother had four of his clients in my boat and I was running abreast of him at some distance in his small boat. All four men were standing forward of mid-ship and I knew the boat was bow heavy. However, the poor trim was not noticeable. Suddenly it dawned on me that the reason the poor trim went unnoticed, even in face of the problem, was that while it is easy to detect when two straight lines are not parallel, it is very difficult to relate a curve to a straight line. The solution to the visual-trim problem was the avoidance of parallelism.

How could this factor be applied to other projects?

Well, if you were making a table and the legs were parallel, the smallest error of alignment would show: splay the legs and you could get away with murder! \*



# Speaking of Design

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

**40-1967-03**

Did the photograph of the West African mask we had expected for our previous session finally arrive?

It was delivered just after you left.

However, I was very surprised when I opened the mailing envelope to see that, although it was a photo of the Mende people's "secret society mask," it was not the view I had anticipated. You know, it had never occurred to me that any view, other than the one from which I made a hasty sketch, would be used. I keep preaching about stereotypes and then get caught in one of my own.

*Let's use your sketch as well.*

*I remember your excitement on your return from Chicago when you were telling me about seeing the mask at the Field Museum. Has the excitement worn off?*

Nope. I can still apply my severest criteria, "I wish I had made it." Although the mask is less than two feet high, it has a monumental quality. This quality is achieved through the extreme simplicity of its basic form to which every other form, line, and texture have been subordinated. To me this piece is a work of art!

*I haven't heard you make such an outright concession to any work for a long time.*

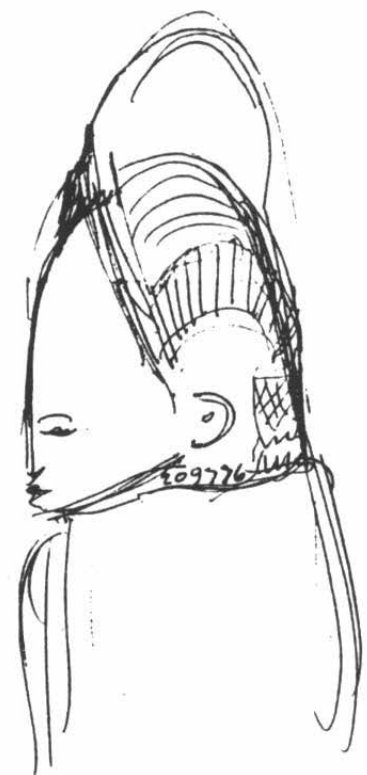
[Reprinted by permission of Field Museum of Natural History, Chicago Il: Drawing by Aarre K. Lahti.]

When I compare this work to Brancusi's "Bird in Space," which is generally considered to be one of the cornerstones of modern sculpture, I find the mask far superior. Of course, this should not come as a surprise since the very foundation of modern sculpture rests upon African Negro sculpture. To me, this Bundu women's society mask used at the girls' initiation rite, is an excellent example of problem solving in its total functionality. I am convinced the mask was not carved as a mere self-conscious self-expression. It was created to fulfill a need. Art seems much like a perverse mistress: if you go chasing after her she could care less, but if you mind your own business and solve problems creatively she starts hanging around and swing-

ing her hips. Of course, the mask maker had one important factor helping him, which we do not have. He had a tradition on which to stand and build. He did not need to self-consciously strive to create something entirely different; he could refine and improve on what had already been accomplished. He didn't need to shock people-only evil spirits.

*I am surprised at you; you sound like a gold-plated ultra-conservative!*  
I couldn't be that old! You know I am not against revolt. I've admitted I was a revolting youth, in more ways than one-and maybe I still have a bit of youth left in me. The point is that I do not believe in difference for difference's sake any more than I do in art for art's sake. If one cannot discover an original approach, he must refine that which does work. Revolt is unnecessary when a society is sufficiently flexible to absorb the insights of its people and fulfill the anticipations it has created. However, when the lid of ultra-conservatism is kept tightly bolted, the pressures result in an explosion. In fact, under such conditions a revolt becomes the only channel by which we can remain where we are and not keep slipping backwards. If a society had such flexibility it could evolve its concepts-including concepts in art and design-and not need to go through the wastefulness of revolt.

*So, all right now I don't know what you are, But getting back to our mask functioning on all levels, just what do you mean?*  
Its age is proof of its functioning structurally and mechanically while retaining its form and fulfilling its purpose in ceremonies. It has fulfilled its physiological function by its portability and accommodation of the wearer's head. Although African sculpture uses recognizable elements of





animal and human figures naturalness is not its objective-distortion is deliberately used.

The eye slots were lowered to meet the eye level of the wearer without need for extraneous peep-holes. Finally the mask fulfilled its most important function: fulfillment of the cultural and psychological needs of its people. It's majesty and formal excellence were in keeping with the solemnity and dignity of the religious and social activity. But, while fulfilling this purpose, it did not need to negate the people nor their symbols, as does so much of today's art. It incorporated recognizable color and features of the Negroid peoples and, through details such as the hairdress, enabled the people to identify themselves with the spirit of the mask. While these details were fulfilling a communicative purpose, the texture and patterns of the hairdo were accenting the simplicity of the form and creating a liveliness of surface. Psychologically it helped the people to feel they were doing that which had to be done for their welfare and future. And who knows how many demons it really helped to coerce with its monumentality, and how many desirable spirits it enticed to stay with its sensitivity to detail. \*

# Speaking of Design

By Aarre K. Lahti  
Professor of Design, University of Michigan, Ann Arbor  
**40-1967-04**

*I hear you're attending evening classes. I presume this has some bearing on our "Tooling Up Education for Tomorrow" topic. What's the subject?*

I enrolled in a beginning seamanship

*What? I should think that with all your experiences with boats it would be a waste of time.*

Well, when you design and build boats and study drawings and plans of had little need for and plans of boats while operating strictly as a lone individual there is no need to call the parts anything. And, when you do, the terminology in oral form is sufficiently universal to be understood at a Sunday sermon. The point is that I terminology. Now that I am becoming more academic, i.e. talking more and doing less, I thought I had better enroll in a class and be forced into acquiring the terminology

*Any results?*

Immediately! My first returned and corrected homework showed that I had misspelled sheer. With apprehension I rushed home to check my February article and found I had made the same mistake in it, and it had been published!

*Such scholarship!*

I know, I feel embarrassed. But, it wasn't as bad as having our departmental chairman change my order for vices to vises.

Having had a command of a visual and graphic language since my junior high-school days resulted in my being left as deaf to oral and verbal communication as most people are blind to their visual environment and deficient in visual and graphic communication.

Words, although extremely convenient as a rule, are very general and non-

committal in their meaning. Illustrations, drawings, and photographs are specific. In fact, photographs tend to be so specific that communication suffers.

Since most of our first learning was visual and provided a vast store of visual associations, it is almost impossible to express generalities through vision. For example, if I were to draw a boat it would immediately communicate a specific type.

*Now you are contradicting yourself! You just said we acquire most of our learning visually but just a moment ago you said people were visually blind. We may be blind but we are not deaf!*

What I meant was that, although we see, an untrained individual is quite incapable of being analytical about the visual stimuli. For example, let's consider a situation which just might occur if I were painting a portrait and, as a result of becoming too involved with the painting, I had become uncertain of the likeness. I could at such a time pull almost anyone off the street and he would be able to tell me whether there was a likeness. If he found the likeness missing and I asked him what I should do to achieve a likeness he would be unable to help. The public can react - and with great sensitivity - but the analysis of the reaction is a professional task.

*What has all this to do with the future of education?*

It has much to do with visual communication as an educational deficiency. I frequently try to imagine just how fuzzy and muddy our world must seem to people who have not learned to see. It must be like a misty bog. I also keep wondering how much more orderly and advanced our society might be by now if as much time and energy had been expended on visual learning and communication as has been expended and is being expended on verbal and oral communication. However, there is a great awakening-taking place, though we're still groggy from a long sleep, concerning the importance and the essentiality of the visual language. An example of this awakening is the vast amount of time, energy, and money being expended on developing computers with graphic inputs and outputs. Only through visual means can we readily grasp relationships. Already computers can provide a perspective drawing and rotate it to an angle desired by the viewer. Just consider the speed with which relationships are communicated by a set of overlapping hull cross-sections when compared to a table of cross-indexed figures. Just think how easily we can see which is the longest if  $7/8$ ,  $15/16$ ,  $.625$ ,  $13/32$ , etc. are presented as bars instead of as confusing, though accurate, numerical notations.

We are already at a stage in the development of visual communications where it is unnecessary to travel to a distant city to convene a conference. The prime reason for holding such meetings was for visual immediacy, which letters and telephones could not provide. Today with the electronic devices already at hand one can conduct a nationwide business from his own hometown without having to be buried in a metropolitan ghetto. With our regular and closed-circuit TV, video telephones, and the instantaneous replay, facsimi-

le, and reproducing devices, personal contacts are not essential for signing contracts, closing deals, exchanging and keeping records.

Education in the future will be more and more involved with the process of problem solving and less and less with the retention of data. Most teaching concerned with skills will be delegated to self-instruction and a greater amount of time will be made available for comprehending concepts and for creative activity. The computer as an information retriever will make our present libraries seem as systematic as war surplus stores. The computer will retrieve information, provide facsimiles, and be the device for quickly visualizing relationships. We will, as a result of these advances, be able to devote a greater portion of our time to the understanding of mankind.

# Speaking of Design

By Aarre K. Lahti

Professor of Design, University of Michigan, Ann Arbor

41-1976-05/05.2, May 1967

*You did it again!*

*What's-our topic for today?*

We hear so much about systems, programming, computers, that problem solving without their help. Societies, I thought we the primitive past of days, and hardware seems impossible to calm our anxiety retreat to my grandfather's days.

*Don't tell me it's boats again!*

You know, you have an uncanny and an almost nasty way of outguessing my intentions.

*All right, go ahead. You're the cook!*

What I have in mind involves a bit of cooking as well.

The other day I recalled seeing a very a problem ingenious solution to in one of our books. The title of the book, loosely translated, "*The Work of Our Fathers.*"\* Just as our pioneers had a need for a canoe, the Finns in the backwoods also needed a maneuverable, light-weight, portageable boat. However, their solution was a lightweight dugout. A limitation for a dugout has always been the diameter of the log. Now, the Finns abhorrence of waste would not permit them to reduce a huge, valuable pine log to a heap of chips. In fact, their concern for waste is such that they even pronounce all the letters they use in their spelling of words. Even the "h" in my name is pronounced and not wasted.

*... meanwhile, back in the woods ...*

Well, instead they used a 12' ' - or 14"- diameter poplar log.

*You mean aspen.*

Heck, I didn't know there was such a word until I went to a conference at Aspen, Colorado. Now a beam of only 12 or 14 inches would certainly leave our beams overhanging the edges. But instead of letting the diameter of the log determine the beam, they used all but a few inches of the circumference for their beam. This was the ingenuity that intrigued me.

After selecting a tall and straight white aspen, as free as possible of knots for about 14- feet, they felled the tree and sawed off the desired

section. The log was peeled (fig. 1) and studied for its best orientation for a hull. The hewing started immediately with the carving of the bow and stern (fig. 2T). Next came the hewing of the hourglass-shaped opening, starting from the narrow slot at the center and widening out at the ends to meet the already carved bow and stern (fig. 3). Through this opening the interior was gouged out with a special adze. The uniformity of thickness had to be judged by feel. This was done by holding the finger tips of one hand inside the shell and tapping the outside of the same spot with the heel of the adze. The sound and transmitted vibrations would vary with the thickness. Finally shell's exterior was planed to the desired degree of smoothness.

Next came the very delicate task of opening the shell. This was done by swabbing the inside with pine tar and, while the outside was constantly kept moist with water to prevent its catching on fire, the hull was set over a small, but long and narrow fire. The heating was continued until the pine tar started to bubble and the shell became pliable.

The opening operation was started by pulling the lips apart little by little. As the opening widened, sticks were jammed inside to hold the gain. This operation was repeated, moving back and forth along the hull, with longer and longer sticks replacing the shorter ones.

*What kept the sides from closing again?*

Frames shaped from naturally curved sections of tree trunks and branches were finally fitted and attached inside the shell (fig. 4).

*You're really intrigued by this process, aren't you?*

I certainly am. Instead of settling for a narrow, unstable hull or wasting a huge valuable piece of timber, by combining imagination, resourcefulness, and an understanding of the nature, potentials, and limitations of a material, they solved their problem well.

*I guess so. But it took a lot of sweat.*

Well those were the days when materials were costly and human energy was cheap. Besides, if you keep constantly sweating, you don't have to pay a dollar and a half for a deodorant. It's only the stale sweat that smells.

Fig. 1



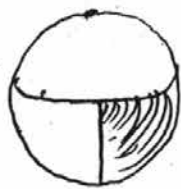
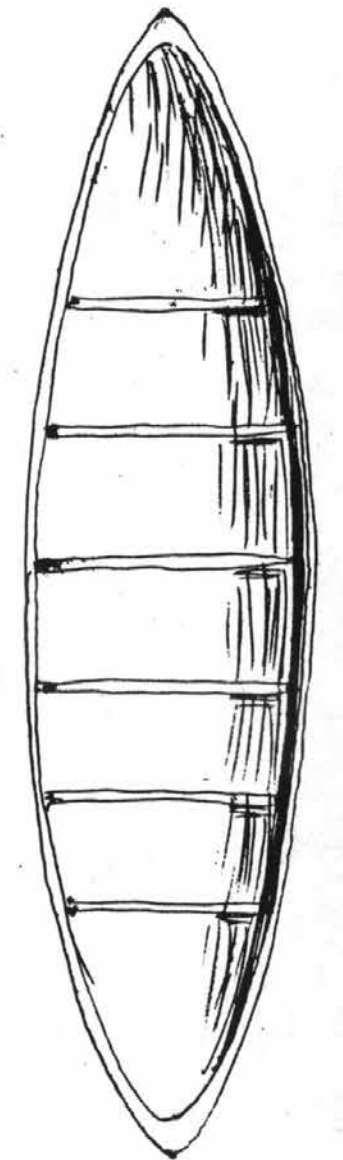
Fig. 2



Fig. 3



Fig. 4



\*Kustaa Vilkuna and Eino Makinen, *Isien Työ*, Otava, Helsinki, Finland, 1953.

"You don't have to agree with me, but..."

## Speaking of Design

By **Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

**September 1967, 42-1967-09**

*Do I dare come in?*

You might as well. I am really not angry with anyone in particular—just peeved about a situation.

*What did you do, get a parking ticket?*

No, it's what I just heard about the future "Indianapolis 500's."

*You mean about they're barring turbine powered cars from future races?*

That's the situation. This is the kind of thing that kills creativity. For years, when I've been talking about problem solving, I have maintained that competition is a hindrance to creativity and that it provides little more than expediencies and gimmicks.

*What are you, a "hippie"?*

Even with a flower in my hair they wouldn't want me—or would they?

What we need is cooperation and not competition. No individual can solve any but the most primitive problems without the help and cooperation of others. Yet, thus far, we've been trained primarily to compete.

*But competition is necessary!*

Maybe I should qualify what I may mean when I talk about competition. For example, if by competition you should mean wanting to break a world's record or doing that which has never been done before, then I am all for that kind of competition. If, however, one has to resort to deception, feints, and so on, to best someone else, than that is the kind of competition is primitive, barbaric, and wasteful.

*... and the "Indianapolis"?*

Well, I've always heard the "Indianapolis 500" drummed as an outstanding sporting event which provides an unparalleled opportunity for experimentation with new ideas and a place for testing new equipment. Apparently all they want to do is just race and compete and contribute little to the progress of transportation, to say nothing of lessening pollution. I guess it turned out to be only a business venture in which the possible witnessing



of death is the primitive "come-on." Apparently they just want to keep on currying the dying dog of reciprocation.

Look ...

... and as for sportsmanship, I am beginning to question the whole package. Could it be that it is after all only an ego-feeding activity demanding a victim in some form or other? If it is such a character builder, how come so many restrictions, rules, umpires, and judges are needed to keep gentlemen from cheating?

...and how come the deer hunters shot holes in my mortar mixing wheelbarrow?

... Look, I just remembered my wife needs the car to get to her bingo game. Maybe we can get to talking about design the next time?

*"you don't have to agree with me, but..."*

## Speaking of Design

**By Aarre K. Lahti**

Professor of Design, University of Michigan, Ann Arbor

May 1972, 100-1972-05-050



*Hey! I see we have a new photo of you!*

Right! I needed a picture for our industrial designers' journal. Maybe this new picture will provide a more compatible "image" than the old (younger) picture you and I have been seeing here. It is more in keeping with the grade school kid called "Haircut" and the industrial design instructor who was escorted to the barber shop for genteelizing during the crew-cut era. At last I am almost in step with society, or should I let my arrogance show and say society is almost in step with me.

*You should be feeling quite smug and self-satisfied.  
I should, but I have forebodings that I may be slipping.*

Well, let 's hear what the discussion will be about today.

Six years ago you and I discussed making cartridged 8-mm sound films for individual instruction ("Self-instruction: The Need and the Tools," SCHOOL SHOP, Sept. 1966, pp. 37-39). During the intervening years I've been using the cartridged sound films I made. I have not had to if give a lecture or make a demonstration of the skills these films covered since.

Not really. About four years ago I dropped film-making because of the chaos in standards for films, cameras, and equipment which came about when Super-8 film was introduced. Our camera, lenses, editor, projector (for editing and dubbing-in sound), and table-top projector (the key piece of equipment) were all for standard 8-mm film.

Our problem grew out of a need for a faster color film which would allow us to film interiors without supplementary lighting on the field trips we were still making. An adequate color film was available in Super-8 but not in standard 8-mm format. Regardless of the threatening letters I wrote to

American manufacturers, the faster film was not made available to those of us with out-dated 8-mm equipment. Rather than replacing all of my 8-mm But why this persistent concern for equipment with Super-8 equipment, I decided to stop making films. If I could wait from 1953 to 1965 for a tabletop sound-film projector to be developed, I felt I could wait a few more years for cartridge color video tape to be developed.

Such equipment is now available, and it is portable and priced within relative reason. Fortunately for us, the Japanese manufacturers have taken the initiative in establishing a standard for cassette video-tape width, an initiative our own industries were unable to establish. 4

The video-tape format allows the instructor much more flexibility than films gave him. He can edit, dub-in sound, revise, copy, erase, and re-use. He also has the option of using stop-action and re-play. And, perhaps more importantly, he can do this without being hampered by delays of processing, shipping, and magazine loading by specialists.

Well, if you were able to make cartridge films it cannot be too involved. No, preparing the script, arranging the sequences, and doing the shooting weren't allot, but beyond that the legwork became fantastic. The steps required after shooting were: o Packaging and shipping to Rochester, N.Y. for processing. 0 Editing in Ann Arbor. C Packaging and shipping to Rochester or Kansas City for copying and magnetic sound striping and dubbing-in the sound in Ann Arbor. Packaging and shipping to Long Island, N.Y. for deburring, lubricating, and magazine loading of the final copy film.

Eventually after all the shipping, delays, postages, insurance, and losses the films were ready for student use. When the table-top projector needed repairs it had to be taken into Detroit. Video tape eliminates all these steps and the maintenance of equipment can be done locally. seU3 instruction?

First, it works and I've proved it! After years of experience with teaching I can say with conviction that the major goal of education must be self-instruction. More and more of our students are demanding real problems. A greater and greater portion of their activity will be with individual projects rather than class work. No single instructor can teach all the skills the student may need to handle a project.

No instructor will have enough time available to cope with each individual student, as need. No project involving problem-solving, unless structured to stay with unrealistic limitations, can stay within the confines of a single material.

Finally, the only time that learning is really taking place, as it should, is when the motivation is high and the information is desperately needed. These peaks do not wait for the availability of an instructor.

This is when the video-tape cassette becomes an untiring, skilled teaching assistant.

# COLOR

## speaking of color



Professor Aarre K. Lahti, University of Michigan  
110-1972-08-055, September 1972

*I have good news for you!*

Good news coming from a pessimist?

Remember we ended our last discussion with the thought that the editor might let us have a page of SCHOOL SHOP for a color chart? Well, it's ours!

*I guess editors are not all bad.*

Our last discussion ended, with an experiment demonstrating the impact of hue fatigue and the shift of the resultant color distortion towards the complement of the hue.

*I remember what happened but I still don't get the "hue, " "complement" business.*

Well, now that we have the color chart, let's start all over again. Incidentally, the color chips used for our chart are but a few taken from the nine hundred chips in the "Color Harmony Manual" published by the Container Corporation of America. These manuals were devised as a means of communicating about color verbally.

*But how?*

After publication, hundreds of libraries, schools, companies, and offices acquired the manuals. Accompanying each manual is an index of owners and their names and addresses. Since each color chip has a letter/number identification, as well as its popularly used name or names, those who possess the manuals can refer to colors by their identification over the telephone or in writing. Each chip is removable (a must for comparison) with one side of each chip glossy, and the other matte.

### *Why removable?*

You cannot compare colors unless you can bring them together. Any separation, border, or gap; whether white, black, or gray, will cause a distortion. For example, if you are painting a room, and you are running low on the particular color you're using, stop at the nearest corner. Even if your next batch of paint is a poor match, no one will be able to detect the difference if the plane it is on suddenly and abruptly changes direction. But, trying to match the color in the middle of the wall is almost an impossibility.

But, let's get on with our discussion, which will be primarily concerned with color terminology. The basic terms we will be involved with will be HUE, INTENSITY, VALUE, TINT, SHADE, COMPLETARY, and NEUTRALIZATION. Someday we may need to refer to a specific color only by its wave length, but today even the terms I just mentioned are far from common usage.

Our color chart is arranged with the circle of chips, the "color wheel," in the center showing the twelve basic HUES with a neutral gray in the center. Starting at the extreme right of the rim, our first HUE is yellow (a primary) just below is yellow orange, then orange, next red orange, red (another primary), red violet, violet, blue violet, blue (the third primary), blue green, green, and finally, yellow green.

### *What's the "primary" stuff?*

Theoretically, you can mix any of the other HUES by using the primaries, but you cannot create a primary by using the others.

Each of the chips, in the rim of our color wheel, is different in HUE, but they are all alike in INTENSITY that is, each HUE is at full INTENSITY—each is as strong, or as brilliant as the pigments chemically permit. Water colors, oil paints, "day-glow," fluorescents, etc. vary with brilliance as groups due to their chemical and permanence composition, but INTENSITY is used to describe a color's strength within the group.

Horizontally across the top of our chart is a row of chips starting on the left with a very deep SHADE of blue green, and gradually, while passing through the blue green at full INTENSITY terminating at the right with a very light TINT of the same blue green HUE. Note that the HUE is still blue green for every chip but the INTENSITY varies. SHADES represent the subtraction of light from the HUE just as though it were seen under a shadow while the TINT is the addition of light. A TINT is like adding water to transparent watercolor so the white paper begins to show through. This brings us to our next term, VALUE. A VALUE scale runs horizontally along the bottom of our chart.

The scale starts with black on the left, and ends with white. VALUE pertains only to the amount of light a color reflects back to the eye. A white at night can be lower in VALUE, that is darker, than a black in daylight. Yet the white is always a white in HUE. Going back to our color wheel, we can see that although each chip differs in HUE and is similar in INTENSITY, the yellow is the highest in VALUE, and the violet lowest. But we also note (assuming a perfect color wheel—an impossibility) that yellow orange and yellow green are the same VALUE. The pairs orange-green, red orange-blue

green, and red violet-blue violet contain two HUES of the same VALUE. But note our highest value HUE at full INTENSITY, the yellow, is still darker than white, while the violet' is lighter than black.

*Now what about that "complement" business from last time?*

I think we have the groundwork for it now. Any HUE directly opposite another

HUE on the color wheel is its COMPLEMENTARY color. If two COMPLEMENTARY HUES are mixed, the result can be a NEUTRAL gray depending on the quantity of each pigment used. This combining of COMPLEMENTARY HUES is called NEUTRALIZATION.

Combining yellow and violet can produce a gray as can combining orange and blue, and so on.

*But, what good is this terminology?*

It helps us to identify and separate the factors which make for a given color and helps us in the color mixing and matching.

For example, a rust color is nothing more than a full INTENSITY HUE of orange lowered in value to a SHADE AND ITS INTENSITY reduced by NEUTRALIZATION with its COMPLEMENTARY HUE. A pink is a TINT of red violet and an olive green is a SHADE of yellow green.

*WOW!*

In my opinion, NEUTRALIZATION is one of the most important factors in color matching. For example, if you are mixing a color to match a color swatch, and you see that your mix has an undesired violet cast, don't try to change it by adding all the other colors than violet, or you will have a gallon (or five gallons) of a color you do not like. To resolve this problem, you should use the COMPLEMENTARY HUE to NEUTRALIZE the violet cast. Simply add a couple of drops of yellow, and behold, the violet cast is gone!

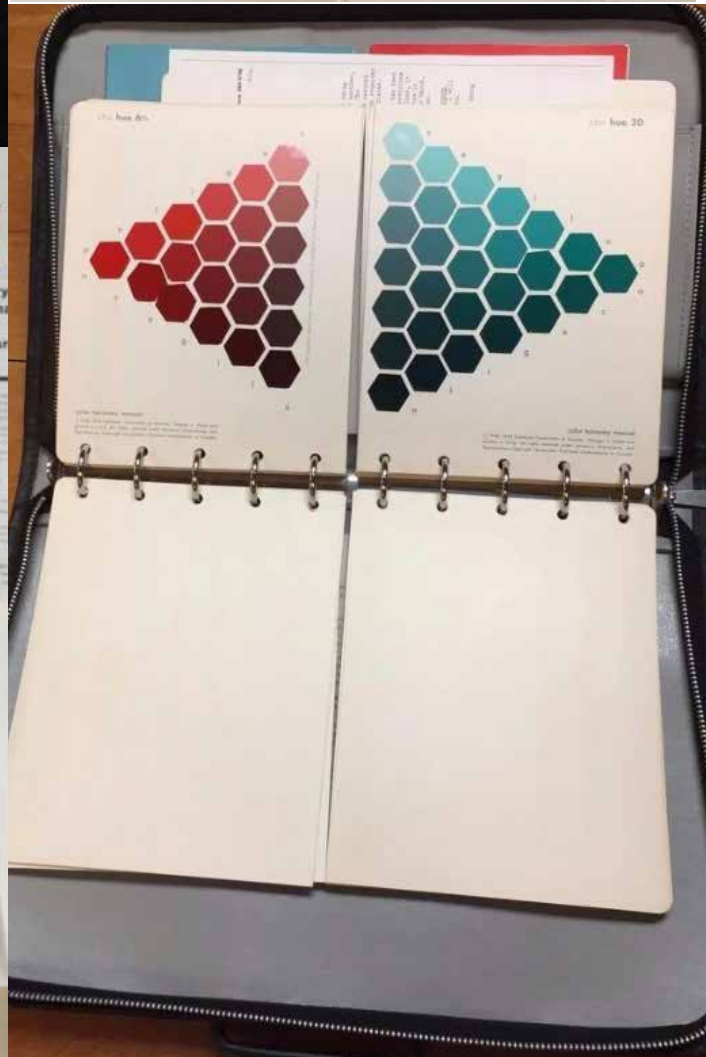
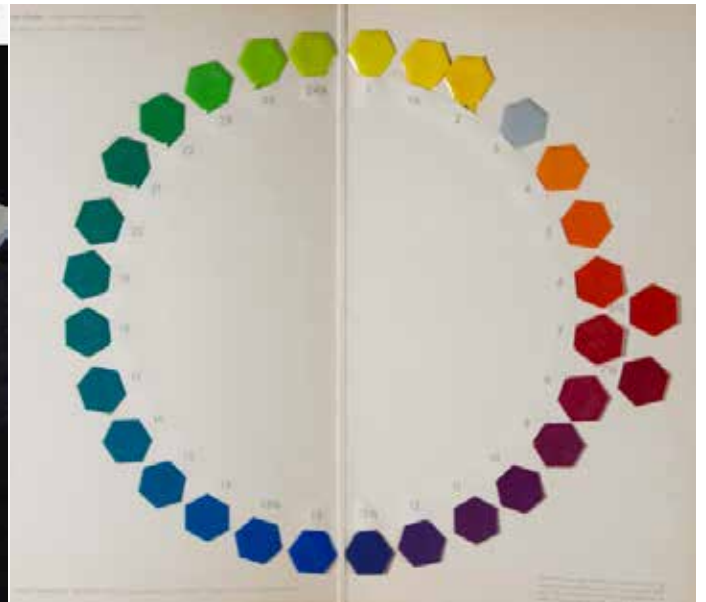
*But, wouldn't that gray or lighten the color?*

You've got it! Yes it would, but the amount of graying and lightening would be imperceptible, while the HUE change is potent.

I'll this the next time my wife wants a special color.

*Do that, and if your wife is too fussy about the match, re-paint her color swatch...*

Q color chart old color harmony manual container corpora



# Speaking of Design

Professor Aarre K. Lahti: University of Michigan  
April, 1975: 111-1975-04-052



*We should teach those Arabs a lesson and get their oil!*

That's precisely what I'm afraid of! Our cause and effect policies could bring about a worldwide catastrophe. What really gnaws at my viscera is the failure of our military!

*Failure?*

Yes, that our well-financed and nurtured military, the supposed realists dealing in hard, cold, brutal facts, were not conducting or sponsoring research and development into basic energy sources. They failed in fulfilling their charge while we, the taxpayers and consumers who support them, were entrusting our future to them. How could they possibly pretend to safeguard our welfare in bypassing the energy issue? How could they expect to proceed logically and effectively while vulnerable to threats of energy blackmail?

*Oh, for heaven 's sake, they have stockpiled material and they can get more when they need it!*

That's cause and effect "brinkmanship," not designing. When the stockpiles begin to dwindle there will be a resort to irrationality, to force, and to war. Wars are the most shortsighted, destructive resource depleting cataclysms. Wars, while accomplishing nothing but demonstrating "might is right," consume resources at an explosively accelerating rate. The world energy crisis could lead to conflicts which would consume the very human energies, intellectual and physical, which are so desperately needed for constructive research and development. Can you visualize where we might be had the decisiveness, energies, and resources expended during World War II been applied towards research into new energy sources?

*Well, we didn't, so what?*

The carelessness and thoughtlessness with which our energy has been managed and exploited may be the swan song of laissez faire and private enterprise. 114



*What's wrong with private enterprise?*

Nothing, when it's private! But, when peoples and nations are used as pawns in global games of piracy-it is no longer private! This energy crisis may become the sepulcher for cause and effect policies and a corner stone for designing.

*Talk's cheap! But what can anyone do about the world's problems?*

We, as the most affluent nation, should set an example: first, by discarding cause and effect behavior, and second, by adopting designing as an operational policy.

*Just what do you mean by designing?*

I mean problem solving which squarely faces reality and acts predicatively. We must do what should be done, rather than what is expedient and convenient. We are behaving like animals at a water hole whose water supply is dwindling-we squabble while we adapt to consuming less water, moving elsewhere, or dying. We are not building the dams or planting the ground cover to assure a water supply in the future. We are not designing. Every morning when I attend to my teeth I am reminded of professional shortsightedness. A decade ago I had to expend thousands of dollars to restore the damage of cause and effect patchwork dentistry. I had learned almost too late that with adequate periodontal care no individual need lose his teeth during a lifetime.

*Were you implying, before you got your teeth into thl's discussion, that we should espouse planned economy?*

Yes. Not just the economy, but also the whole complex. I would rather use the word design than the word planning. I have seen too many shelved planning proposals. Planning is too passive and schematic. Designing incorporates planning, resources, technology and action. The ultimate result of` not designing is chaos and war. To many, the word planning implies regimentation and the loss of individuality. But wars are the ultimate in regimentation and a total denial of individual freedom. We must exchange the false concept of individualism for the development of our species; these promoters have squandered their energies and those of mankind in competing for domination of peoples in disputes of jurisdictional dogma. Our current war declared or undeclared, result from artificially concocted schisms. Wars have never solved problems; they are lesions on a body deprived of designing. When people are mislead, bribed, cajoled, and eventually trapped into box canyons misinformation, sanity and reason collapse, and violence becomes the norm.

*OK, OK! So what?*

We need world government!

*You 're an idealistic fool!*

I may be that to most people, but working government is as much a certainty as the depletion of our resources. Whether you like it or not, world government will emerge. To those who cannot conceive of world government, let them be reminds you of the progress from romanticized, is civilization of a few feudal lords squabbling amongst themselves at the expense of the common man.

*Why blow your top, if you're so convinced about the inevitability of world government and it's becoming the resolving of world problems. Cool it!*

Because I cannot answer the when, the meantime, the increasing pressure induced by our backwardness may destruction our gains. We may have to start from scratch and grope through barbarism.

*What could world government do about energy?*

It could establish that the earth and its resources are the property of all people and nations. Rather than exploitation, the measure for civilization would become the intelligence and creativity with which the world resources are used for the welfare people-all the people.

*You're suggesting the impossible! The problem is too vast and complex even for world government.*

That's what we said about space travel. It became a reality despite a total lack of cooperation between the two nation involved. Problem solving-designing is something to be learned. It is a process, which can only be learned through involvement, participation, and application.

*But what can teachers do when even they don't know the interdependence of all mankind.*

We-the people-must take the initiative in designing our future, instead of fulfilling their responsibility for ethical guidance.

# Speaking of Design

by Professor Aarre K. Lahti  
University of Michigan  
December 1972/121\_1972\_12\_069



*You promised to tell me, during our last session, about the trials and tribulations of your industrial design students while they were designing and constructing the body pattern for the "Urban Vehicle Design Competition."*

I did and I managed to get some photos, which show the pattern trimmed as a mock-up at the 1971 Society of Automotive Engineers' Congress (below), and the completed prototype with its fiber glass body (see cover).

*I was seriously beginning to wonder there was any such car beyond your verbiage.*

The trials and tribulation, which you mention, stem from the shortage of funds, space, and equipment. One of our first problems was the clay for the pattern. In industry, the pattern for the body would have been made of hard industrial modeling clay. However, for us about three hundred pounds of this clay at nearly a dollar a pound was out of the question. Another immediate problem was workspace. With our students having many other courses besides their "major," the work area had to be nearby and available at all hours. If we were to meet the deadlines we could not afford the luxury of transportation or hunting for parking spaces. Therefore, we decided that as impossible as it may have seemed, we should use our own industrial design ghetto.

*Ghetto?*

Yes. Our quarters are not even in our own building, but in the lowest basement depths of the building next door. It was a space everyone would have wanted, but no one accepted it since no funds were available for cleaning, painting, plumbing, lighting and, of course, air conditioning. We needed quarters for ourselves so badly that we took it. The industrial design students hauled, shoveled, dusted, mopped, and painted the room and floor. We managed to find enough discarded fluorescent lighting fixtures to provide for minimal illumination.

All would have gone well with our lighting installation if one of our students had not accidentally shorted a wire and blown a fuse. No one could or would tell us where the circuit breakers were for our area, nor did we have keys to classified areas. An electrician had to be called. When he saw our installations he angrily slashed our wires. After several days under a couple of glaring "clear" bulbs another electrician appeared. As far as we could tell, he duplicated the students' wiring. By scrounging we managed to find discarded desks, chairs in unmatched brindled oak, and even a rocking chair for the aging faculty member. To this day we are our own janitors, sociologists, welfare agents, and ecologists.

*If you couldn't afford the clay, what did you use for the pattern?*

We resorted to a method I had previously used for building free-form fireplaces, which my sons had used for building the pattern for their sports car body.

We made an armature of angle iron, quarter inch rods, and diamond mesh metal lath. The slightly undersized armature allowed for about an inch of plaster. The angle iron base of this armature was set on a two-part wooden frame made of two by sixes. The whole assembly was mounted on four large rubber-tired castors.

But the castors themselves must have cost a fortune! I had picked them up at a junkyard just a few months before for one of my own projects. The rods were bent to conform to each of the cross-sectional stations of the body. The ends were welded to the angle irons at the rocker panel and to the angle irons at the longitudinal parting line.

*I can understand a parting line for the molds you would need for the fiberglass lay-up but why one on your pattern?*

Ah ha! I have built many boats!

*I get it, it had to fit through the door.*

Right! We had to have a split pattern. The parting line was made of two matching angle irons shaped to the longitudinal centerline and bolted together. After all the rods were welded in place the form was covered with metal lath was wired into place, it was formed by stretching and shrinking to provide the necessary compound curves. The lath and rods were next cut at the parting line and the two halves were separated. We found much to our joy that the two halves held their shape and that they indexed perfectly when reassembled. Next came the plastering. We mixed the plaster with vermiculite to make it lighter and more easily cut scraped planed and sanded.

*Sounds messy!*

And it certainly was: by the end of each day we were walking gradations from the colors we put on in the morning to white bottoms. For the first, time everyone could find the industrial design quarters by following the "white chalk road." Even the solid deep-blue carpet of the dean's office was imprinted with footprints. We were no longer the forgotten ones. Unfortunately, our abundance of visitors included too many from the administration.

*Obviously you survived!*

So did the students—even the two young ladies who went through every stage of plaster glass and resin. The industrial design students involved in the project were: Irene Neumann, Deborah Kelman, Tom Newhouse, Mark Bonnette, Tim Shear, William Anderson, and Mitch Walker.

After the plasterwork was completed the pattern was again parted checked and reassembled. Finally it was primed puttied and lacquered so it could be used as a mock-up. The finished mock-up was once again taken apart and trucked to the S.A.E. show. There it was trimmed with the final necessary accessories to make it as realistic as possible. Too many visitors did think it was the operating prototype. The industrial design students had also designed and constructed a semi-enclosure system, which served as a background and a display wall for the sketches, working drawings, calculations, and rationale of the engineering and industrial design student team. After the Detroit showing where it was very well received, the exhibit was set up again in the lobby of our own college. At some time during the exhibit, someone had held a lighter near the front wheel opening and managed to scorch the lacquer. This however was not serious since the mock up had already served its purpose and it next had to be stripped of all trimmings and readied for fiberglass mold making.

*How did the engineering students react to working with design and art students?*

Beautifully! Although at first they were skeptical about working with an unknown breed of undergraduates they and their faculty advisor admitted to being amazed at the range of capabilities our students commanded. They were even more astounded by their attitude that "nothing was impossible."

*The engineering students must also have had their problems.*

We all did At the risk of turning our discussions into a serialized soap opera. I would like to continue with this topic. Some of the happenings presented insights into: structured vs. unstructured, and linear vs. cyclic approaches to problem solving. (Cove photo and photo on p.46 courtesy of The University of Michigan Press Service)

## The Urban Vehicle Design Competition

While University of Michigan students were experiencing the tribulations discussed at left, 62 other student teams un the United States and Canada were also trying to design cars which could help ease the urban transportation crisis. The resulting prototypes were entered in the Urban Vehicle Design Competition held in August at the General Motors Proving Grounds at Milford Michigan. The contest was sponsored by SCORE (Student Competitions on Relevant Engineering) whose board of directors consists of 10 engineering-school deans.

Winner of the top award for overall excellence was a minicar entered by a team of 150 students from the University of British Columbia in Vancouver. Their entry got the highest total score when rated on emissions, safety, consumer cost, space utilization drivability, fuel efficiency, bumper effectiveness, and performance. If the contest results are a fair indicator, air pollution will continue to be one of the most stubborn of urban transportation problems. Only one entry, a hydrogen powered Volkswagen built by a team from Brigham Young University met federal emissions standards. The BYU team won the prize for internal combustion engines run on gaseous fuel while other prizes went to the University of Detroit for the best liquid fuel Internal combustion engine to the University of New Hampshire for the best electric hybrid engine and to Cornell University for the highest scoring electric motor.

The University of Michigan's entry did not fare badly in the contest either. Although its electrical and electronic systems failed at the proving grounds, the Michigan "Urban Car One Thousand" won prizes for styling and safety.

One of its safety features is a Physi-tester unit aimed at preventing drunken driving. If the driver fails three consecutive reflex-timing tests,

the car becomes inoperable for more than an hour. In exceptional situations, however the car can be driven even if the test is flunked, but only with all the emergency lights flashing and with a top speed of 20 mph.

Perhaps the key question to be asked about this and the other prototypes is whether such experimentation is relevant to real urban transportation problems. Most of the designs seem to be economically feasible a panel of automotive experts at the contest estimated that most of the entries would cost between \$2200 and \$2800 each to mass produce.



# Speaking of Design

Industrial Design

Professor Aarre K. Lahti

March, 1973/121-1973-03-067

*You're certainly absorbed in your Scientific American.*

I'll say I am! This January's edition with its article "The Hydrogen Economy" is one of those issues I stack in a special place. This article surveys and sums up the potentials of hydrogen as the key to resolving our "energy crisis."

*Is this something new?*

The energy crisis?

*No! I mean the consideration of hydrogen as an energy source.*

The idea is not new The consideration of hydrogen as a non polluting fuel goes back several decades but more recently - in fact just a few months ago an article in *Industrial Research* brought the hydrogen system to my attention.

*I never heard of it.*

The magazine?

Yes.

The *Scientific American* and this magazine are the two which I never fail to examine carefully and thoroughly. Nearly every Issue of *Industrial Research* contains some note some article some observation some technological development which is crucial to problem solving. I suggest that every school take advantage of having this magazine in its library. The students Might not read it but the faculty should.

*Well, what's so significant and new, then about the Scientific American article?*

The author, Derek P. Gregory, covers the whole gamut of pros and cons of the potentials of hydrogen as a non polluting fuel and Its inexhaustibility as a source of energy He covers its manufacture, the generation to the necessary electricity, and the means for hydrogen distribution.

*Okay, so what's so hot about hydrogen?*

Nearly every factor which the author introduces is known to us, but as separate pieces of information. We have not, nor had I, considered the impact of one factor with and upon another. For example, we all know that when hy-



drogen and air are mixed and burned the combustion produces pure water as the burned residue. We also know that hydrogen can be produced from water by electrolysis.

*Now, hold your horses! This sounds like your teenage attempts at designing a perpetual-motion machine.*

I admit I was naïve. I should have been designing a perpetual-static machine.

*You're even worse now!*

Well, everything is in motion and what we need is a good reliable reference point, a "fix," a "sky-hook."

*Okay, okay, I am sorry I said anything.  
But you can't have something for nothing!*

Oh, I know. The article points to that. Immense amounts of electricity will be needed to produce the hydrogen. The article covers the use of nuclear energy and touches upon solar energy. Solar energy, in my opinion is the true raw energy potential for this system. The cycle begins with solar energy to produce the electricity used in the electrolysis of the water into hydrogen and oxygen and then into the distribution of the hydrogen by trunk pipe lines to production centers. Finally the residue of water pure enough to drink will be re-distributed by solar energy over the earth.

*If it weren't for your good coffee, I would stop dropping by. You and your divining rods are off base. We do not have enough sunshine in Michigan for the solar energy needed to make enough hydrogen for a weather balloon.*

But this is exactly the point. The electricity can be generated where there is an overabundance of sunshine and heat. For the first time, the energy of electricity can be economically stored as hydrogen. Up to this time, the storage of electric energy has been nearly impossible and the most efficient and practical way has been to pump water, during off peak periods, into high reservoirs, and later to re use the water during peak power demands. Hydrogen can be stored like natural gas and transmitted over trunk pipelines.

*But all this will cost too much!*

So do illness hospitals and funerals! It is amazing how costly we think truly vital factors are yet nearly everyone of us if we're not too old would give up all or nearly all of our possessions to by pass certain death. If mankind IS to survive he must drop short range economic thinking. We must plan and expend what is necessary to ensure our survival.

*If the views of the author and your convictions materialize I am going into a new business.*

And what might that be?

*I will corner the market and sell rain-coats in Detroit!*

# Speaking of Design

Industrial Design

Professor Aarre K. Lahti

February 1973/121-173-02-066

*I heard that you finished making your first cassette video tape?*

Yes, I did. This tape, "The Use of the College Shop," will be required viewing for any student who uses the college shop facilities for the first time. The tape alerts the student to the availability of materials and supplies in the shop and introduces the student to its hand tools, powered hand tools and power tools.

*How did the tape turn out?*

Surprisingly well, considering it was my first tape.

*Tell us more!*

I really shouldn't, not on the basis of only this one tape.

*For the first time your scholarly restraint is showing!*

I guess the peasant in me is finally wearing thin. Nevertheless, making the tape was so much simpler and easier than film making that I cannot resist passing on my impressions to others.

For a starter, what you see in the video camera's viewfinder is what you are getting and what you will have on the tape. The viewfinder is a miniature monitor. If a monitor is not available, the viewfinder can be used to examine the scene just shot.

No longer need there be days of nail biting while waiting for the verdict from returned processed films.

The videotape camera is simpler to use than a movie camera. Exposure is not critical, since what you see on the monitor is what you get. There is no need for repeated winding of the spring nor the need to adjust scenes to the spring's capacity nor the constant watching of the footage. Nor do you have the repeated reloading, threading, "burning" of the film lead which had been exposed to light, and after a few "takes" the same process repeated in reverse.

The editing of videotape, however, is more demanding in terms of equipment, timing and synchronization. Film editing, as you know, is done visually. The viewing, cutting, splicing, and sequencing is a direct, tangible act. Videotape editing is in actuality the copying of the wanted portions of the "take" in the proper sequence. Tape editing requires four rather clumsy, although portable, pieces of equipment, a playback unit, a copy (editing) unit, and two monitors. The newer editing equipment, not available to me at this time, will be simpler, more flexible, and easier to handle.

The sound, the verbal commentary, and the background music, were dubbed af-

ter the tape was edited to visually communicate the desired message. I had, in the past, avoided background music. But I found it helpful in this tape. It helped in providing continuity and in giving life to spots where the commentary was much shorter than the scene. The music also helped to make the tape "alive" during the showing of titles and actionless scenes.

*Weren't you at a telecommunications conference recently?*

Yes. Paradoxically, this conference could and should have been handled by telecommunications. It would have saved travel, time, and money, and made the conference available to many more interested educators. This was one of two significant points I gathered from the sessions. The second is our need to be more aware and involved with cable television.

The objective of this conference was to encourage a greater use of audio-visual materials and facilities. However, I am afraid that the conference did more to discourage than encourage the making of audiovisual teaching materials. The numerous slides, films, and video tapes shown 'during the conference were of professional quality, a quality beyond the reach of most of the conferees. Anyone could interpolate, from the materials shown, the effort needed in planning and the need for a substantial budget and a rather substantial commitment on the part of the school and the individuals involved. When all this was weighed against the need to communicate information, the question could very well be, "Is it really worth all this?"

The materials shown were too polished, too slick, too carefully and diplomatically stated. They were not believable. For years I have not taken advantage of the films on "styling" available from the automotive industry. When I last used them, students laughed them off the screen.

My advice to those who could use videotapes for instructional purposes is to go right ahead and make them. Do not worry about professional quality. If the information is in the tape, although a bit ratty, it will be sincere and believable. We must remember that our task is to provide information and not to "sell." I admit that if you have nothing special to offer, then the "sell" must take over.

*Your second point had something to do with cable TV.*

Yes, I was made aware of the educational potential of cable television and our need to become better informed about it and the nature of the franchises involved. We should become concerned and involved in the negotiations for franchises to assure that a franchise, given by the community to a cable TV organization, provides enough extra channels to meet future educational and community service needs. This can be arranged. The cable TV organizations will provide studio, equipment and personnel for the making of videotapes to serve educational and community purposes.

*Wow! What a potential!*

And it's there for the taking!

# Speaking of Design

Industrial Design

Professor Aarre K. Lahti

April 1973/121-173-04-068

*You certainly were wallowing in learnedness during our last discussion on the "Hydrogen Economy." Your pedantry was showing.*

It's an occupational hazard. After all, the definition of a professor is, "one who professes." I do try, at times, to live up to my title.

*But. Today you seem humbled.*

I've been struggling to get my beginning students to do more drawing and to get them to draw constructively.

*Draw constructively?*

Most of our students eventually do passably well when drawing from "objects, models, and, still life," but when asked to draw from memory, plans, or dimensioned information, they flounder pathetically.

Drawing is the designer's language. You can't photograph an object that exists only in the imagination.

*But not all of us have the native ability to draw.*

There is no such thing as "native ability"!

*Well. I've never been able to draw. It just isn't natural for every one!*

That's what you think. But Sinichi Suzuki, the originator of the Suzuki method for teaching violin, wouldn't agree with you in the least. And he has proved his point. The idea for his method emerged from an observation mentioned in his book *Nurtured by Love* in which he states:

"Talent is no accident of birth. Any and every Japanese child - all speak Japanese without difficulty. Does that not show startling talent? The children of Osaka speak the Osaka dialect. We are unable to imitate the Tohoku dialect, but the Tohoku children speak it."

Applying the principle of providing an environment for learning-and learning through exposure, as language is learned - the teaching starts when the child is a year old. At this age the child is repeatedly exposed to a violin recording of "Twinkle, Twinkle Little Star" which will eventually be the child's first practice piece. At the age of two the child accompanies its mother to her violin lessons, during which the child plays with a dummy violin. At three a real but small violin is provided by the age of five the child is playing Vivaldi.

*What's this to do with drawing?*

Just this: If any child can learn to speak and read any language, then why not learn to draw? If a child can learn a language, complex collection of symbols with no direct relationship to reality, then why not drawing?

*Okay! So we don 't draw. What's so wrong with not knowing how to draw?"*

Because, amazingly enough, 83 percent of all our learning is through vision.

*Now, where did that information come from?*

Some years ago the Socony-Mobil Oil Company did a survey, which was used in the United States Power Squadron's Teacher Training Manual. This survey indicated that: 83 percent of our learning is through seeing, 11 percent through hearing, and 6 percent through touch, smell, and taste.

It was also noted that we retain only 30 percent of what we see and 20 percent of what we hear, but we retain 50 percent of what we both see and hear.

The reason I am concerned is that since vision is our best sensory channel for learning, why then is there not more effort devoted in training to see and to communicate graphically?

*Drawing doesn't come naturally.*

I think it could be just as natural to draw as to speak.

*Why then can't we draw?*

Because children are not exposed to drawing. The most basic learning is acquired in the early years in the home environment. However, the emphasis in the home is invariably verbal and not visual. Obviously there is much to see but no one is there to encourage critical seeing and graphic communication. Of course parents do want their children to learn but they can teach a child only what they know. The parents know letters, numbers, and words but they are visually and graphically illiterate.

*I think you're making a mountain out of a molehill.*

I don't think I am. Creative problem solving is not concerned with things but with relationships among things, ideas, and objectives. For example, it would take quite a bit of time to determine which of the following is the longest:  $7/16$ -in.;  $31/64$ -in.; 0.495-in.; 12.6 mm.; or 0.0415 ft.? A bar chart could tell us at a glance.

*Which is the longest?*

Whups! The coffee pot is boiling over!



In preparation for the session, the rating scale would be drawn on the blackboard.

Blackboard? Your vintage is showing!

I was merely attempting to be ethnically "cool,"

However, in the boxes of the chalkboard scale I would write in numbers, 1 on the left to 10 at the right end. The student need only record the number representing his rating. Each student needs to be provided with a vertical strip of ruled paper for recording his ratings. These strips, about 2-in. wide, could be cut vertically from standard or legal sized writing pads. Each line provides the space for the rating for each project to be evaluated.

The reason for such strips, which could be "dittoed," is to assure a uniform format, reduce errors, and ease the task of tabulating. Each line of the strip will need a letter designation which is to coincide with the letter designation assigned each student project.

I don't get it.

Andy, for example, might have the designation, "M" for his project, so the rating for his project would be written on line "M." However, the order of project presentation need not conform to the sequence on the strip. Before evaluation starts, the criteria for what is to be measured must be established through group discussion. For example, design could be one of the categories up for evaluation. However, it must be discussed so that there is agreement on its inclusion and that everyone understands that design during this evaluation will pertain to the project's appearance, its sensory appeal, and not workmanship, etc., etc. Several categories could be used such as: workmanship, structure, originality, suitability for its intended use, etc.

However, keep the number of categories to an absolute minimum. Each of the categories agreed upon is to be written on the chalkboard and identified by a Roman numeral. If more than one category is involved, then, for example, the respondent would write on line "M": I-8, II-3.

The session begins with the first student bringing his project, with its letter identification, before the class. While telling the class of his intent, he can be showing his project, turning it around so all sides can be seen. There is to be no discussion about his project nor the other projects until all ratings have been turned in. He then leaves his project before the student group. The instructor now states, "We will now rate project "M" for design. Roman numeral

I." After about 15 seconds, the span of time needed can be determined by observing the students. Next the instructor will move to, "We will now rate project "M" for workmanship, Roman numeral II."



*But won't the first student to present his project be at a disadvantage since the students are unfamiliar with using the scale?*

He would be, and this is discussed during the preparatory session. This problem, however, is resolved by the first three or four students repeating their presentations after all others are rated, and using only the second ratings.

*Does the student rate his own project?*

I almost forgot and I am glad you brought it up. This is one of the most important points in making the evaluation work. The student does not rate his own project.

*But why?*

He would start comparing the other projects to his and soon he would be in a bog of frustration and wasting his time trying to remember what ratings he gave others. He simply leaves his line on the strip blank.

*Ah ha! But that identifies the evaluator!*

That's true, the rating strips must be unsigned. However, if the students suspect Watergate-ism on the part of their instructor then each student can automatically write in the highest rating for himself.

*Why the highest?*

It's so satisfying, and one's own project is, of course, the best. Ask any mother."

You mentioned that the instructor's ratings are also to be included.

*I did. The instructor's ratings are to carry the same weight as that of the group.*

However, the instructor need not use the rating scale, since he can, at his leisure, place the projects themselves in an order of rank for each category.

*At his leisure?*

Leisure to an instructor is that period of time between falling off a roof and hitting the ground.

The tabulation of the ratings will provide averages and from the averages lists of order of rank are made. After these lists have been prepared they will form the basis for discussions concerning the projects. This will require that there be a list for each category as evaluated by the students, another for the instructor, and a third, an overall average of both the

student and the instructor lists.

*How on Earth is the instructor going to find the time for all this mathematical manipulation?*

That's why we have TV. This is an ideal activity during Ironside or sports events. By doing my violin practicing while watching TV, I have eliminated all feelings of intellectual guilt.