The FLORIDA ARCHITECT

OFFICIAL JOURNAL of the FLORIDA ASSOCIATION OF ARCHITECTS of the AMERICAN INSTITUTE OF ARCHITECTS, INC.

December, 1963

Current Highlights . . .

- **THE BUSINESS OUTLOOK FOR 1964 REMAINS BRIGHT** . . . tax cut or no tax cut. That's the view of most government economists, as well as those in industry. They don't buy the official line — that cuts are needed to avoid a recession, or to make what allegedly would be only a so-so year a really bang-up one. Most experts still support Kennedy's reductions as a good long-range reform. And they expect the bill now pending before the Senate to be voted into law. It is now only a question of timing — probably early 1964, rather than 1963.

  There are three main reasons for this unqualified optimism:

  . . . **Present momentum is strong.** Neither consumer nor government spending shows signs of slackening its recent robust pace.

  . . . **There are few weaknesses** serious enough to cause trouble. Certainly, business inventories can't be called excessive.

  . . . **Investment in new plant is rising** and will keep on rising in 1964. The good business prospects encourage new outlays.

  Tax cuts can make a good outlook even better, the economists believe. Reductions would add to the gains industry would be showing anyway. More importantly, substantial cuts would provide some extra insurance for a rattling good year.

- **SOME EXPERTS ARE BEGINNING TO WORRY ABOUT THE OPTIMISM** that is now so general. They recall that when forecasters become as nearly unanimous about the outlook as they are today, they seldom prove to be very accurate. The "crowd" didn't do very well in 1960 . . . or again in 1962, until the fall. And don't forget that many were wrong in saying there'd be a slide in 1963.

  Sometimes things go wrong precisely because opinion was so unanimous. Over-confidence can lead to overlooking of some weaknesses. And if everyone rushed to act on the uniformly high expectations, excesses could develop fairly quickly.

- **SPENDING WON'T RISE MUCH IN THE NEW U.S. BUDGET** now in preparation for submission to Congress in January. The President has dropped plans for new programs and is even paring some projects already begun but scheduled to expand. Officials are doing their darndest to keep outlays below $100 billion. This year, the total will be $98 billion. Next year, without the President's hold-down, the figure could easily reach — or top — $102 billion.

  This is a switch from the New Frontier line. And it isn't sitting well with liberal Democrats in Congress. But the President feels it's needed to get tax cuts past Congress.

- **THERE IS A LITTLE CONCERN ABOUT PRICE INCREASES** in Washington these days. Officials are still watching developments closely. They are prepared to act — by tightening money, for example — if that should prove to be necessary to check a new round of inflation. But, for the time being, the upward thrust of prices seems to have dissipated some of its momentum.

  For a while, officials were really worried. That's when the hikes in steel seemed to have given a green light to other industries; a psychological barrier seemed to have come down. But now it doesn't look as if a new price-wage spiral is about to begin. And motives behind the hikes are clearer.

- **AN EFFORT TO RESTORE PROFIT MARGINS IS THE KEY REASON** for the rash of price increases of recent months. Prices had drifted down during the past five years, despite expanding sales. Now that demand for goods has perked up, many companies are understandably trying to regain lost ground. If businessmen can't do it now, when things are favorable, when can they?

  The trend to higher prices is now expected to have a more limited impact on the economy for these basic reasons: *(Continued on 3rd Cover)*


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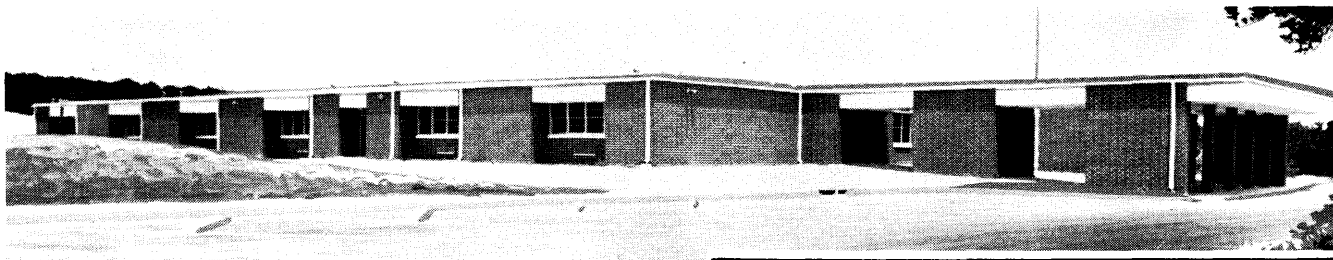

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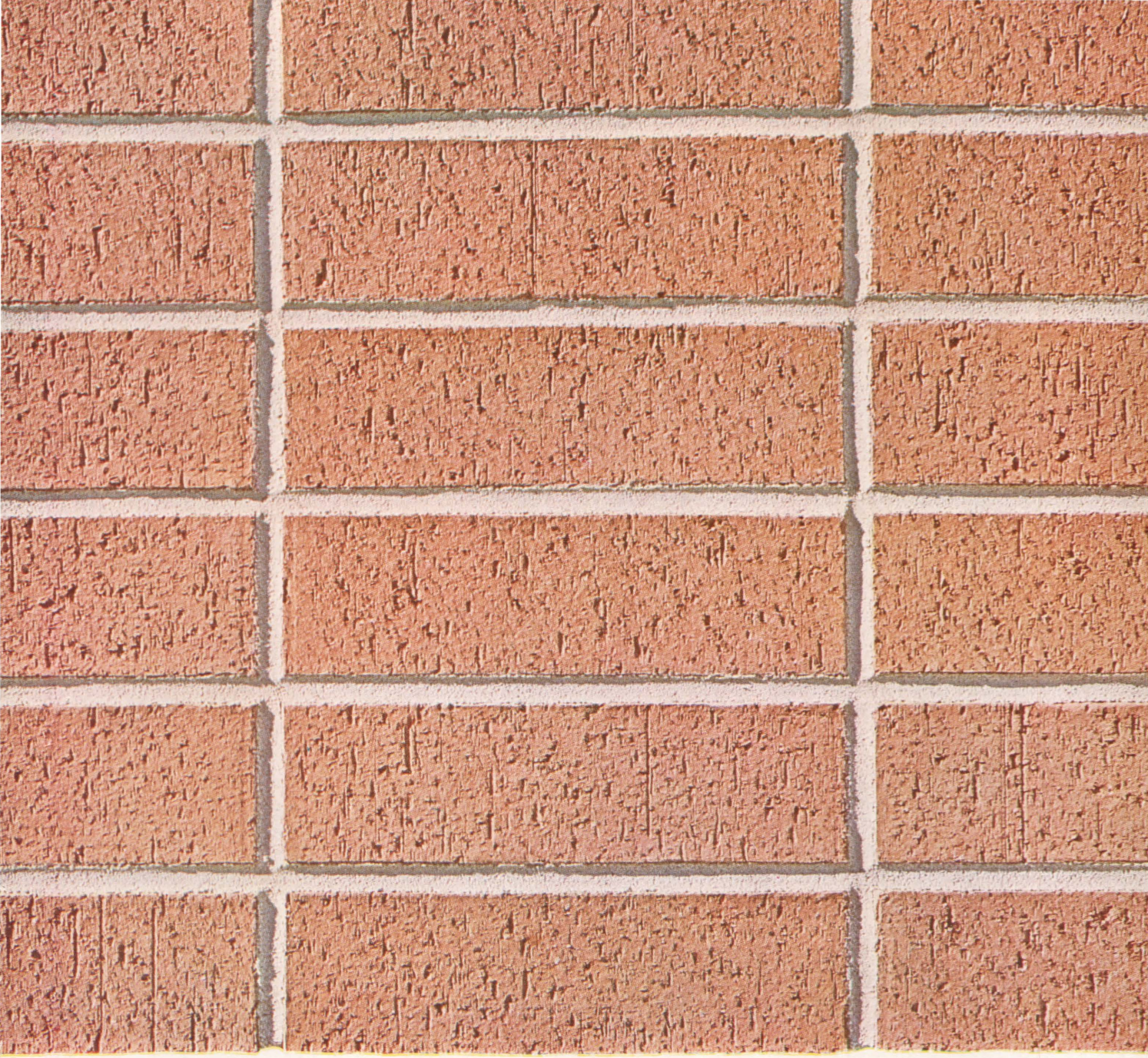

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The

Florida Architect

OFFICIAL JOURNAL OF THE FLORIDA ASSOCIATION OF ARCHITECTS

In This Issue ---

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THIS ISSUE . . .

VERNA SHAUB SHERMAN
Acting Editor

H. P. ARRINGTON
Acting Advertising Manager

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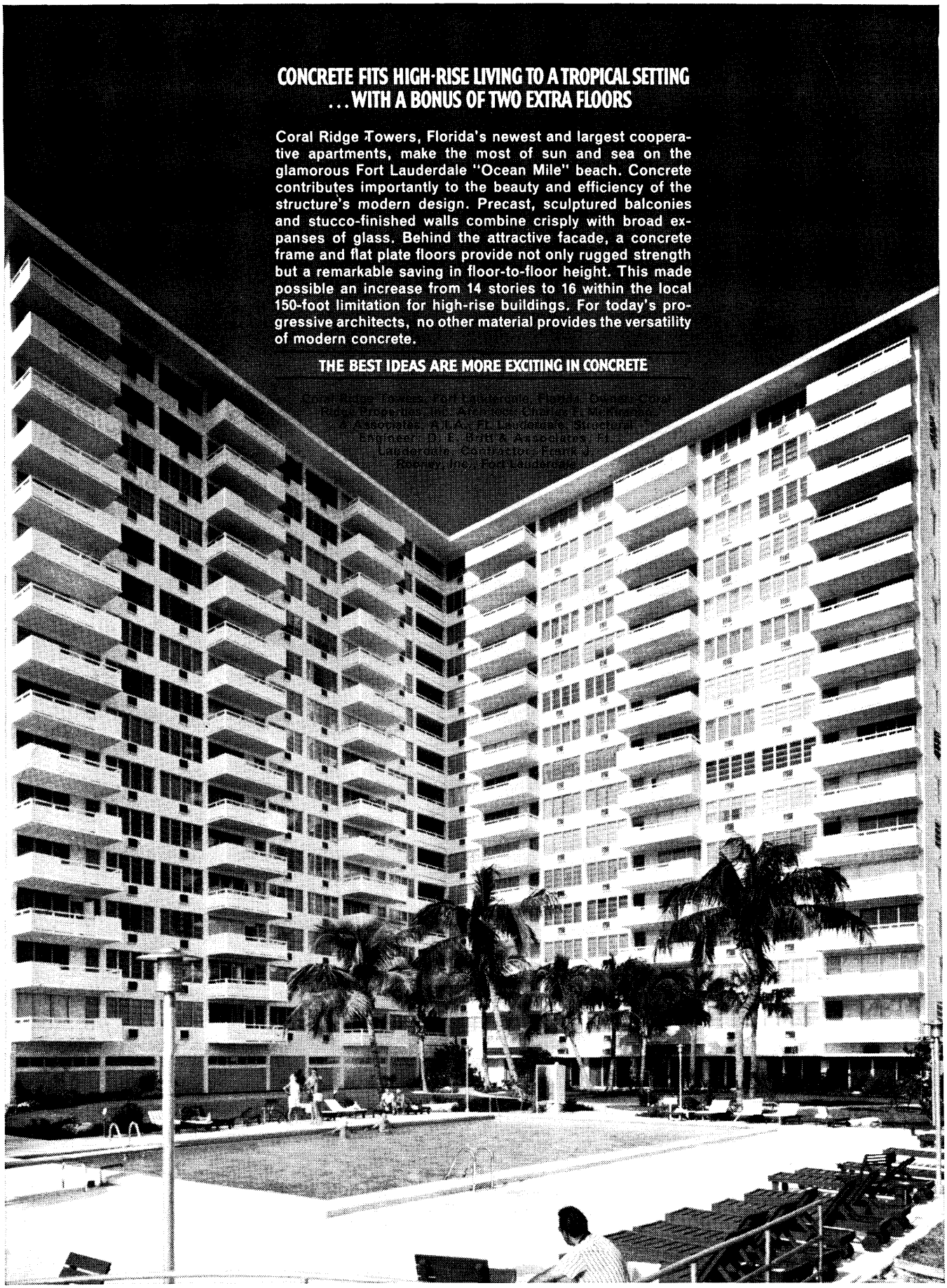

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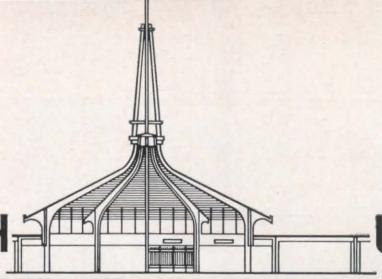
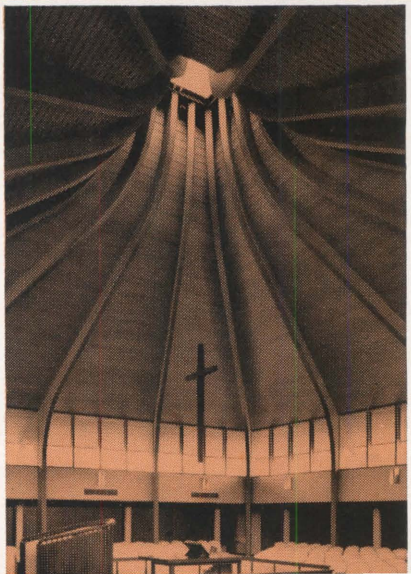
☐ *A Report From Key Biscayne*



INSPIRATIONAL DESIGNS WITH UNIT LAMINATED WOOD

Architect: Joseph N. Smith **Contractor:** G & N Construction Company
Consulting Engineer: Carr Smith and Associates

beauty, dignity, economy at Key Biscayne Presbyterian Church is achieved with designs of UNIT glued laminated wood. Sixteen reverse-curved laminated frames form the sanctuary—and basic shape of the structure. These high-rising one-piece members meet at a center compression ring that supports laminated steeple members which rise an additional 32 feet above the arch tops. Forty-eight straight laminated beams form a low roof around the perimeter of the sanctuary to cover additional facilities. A finished roof of Southern Pine UNIT-Deck spans directly over all laminated members. The seemingly complex framing of this church was resolved quickly and economically with UNIT laminated members. Substantial additional savings were realized since the laminated members were furnished pre-stained and varnished at the factory. Take a closer look at UNIT. Mail coupon for more details.



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Officers Elected for 1964...

H. LESLIE WALKER
Secretary

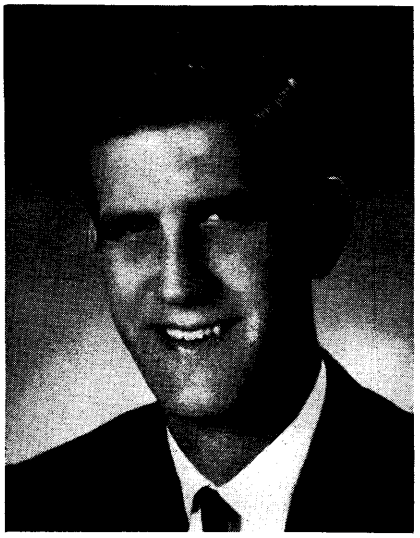
Officers re-elected at the Annual Meeting to serve a second term were Roy M. Pooley, Jr., President and James Deen, Treasurer.

C. Robert Abele, Florida South Chapter, was elected Third Vice President, South Florida Area. William T. Arnett, will as of January first, automatically become the FAA's First Vice President, North Florida Area and Richard Boone Rogers, Second Vice President representing the Central Florida Area.

The newly elected Secretary, H. Leslie Walker, has just completed a two year term as President of Florida Central Chapter.

Elected by unanimous vote on the Convention floor as the three year member of the Regional Judiciary Commitee is Donald Jack West a member of Florida Central Chapter. Alternates named are Lester N. May, Florida North Chapter and William Stewart Morrison, Florida North West Chapter.

Clinton Gamble, FAIA, a member of the Broward County Chapter and former President of the Florida Association of Architects now serving his second term as Secretary of The American Institute of Architects, was unanimously nominated by the Association's members and delegates for the office of Vice President of The American Institute of Architects.



photo—Pilkington

C. ROBERT ABELE
Third Vice President

Executive Director Named...

photo—Chase, Ltd.

FOTIS N. KAROUSATOS

The Florida Association of Architects announces the appointment of Fotis Nicholas Karousatos as Executive Director and Editor of its publication, THE FLORIDA ARCHITECT, as of January 1964.

Born in Washington, D. C. in 1929, he received his B.A. in Business Administration from George Washington University and completed graduate work in the field of Management at the same University. He is well prepared for the tasks he will assume for the Association, for not only his fields of study but also his experience embraces management, business policy, personnel management, marketing and controllership.

Mr. Karousatos has held varying positions in National Associations ranging in size from 120 to 3500 members with annual budgets from $60,000 to $350,000., has worked closely with governmental agencies, written and edited bulletins of all types, training manuals and technical publications and has prepared articles for weekly newsletters and annual marketing guides. In addition has planned, promoted and directed conventions; regional meetings, educational seminars and social events for groups ranging in size to 1000. He has organized and conducted membership and public relations campaigns, statistical reporting programs and other types of surveys.

His background includes responsibility and direction of all aspects of association office procedures, including supervision of personnel, purchasing and all phases of accounting. In addition he is an accomplished public speaker.

His position immediately prior to joining the Association has been Assistant Executive Vice President of a National Manufacturers Association. Accordingly, he is well prepared to assume the responsibilities as Executive Directors for The Association.

Mr. Karousatos is married to a New Yorker named Anne and is the father of two boys and two girls—the youngest child, a daughter, was born September 28, 1963.

Facilities Conference

The Junior College Division and the School Plant Section of the State Department of Education are coordinating efforts with the National School Facilities Council in planning for the *Junior College Conference* scheduled to be held in Tampa, January 23rd. through the 25th, at The Causeway Inn.

An exhibit of existing college facilities in the State of Florida is planned as an important segment of the Conference. Adequate space will be available for the Exhibit and *all architects are invited to participate* in exhibiting models, photographs and drawings. There will not be a fee for exhibit participation however, it is suggested that all architects who plan to submit material write for complete information to: Dr. H. L. Cramer, Department of Education, School Plants Division, Tallahassee, Florida.

Co-Chairmen for the Conference are Dr. C. W. McGuffey and Dr. James L. Wattenbarger. Assistants are Dr. Lee Henderson and Dr. H. L. Cramer.

The Conference will explore the present relationship of curricular activities and facilities, and attempt to describe the teaching methods of the next decade.

PROGRAM

THURSDAY, JANUARY 23

11:00 A. M.—Registration

Afternoon Session

Dr. J. L. Wattenbarger, Presiding

2:00 P.M.—*Purpose of Conference* Hon. Thomas D. Bailey, State Superintendent of Public Instruction.

2:15 P.M.—*Educational Specifications.* Dr. H. L. Cramer, Consultant Plant Planning, Florida State Department of Education

3:00 P.M.—*Curricular and Facilities Changes.* Dr. Kenneth Williams, President Florida-Atlantic University.

4:00 P.M.—*Planning Facilities and Curricula.* Dr. Maurice Roney, Director School of Industrial Education, Oklahoma State University.

Evening Session

Dr. C. W. McGuffey, Presiding

6:30 P.M.—Dinner Meeting. *The Materials Center as the Heart of the College.* William Brubaker, AIA, Perkins and Will, Chicago.

FRIDAY, JANUARY 24

Morning Session

K. G. Skaggs, Presiding

8:35 A.M.—*Southern Technical Institute Programs and Facilities.* H. L. McClure, Director, Southern Technical Institute.

(Continued on Page 21)

Improved Communications Undivided Responsibilities

By ROBERT H. LEVISON

Director, Florida Region AIA

At a dinner meeting of the Florida West Coast Chapter of The Producers' Council, Incorporated held late October in Tampa . . . the Director of the Florida Region, AIA, surveyed the current need for Quality . . . and urged material suppliers to join with the members of the architectural profession in an effort to create more efficient and beautiful structures. His address is reproduced in it's entirety here.

"QUALITY is a word which is being given considerable attention this year. The quest for quality was the theme of the 1963 convention of The American Institute of Architects where architects, physicians and journalists discussed the problems of a physical environment of excellence for a society changing rapidly.

Quality, indeed, was the preoccupation of the architects, engineers, contractors, and manufacturers who attended your recent annual meeting in Washington. There, independently of one another, each of the speakers touched on the need for further industrialization of building, the integration of building products into larger elements of design—and particularly—the great need for better communication among all of the principals of today's building team.

The time has come when we can no longer assume that each of us has his own private compartment in which he works alone and to which his contribution should be limited, and although we have been building in our nation for nearly two centuries, technology has been limited and the supply of land has been unlimited.

NOW these two positions are reversed, population mounts, our urban centers decay, ugliness spreads, and time will not, and cannot wait for us to fumble and adjust. Many major decisions of our age have been made for us and we find a new America being built within the span of a few decades. We have called it the *second* United States, since, to meet the need, we are told we must duplicate every single structure in our nation before the end of this century. Meeting the needs of quantity alone imposes a tremendous burden upon our building industry. Whether this result will be one of quality is a question and I am not sure we yet have a clear cut answer. However, one thing is clear, if we are to have quality in our new environment, our responsibilities cannot be divided from one another's.

Your programs many times include sessions on "selling" the architect. Indeed your chairman suggested that this responsibility on this program, in error I trust, be assigned to me. I felt unqualified, but—a brief word of advice. There is really no great mystery to selling an architect if you recognize *one* salient thing—*He is responsible for the quality of his buildings, and what he needs most from you is honest, accurate, and detailed information.* He needs to know what your product will do and, equally important, what it will *not* do.

On the landing of the steps which lead up to the Lincoln Memorial, but some distance from the building itself, there is a wooden pedestal supporting a wooden sign which carries the improbable admonition "No Smoking." To the casual observer this sign is obviously misplaced, standing as it does under God's blue sky on a platform of stone, but it is not. The real purpose of the sign is to prevent the staining of the platform by those who may drop a lighted cigarette and grind it under a heel. These stains, I learned, can be removed from the stone only by special equipment and chemicals. Was that particular stone appropriate? Remember, what your product will *not* do is important. In addition, you should be able to tell the architects costs, delivery schedules and to what degree you and your company will stand behind what you are trying to sell.

I would like you to share with me a few of the major and current con-

(Continued on Page 22)

Needed: Architects of Matter*

By W. D. ROBERTSON

Progress in the use of materials, as in many other areas, is impeded by a synthesis gap—the discrepancy between our ability to analyze complexity and our inability to deal with it. The great need today is not for more facts but for greater understanding of the facts already known. Only then can matter be truly shaped and designed to serve the needs of man.

This article published by permission of the American Society for Testing and Materials first appeared in their publication MATERIALS RESEARCH & STANDARDS.

At some risk of sounding like an "elder statesman" of science, a role I hasten to disclaim, I should like to explore the question: "What is the significance of the research to which so many of our scientists and engineers are now devoting so much of their time and energy?" In particular, are they fulfilling what must be one of their most important functions, namely, to identify and to study the really significant problems? Or are they, instead, subdividing problems into growing numbers of smaller and smaller units to satisfy a form of Parkinson's Law to the effect that research expands to fill the available time, to occupy the available manpower, and to spend the available money?

I should like to explore this question in light of the magnitude, rate of growth, and direction of science and technology and to suggest a perspective, which, while it capitalizes on the knowledge we have accumulated, would direct more of our efforts into what may become the main stream of developments.

The Magnitude of Science

Numbers indicating the magnitude of science and technology and the direction in which we are heading have been compiled by Derek Price (**1,2**).[1] For example, consider the growth in the number of scientific journals (Fig. 1) that have appeared since 1665, when the first volume of the *Philosophical Transactions* of the Royal Society of London was published. Clearly, after the first ten journals were established during a century of uncertain beginnings, the growth rate is an exponential function of time to an astonishing degree of accuracy throughout the succeeding 200 years. During this period the time required to double the number of journals has remained substantially constant at 15 years, or about three such doubling periods in an individual's professional lifetime of about 45 years. Consequently, there is eight times as much to read at the end of one's career as at the beginning. The next time you contemplate the library shelves and despair of keeping up with your field, you may find some justification, if not comfort, in this factor of eight.

There is, of course, a corresponding growth in the number of people engaged in some form of scientific activity. A head count of professional scientists and engineers, as defined by the National Science Foundation (**3**), indicates that their rate of growth in the United States is considerably greater than the growth rate of the total labor force—the respective doubling periods being 12 and 55 years. Thus the professional population inceases by a factor of 23 while the working population increases by a factor of two. Soon it will be very difficult to find anyone willing to use something as mundane as a hammer.

Unfortunately, it seems that high-quality science does not proliferate as fast as science as a whole. A recent study by Derek Price (**2**) indicates that "good" science increases much more slowly than all science and, in fact, is proportional to the square root of the total activity. To double the output of "good science" we must increase the total effort fourfold, carrying along a large burden of individuals whose productivity is not in the category of "good" science. Since

W. D. ROBERTON received a B.Sc. (1942) and a D.Sc. (1948) from the Massachusetts Institute of Technology, where he studied chemical and physical properties of intermetallic compounds and discovered the first intermetallic compound semiconductor (Mg_2Sn). From 1948 to 1950, he was research associate at the Institute for the Study of Metals at the University of Chicago.

* Presented as the Fifth William B. Coleman Lecture at the Franklin Inst., Philadelphia, Pa., Feb. 20, 1963.

[1] The boldface numbers in parentheses refer to the list of references appended to this paper.

the cost increases as the square of the total number engaged, it is necessary to multiply the cost by 16 to obtain twice the current output of "good" science—surely an expensive undertaking.

The Cost of Science

It is no surprise that the expenditure of money on research and development also grows exponentially with time. The significant feature is the rate of growth—about 10 per cent per year, corresponding to a doubling time of seven years. Since the gross national product doubles only once every 20 years, we shall, unless something changes radically, be spending *all* our money on science and technology in about 65 years (**4**). Indeed, at the present rate of expenditure on high-energy physics, most of this money could be used to build and operate the accelerators that doubtless will supersede the Stanford linear accelerator, which will be 2 miles long and cost $200 million to build and $20 million to operate each year. Of course these numbers are relatively insignificant when compared with the estimated cost of landing a man on the moon—$20 to $40 billion.

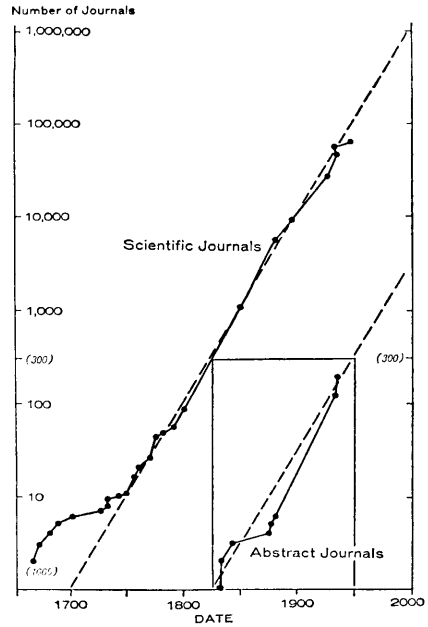
The Research Climate

Just as the Olympic games have taken on political overtones that cannot be ignored in the training of athletes, it would be unrealistic and futile to ignore the political implications attached to science and engineering and the corresponding problem of training competent scientists and engineers in sufficient numbers. As Alvin Weinberg (**4**) has observed, we are inevitably committed to the "Scientific Olympics" in space technology, high-energy physics, and, of course, nuclear devices of all kinds. On the other hand, Weinberg concludes that it is a reasonably safe prediction that relatively few new principles will emerge from this massive effort—except possibly from particle physics—and that even fewer will find application on our planet.

There is at least one other field of endeavor in which the potential benefits far exceed the probable capital investment, namely, the development of systematic methods of controlling the properties of a terrestrial matter.

Research in the Structure and Properties of Matter

In the title I have used the expression "Architect of Matter" in the very literal sense of master builder—one who designs predetermined form and function into a material. I should like to explore this concept in terms of the properties of matter and its relation to various perspectives in research. However, before jumping to the conclusion that we are already engaged in precisely this endeavor, let me submit one of Escher's pictures (Fig. 2) in which the architect has discovered that it is possible to make connections in various ways and that some of the less obvious choices have interesting possibilities. Note that the gentleman on the ladder began his ascent inside the building and that he has stopped to rest at the turning point between the two worlds of inside and outside.



Courtesy Yale University Press

Fig. 1.—The growth in number of all scientific journals since publication of the *Philosophical Transactions* of the Royal Society of London (1).

Seriously, we *are* engaged in designing materials, but let us examine our methods and then ask if they are ideally suited to the purpose and whether significant contributions lie ahead on the road we are traveling now.

Although the number of technical journals and the number of papers in the journals grow exponentially in time, even a brief examination of their contents shows that very few problems are being solved; instead, it appears that problems are being *generated* by a kind of fission process. At exponential rates, to quote Price again (**1**), " the number of problems per square head will very shortly exceed the number of men, women and children, and dogs available to work on them." Thus, one of our accomplishments seems to have been the creation of an efficient device for the manufacture of problems!

In the field of the properties of materials, one of our tasks surely must be to develop stronger and more reliable (more ductile) materials for structures. Examination of the state of the art indicates that progress is indeed being made, but this progress is principally in the direction of learning more about the reasons why materials are weak, rather than progress in designing stronger materials by using newly acquired principles.

The dislocation, as depicted by L. S. Darken in Fig. 3, is one of these newer principles and one that seems to be an inexhaustible source of new and fascinating problems in the field of mechanical properties. In the best tradition of analytical science, dislocations were considered first in the nonexistent, simple cubic structure, and in recent years we have progress-

(Continued on Page 12)

"We have more than enough of the bits and pieces that are required to build a culture and a society of majestic dimensions guided and inspired by knowledge, conscious and confident of its strength, and with ability to guide and reshape its conditions and its goals as understanding deepens and broadens. We have enough knowledge when properly applied and integrated for men to have a much deeper understanding of themselves, and to use the knowledge for transcendent human purposes. Yet the real possessors of this knowledge are in their studies, in their laboratories, seeking more and more information, more knowledge, and living apart from their fellowmen while their destiny is being shaped by people who have little realization of the power of the tools at our command."

I. I. Rabi, at a University of Rochester convocation, as quoted in *Battelle Technical Review*, Vol. 12, No. 3, March, 1963.

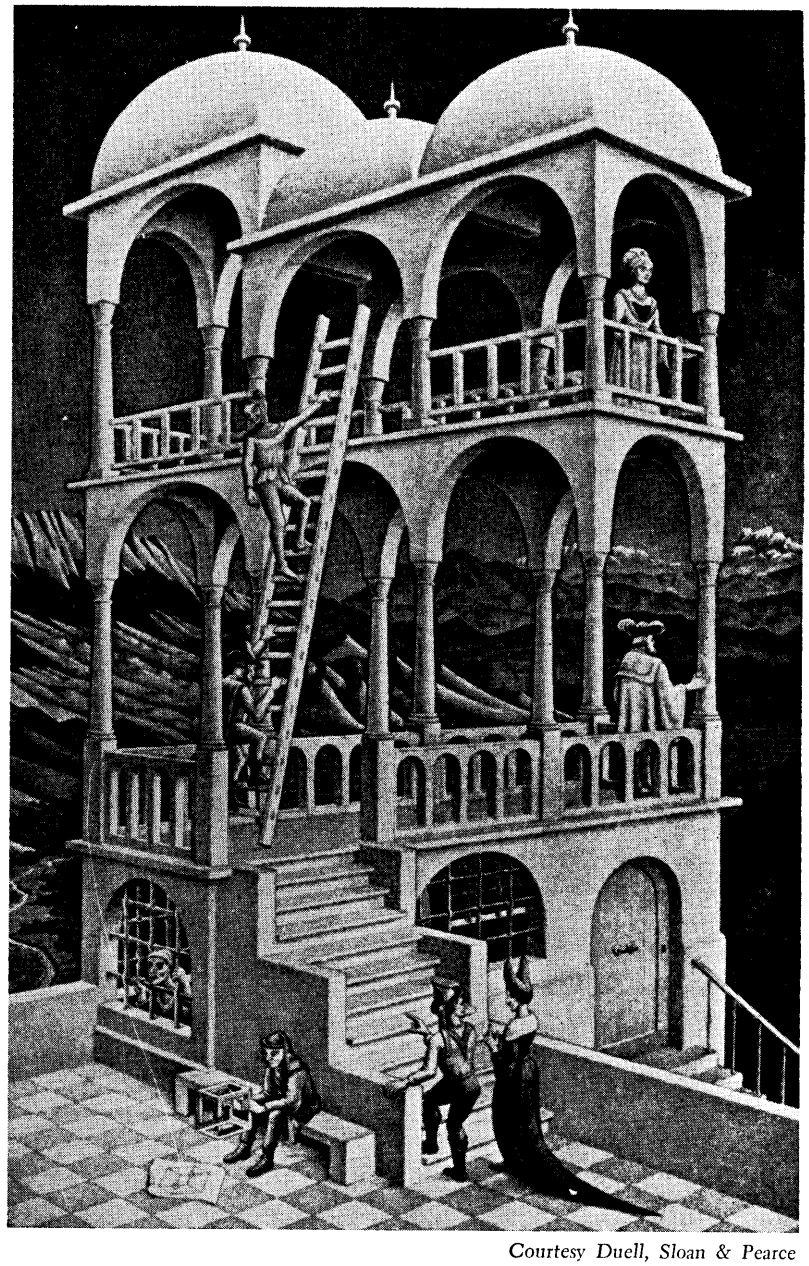
Architects of Matter

(Continued from Page 11)

ed to the hexagonal structure. This state of knowledge leaves quite a large field to be explored among the remainder of the 14 Bravais lattices, not to mention the possibilities for research provided by the delightfully large number of ways in which dislocations may dissociate and recombine in new configurations.

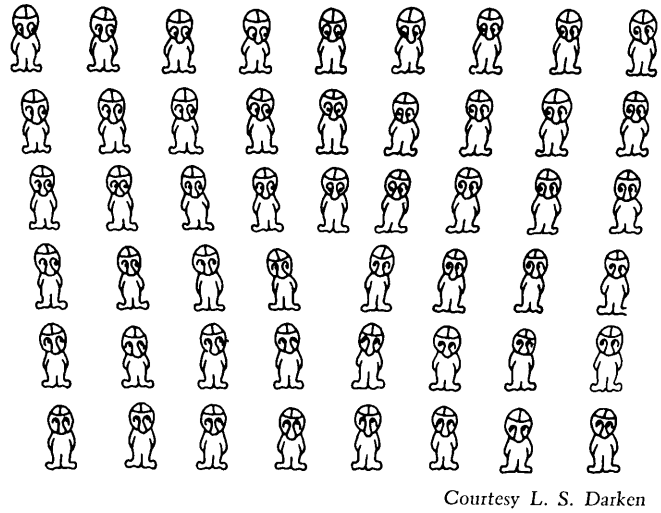
Stronger and more reliable materials are certainly being developed constantly, but the method used is that well-known and justly famous procedure of more-or-less educated cut-and-try. Furthermore, each new accomplishment of this kind immediately causes a stampede into the laboratory —more facts about the new development are uncovered, more papers are published—but, somehow, these facts seldom seem to be very useful in giving birth to succeeding developments in the same field. For example, stainless steel was not developed out of corrosion research. The first materials with properties approaching the requirements for high-temperature gas turbines, together with their method of fabrication, were adopted from a material (vitallium) developed for dental plates, *by the dentists*. Similarly, the newest high-strength steels, the maraging steels, do not appear to owe very much to several generations of intensive and sophisticated study of the martensite transformation. Each of us could supply a long list of such examples.

Perhaps I have said enough to indicate that we are very good at analyzing the behavior of materials and providing ex post facto explanations (usually not including both necessary *and* sufficient conditions). With a few notable exceptions, such as the transistor and its relatives in the field that Von Hipple calls molecular engineering, in which almost all the credit goes to quantum mechanics, we cannot claim to be very successful in using the results of our investigations to build predetermined form and function into materials. I should add that good and perhaps sufficient reasons may be given for the existence of this state of affairs; nevertheless, it is not equally clear that we should continue indefinitely in the same direction without pausing to consider the alternatives.



Courtesy Duell, Sloan & Pearce

Fig. 2—Belvedere (9).



Courtesy L. S. Darken

Fig. 3—The edge dislocation, as depicted by L. S. Darken.

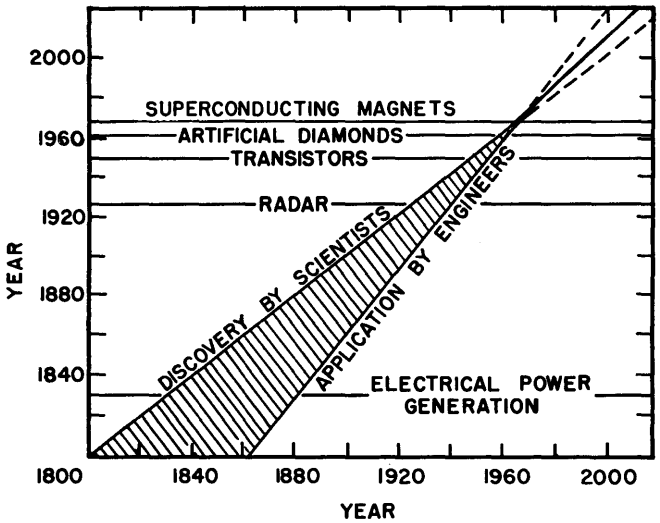


Fig. 4—The time between conception and application of ideas. After K. B. McEachron (5).

The Significance of Complexity

Most of our difficulties seem to originate in the complexity of the *combinations* of units of structure which, individually, may be understood in great detail. However, it is precisely the combination that constitutes the final form and provides the ability to function according to some preconceived plan.

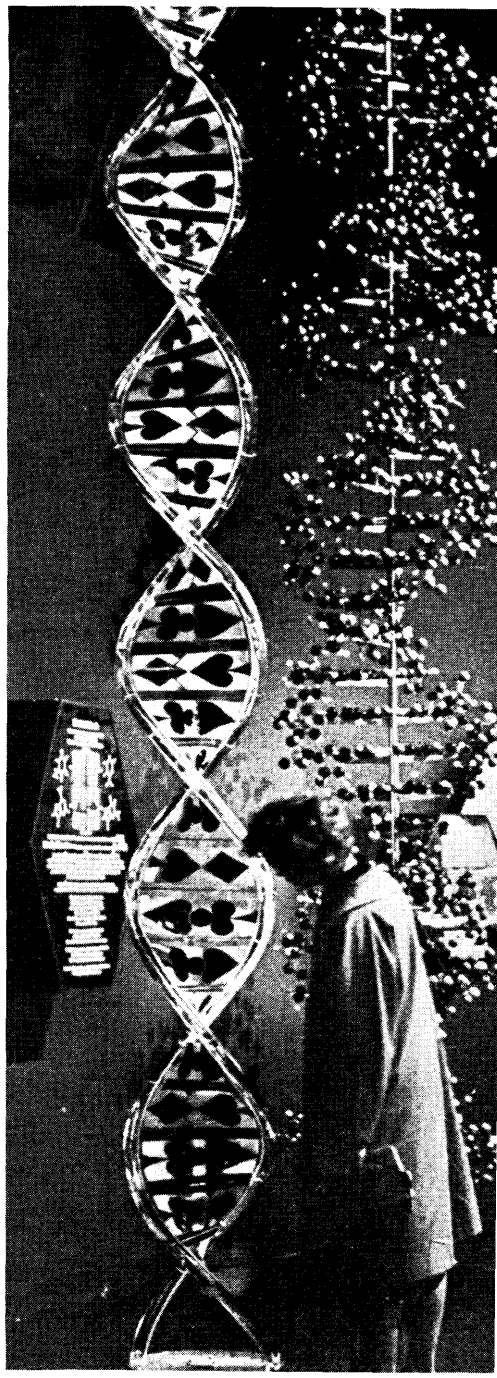
And here we reach the heart of the matter, and I am indebted to Cyril Stanley Smith for pointing out the significance of the discrepancy between our ability to analyze complex problems and our relative inability to deal with complexity itself. We do not seem to possess either the principles or the techniques necessary to deal with the operation of complex combinations of phenomena as a whole except by the process of trial and error, which has become prohibitively expensive in time and money and natural resources.

I venture to suggest that the truly effective engineers of the future will be those who learn how to deal with complexity by systematic and quantitative methods and that engineers today might turn their attention to the development of these methods, before we are completely swamped by facts that we are unable to assemble into larger aggregations with any assurance of reliability.

Notwithstanding our ability to dissect problems into neatly packaged units—a procedure known as the "scientific method" which has been fantastically successful for the last 300 years—the direction in which we might look for help in dealing systematically with complexity is not obvious, and the problem doesn't yield readily to the classic scientific method. We might, however, turn to the master of infinite, organized complexity—nature—to find analogs of general classes of problems and solutions. It might be that we could, with the techniques available to us now, discover something of the principles underlying the organization of the harmonious relationships that ensure reliable functioning of complex aggregation of units.

Nature—Organized Complexity

Turning to nature as a guide, we are not surprised to find that our effective, but time-consuming procedure of cut-and-try in technology has its counterpart in evolution. It works equally well in both realms, but we have reduced the time scale in science and technology to the vanishing point. Thus, as shown in Fig. 4, after K. B. McEachron (5), the 70 years required to produce a significant number of electric motors from Faraday's principle of electro-magnetic induction has shrunk to a few years between the conception of the transistor and the appearance of a billion-dollar industry; artificial diamonds, high-field superconducting magnetic materials, and the later are examples of the same phenomenon. Following the linear extrapolation in Fig. 4, instead of an asymptotic approach to a negligible difference in time between conception and application, it almost seems as if application will be preceded in future crash programs by some form of immaculate conception.



Courtesy Pacific Science Center Foundation

Fig. 5—The DNA molecule and the genetic code (10).

It is just this compression of the time scale that has almost eliminated the previously clear distinction between science and engineering.

Pursuing the analogy with nature, we note that the virtual elimination of the time interval between conception and application means either that we have increased the rate of growth correspondingly or that we have almost eliminated growth as a process connecting conception and the final development of an idea. In

(Continued on Page 14)

Architects of Matter

(Continued from Page 13)

the latter case, development of more or less complex aggregations of units takes on the character of a random, statistical process in which more or less equal weight is given to all contributions, in contrast with selective processes in which actions are predetermined by the boundary conditions of the final product. In short, nature does not depend on raw statistics to solve its complex problems, and when the science, or engineering, of complexity is defined, it will involve much more than statistics—thought it may be that the idea of random processes in communication theory is relevant here.

Probably the best example of organized complexity is the DNA molecule. Furthermore, the research that led to the unraveling of its structure (see Fig. 5) and the interpretation of the structure in terms of a genetic code by Wilkins et al, are equally good examples of operationally significant research. A detailed model of the DNA molecule was constructed in which the significant features of this infinitely complex structure were reduced to ordered arrangements of four units, represented by the four suits of cards in Fig. 5. One could speculate on the number of research papers, all containing insufficient or unnecessary hypotheses concerning the genetic code, that were swept away by this one structural model. However, it is more useful to learn the positive lesson that research in fields that do not involve the uncertainty principle is not finished, and not operational, until one can build a model of the phenomenon.

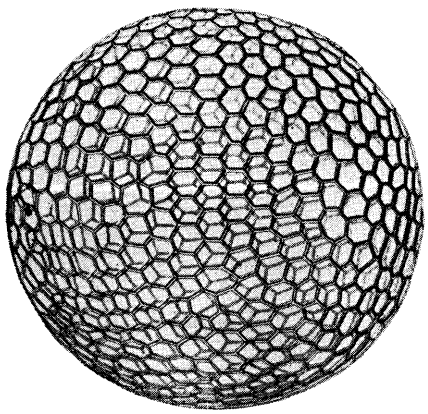
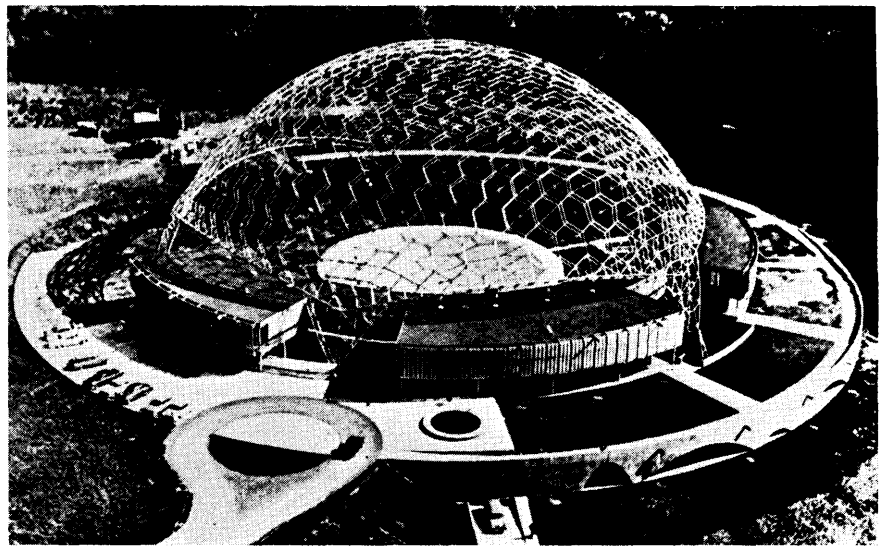
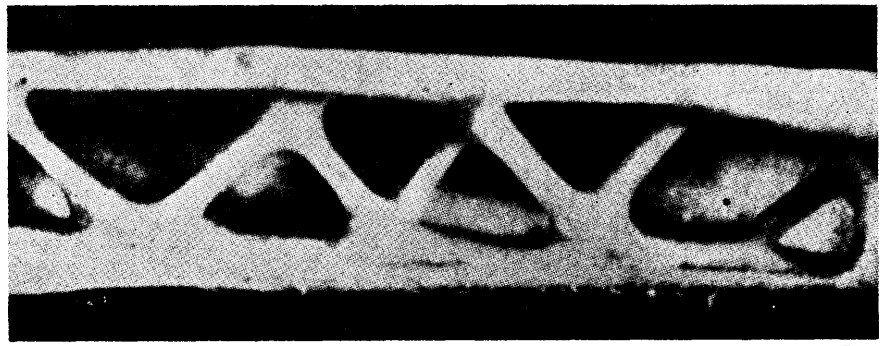


Fig. 6—The dwelling of the microscopic Radiolarian, *Aulonia hexagona* (6).



Courtesy R. Buckminster Fuller

Fig. 7—A "geodesic dome" over the headquarters building of the American Society for Metals (11).



Courtesy Cambridge University Press

Fig. 8—Bone from a vulture's wing (7, p. 981).

In some instances the models we seek are already available in nature on a scale that doesn't require an electron microscope or the detailed analysis of X-ray intensity data that produced the DNA structure. For example, a general structural problem in architecture is that of enclosing space without internal support so that, say, when man arrives on the moon, he will be able to tramp around collecting dust. Nature discovered how to solve this design problem when she enclosed micro-organisms (radiolaria) in a cage of siliceous material (Fig. 6) (**6**), which satisfies all mechanical and topological requimements (note that nature has smuggled in an occasional pentagon) and is immune to corrosion by sea water. Buckminster Fuller, the originator of the "geodesic dome," reached a similar solution. Among other and more functional things like radar domes, the headquarters building of the American Society for Metals (Fig. 7) was enclosed in a cage of aluminum hexagons. However, it is not clear that the topological problem was solved, since space cannot be completely enclosed by regular hexagons, as Euler proved, and the corrosion problem certainly was not solved, as the ASM headquarters building will probably demonstrate in due course.

Many other examples of nature as a designing engineer can be found

TABLE 1—RATIO OF TENSILE STRENGTH TO DENSITY FOR A SPIDER'S WEB, NYLON, AND A HIGH-STRENGTH STEEL (AT ROOM TEMPERATURE).

	Tensile Strength, psi	Elongation, per cent	Density, g per cc	Strength-Density Ratio
Spider's web[a]	26 200	20	0.66	2.7×10^6
Nylon	100 000	20	1.15	6.1
Steel	300 000	10	8.0	2.6

[a] J. R. Benton, *American Journal of Science*, Vol. 24, 1907, p. 75.

without much trouble. For example, the problem of supporting wings in airplanes was solved long ago in the vulture, whose wing structure is shown in Fig. 8 (**7**). Perhaps someone has done it already, but it might be instructive to examine a colony of ants for possible solutions to our traffic problems. Of course, the bees "solved" the minimum wax problem, not only in two dimensions but also in joining two hexagonal arrays in a honeycomb, back to back, via rhombic dodecahedra. I wonder if the packaging industry has consulted the bees?

Returning to the field of structure and mechanical properties of materials (strength, strength-to-density ratio, stiffness, and the factor of reliability) nature and the polymer chemist both have done, and are now doing, an outstanding job of design in fibrous materials. The relative strength-to-density ratios of a spider's web, nylon, and a high-strength steel at room temperature (Table 1) show that nature long ago did as well as the most recently developed steels, and the polymer chemist has surpassed both. Of course it is true that metallurgy has made significant contributions to strength at elevated temperatures—one of our best efforts to date.

When stiffness is necessary in a reed or palm tree, nature arranges the fibers to take the tensile stresses and disposes them in such a way as to prevent buckling—all with due attention to space for internal mechanisms to transmit nutrients. These essential features of the problem of mechanical stability in a palm tree are also those of a rocket. In both cases the primary geometrical characteristics are the ratio of length to diameter and a honeycomb cell structure, the particular virtues of the latter construction we are just beginning to appreciate and learn how to build.

Concluding Suggestions

Instead of multiplying these examples of nature as an archtiect and designing engineer I should like to summarize with a few very tentative observations and suggestions.

1. Essentially all the elemental materials of nature (75 per cent of them metallic) are now available, or can be made available, in the forms and amounts required for most purposes, a significant contribution of the metallurgist. Furthermore, the modes of operation of many of the physical and chemical principles governing the properties of matter are known in broad terms. Thus, we have available all the essential components for the development of technology in the era of The Scientific Revolution.

2. We do *not* need more isolated facts. We already have more facts and principles than we can at this moment combine into socially useful, functioning units.

3. We *do* need to devote a significantly larger fraction of research time and money to the problem of understanding the interrelationships of phenomena and principles that determine the behavior of the whole process, device, structure, or function. New facts are important only if they are necessary to the primary purpose of defining the behavior of the whole, and if they are so related. The period of gathering interesting but often unrelated facts, through which much of science necessarily passed, is now over.

4. In designing materials for predetermined functions we are seldom,

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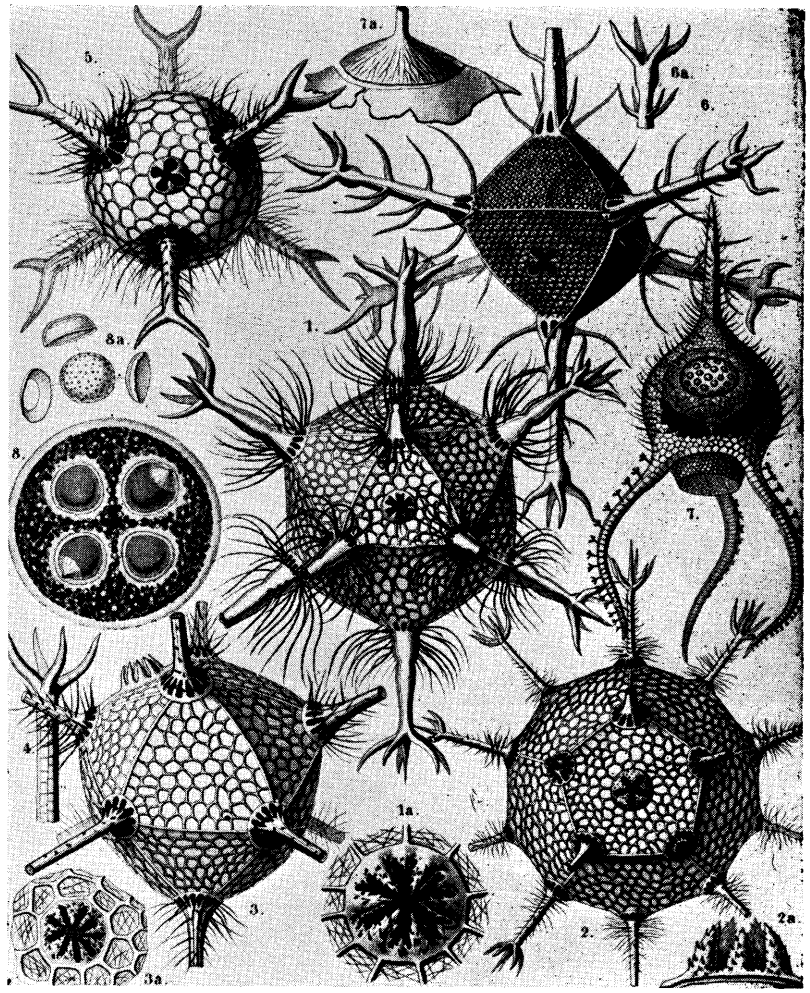

Fig. 9—The dwellings of radiolarians (6).

REFERENCES

(1) D. J. de S. Price, *Science Since Babylon*, Yale University Press, New Haven, Conn., 1961, pp. 93 ff.

(2) D. J. de S. Price, *Big Science, Little Science*, Columbia University Press, New York, N. Y., 1963.

(3) *Investing in Scientific Progress*, National Science Foundation Report No. 61-27, Washington, D. C., 1961, p. 14.

(4) A. M. Weinberg, *Science*, July 21, 1961, p. 161.

(5) K. B. McEachron, *Case Alumnus*, April, 1958, p. 18.

(6) Ernst Haeckel, *Challenger Monograph: Report on the Scientific Results of the Voyage of H. M. S. Challenger*, Vol. 28, H. M. S. O., 1887.

(7) D'Arcy Thompson, *On Growth and Form*, Cambridge University Press, New York, N. Y., 1959, Vols. 1 and 2, p. 981.

(8) A. W. Watts, *The Joyous Cosmology*, Random House, New York, N, Y., 1962, p. xix.

(9) *The Graphic Work of M. C. Escher*, Duell, Sloan & Pearce, New York, N. Y., 1961.

(10) *American Scientist*, Vol. 50, 1962, p. 640.

(11) John McHale, *Makers of Contemporary Architecture—R. Buckmaster Fuller*, Geo. Braziller Inc., New York, N. Y., 1962.

News & Notes

Jacksonville Chapter Awards . . .

photo—Joe A. Hernandez

Shown above, left to right, Theodore C. Poulos, President of the Jacksonville Chapter; Alfred Browning Parker, F.A.I.A., Guest Speaker and Robert H. Levison, Director Florida Region American Institute of Architects.

Jacksonville carpenter Raymond R. Caddis was selected Craftsman of the Year for his work in erecting hardwood paneling, by a Jury of the Jacksonville Chapter chairmanned by Mellen C. Greeley, FAIA.

Theodore C. Poulos, Chapter President, presided at the ceremonies held early in November at the Florida Yacht Club attended by persons prominent in building construction industry.

Guest Speaker was Alfred Browning Parker, FAIA, who stated in part "Craftsmanship is one of the yardsticks by which architecture can be measured, it is pride in one's work. A true craftsman is aware of his materials; of their limitations and capabilities and is able to bring forth the best from the 'sticks and stones' with which he works".

Florida South Awards . . .

The annual Awards Banquet of The Florida South Chapter, American Institute of Architects was held at the Dupont Plaza Hotel on November 5. Awards were given to four Craftsmen of the Year: Albert Hallquist, carpenter; Carl Strandberg, stonemason; Charles Wilcox, carpenter; and Murray Jones, painter. A special award was given to Stanley Tupler, art director at Miami Springs Junior High, and his students, for their creation of a mosaic mural for the cafeteria of their school.

Architect Guillermo, Gutirrez Esquivel, representing the Mexican Society of Architects, spoke on Craftsmanship in Mexico, and illustrated his talk with slides of hand-crafted objects from prehistoric times to the present. Senora Gutierrez was translator for her husband.

Guests of the Chapter included Senor and Senora Rafael Reyes Spindola, Mexican Consul in Miami; Mr. Robert Levison, A.I.A., Director Florida Region, AIA, and Mrs. Levison; and Mr. Roy M. Pooley, President, Florida Association of Architects.

Members of the Awards Committee were Geoffrey Lynch, Chairman, Jorge Arango, Edward Crain and Donald Rider.

Correction . . .

Inadvertently we failed to give credit to THE CARRELL, *the Journal of the Friends of the University of Miami Library*, for permission to publish an article originally written for them by Frank E. Watson, FAIA, entitled "The Sun Is Seeking Something Bright To Shine On" which appears on page seventeen of our November Issue.

SCHOOL CONSTRUCTION PROJECTS?

By DR. C. W. McGUFFEY
Assistant Director, School Plant Administration
State of Florida, Department of Education

At the last session of the Florida Legislature a bill was passed permitting county boards of public instruction the option of pre-qualifying bidders on school construction projects. The bill received overwhelming approval by the Legislature — passing the Senate 42 to 2, and the House 79 to 17. The general opinion regarding the bill was that if properly implemented and administered the general quality of school construction in the State of Florida could be improved through the more selective bidding process possible under this law.

Post Qualification Inadequate

Until this Act was passed school boards had the single alternative of accepting all bids from contractors who were financially capable of posting a bond. The competitive bid laws of the state require that school boards accept the lowest and best bid. On all projects financed from state sources, a school board is required to accept the lowest dollar bid unless approval is obtained from the State Board of Education to reject the low bidder and award the contract to the second low bidder.

Several questionable practices have grown out of the legal and regulatory requirements imposed on school boards. A common practice has been to reject all bids if the school board was skeptical of a low bidder. This practice costs both time and money due to delay in the bidding process. Another practice, over which a number of complaints have been raised, was the refusal on the part of some school boards to distribute the drawings and specifications to all contractors requesting them. This practice tended to restrict bidding and involved the questionable use of discretion on the part of the school board. Still a third, and most undesirable practice of post-qualification has been the acceptance of the lowest dollar bid submitted to the school board. Many boards have felt that the process of disqualifying a bidder after the opening of bids was too involved and too hazardous legally to attempt it. The State Board of Education has acted on one case only during the past five years in which it approved the action of a school board to disqualify a low bidder. Yet, contractors with records of default and incompetency continue to bid on school construction jobs and are awarded the contracts. Generally speaking there has been little or no choice but to accept the lowest bidder regardless of his integrity, financial responsibility or competence.

The Practice of Pre-Qualification

Pre-qualifying a bidder refers to the process of determining and evaluating a bidder's qualifications before the issuance of drawings and specifications and before a bid proposal is submitted. The practice involves a determination that a bidder is qualified to do a job before he is permitted to bid on it. This is contrasted to the usual practice of qualifying a bidder *after* he has bid — the latter practice is known as post-qualification.

The practices of pre-qualification and post-qualification are followed in the various states. Many states have pre-qualification requirements on highway construction. Utah, Oregon, New Hampshire, New Jersey and California have requirements for pre-qualifying bidders on all public work.

The advantages of the two methods have been debated for many years. Some of the advantages favoring pre-qualification that have been demonstrated in the experience of those who have tried it are as follows:

1. Helps insure that all bidders who submit proposals are competent to perform the work required.
2. Helps to avoid unnecessary delays in making contract awards and avoid legal battles over who is the lowest responsible bidder.
3. Removes the temptation of awarding officials to qualify irresponsible bidders who would not deliver the desired quality of work.
4. Encourages more responsible and competent contractors to bid on school projects who do not now bid because of irresponsible competition.

Pre-qualification will not cure all evils in the process of bidder selection and contract awards. It does promise some improvement in the general quality of work, however, despite the disadvantages claimed by those who oppose the procedure.

Florida's Pre-Qualification Law

Chapter 63-500 authorizes the development and adoption of regulations for the pre-qualification of bidders on school construction projects. The regulations are to be prepared by the State Superintendent of Public Instruction, after consulting with a

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Pre-Qualify...

(Continued from Page 17)

technical advisory committee which includes representatives of recognized contractor's associations. The recommendations of the State Superintendent are to be submitted to the State Board of Education for their approval and adoption. Such regulations are to be applicable only to those school districts where the county board of public instruction elects the option to come under them.

County boards electing to come under the pre-qualification option are required to give thirty days public notice of their intent and at the end of the advertising period to hold a public hearing. Upon exercising their option the school board is required to adopt local policies, procedures, and practices to implement the state law and applicable State Board of Education regulations. Both state and local regulations and policies are to be drawn so that competition *shall be limited only to the extent that parties able to promptly perform the conditions of the contract and to respond in damages in case of default are allowed to bid.* Local policies and procedures implementing the pre-qualification option are to be approved by the State Superintendent of Public Instruction before becoming effective.

Following adoption of the option to pre-qualify and the approval by the State Superintendent of local policies and procedures, the county board of public instruction can certify those contractors who are qualified to bid on school construction projects. Contractors who fail to qualify and are aggrieved by the action of a school board are provided an appeal for reconsideration of their applications with ultimate relief available through the courts.

Follow-Up of Legislative Action

The State Superintendent has subsequently appointed the members of the Technical Advisory Committee to consult with him on the preparation of the regulations for State Board of Education approval. Representatives have been appointed from several groups having interest in, and concern for the planning and construction of school buildings in the State of Florida. These groups are:

- The Florida Association of Architects
- Florida School Boards Association
- FEA Department of County Superintendents
- The Associated General Contractors of America, Inc.
- Florida Engineering Society, Inc.
- Florida Association of School Planners

This committee will meet at an early date to consider the preparation of regulations as required by Chapter 63-500.

Conclusion

This new law makes possible more complete control of the bidding problem by the school board but within a framework of state regulation. Adequate safeguards are provided in the law to reduce the possibility of abuse of the competitive bidding principle, and at the same time, should encourage responsible competition among competent contractors. A degree of uniformity is possible through State Board regulations, yet differences in local conditions are possible through variations in local policies and procedures to be followed in the implementation of state regulations. Aggrieved contractors, should there be any, have an appeal and a means to seek relief.

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Museum of the Arts

By GEORGE M. POLK, A.I.A.

First of all, if you ever get the chance to conduct a competition, do it, by all means. You won't get rich but you will get a look at the architecture of your community that few architects get.

When I accepted the job as adviser for the Museum I thought my biggest hurdle would be getting approval from the A.I.A. in Washington. This turned out to be the least of my worries and Mr. Pettingill promptly answered all my letters.

The A.I.A.'s *Circular on Architectural Competitions* is not the easiest document to understand but with perserverance and an old competition circular it all soon made sense. Later on I was thankful for some of the basic paragraphs that held the competition together.

There is, of necessity, much typing and retyping of the program and unless you are careful the time can get away from you. To add to this, the printers I had experience with are not in a position to rush you through to make up any lost time! They already have their own problems.

Due to this natural slippage in the time machine it is good to allow entrants about half the competition time to make their registration entry rather than the two weeks I had originally thought sufficient. Also the closing date should state a specific closing time or you may have to wait up until midnight to receive a few entries.

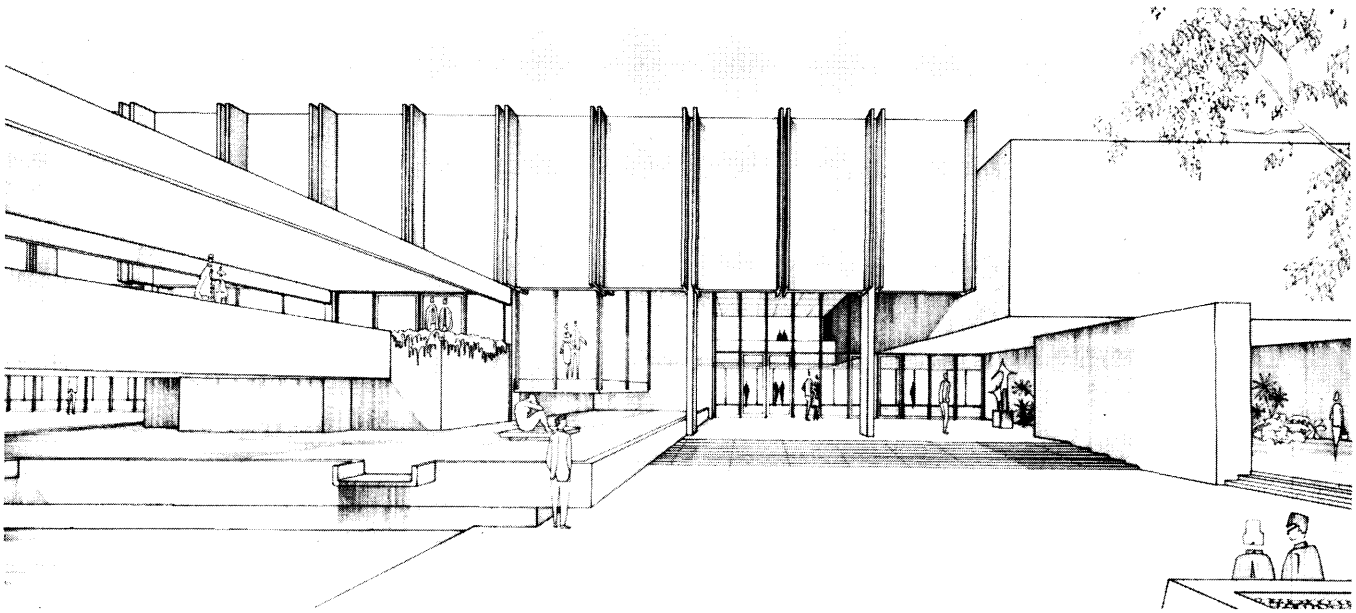
It is a great help to have, as in my case, a Museum Director who had a good idea of his space and functional requirements.

The most enjoyable part of the whole job was the judging. The advisor is not a judge but he is present to assist the jury in answering questions and going after coffee. Our jury consisted of men, experts in their fields, who were quick to see and analyze the good and bad points of each design. Besides the winners there will be several designs of good quality that the jury will want to recognize so it's a good idea to have several honorable mentions, or some sort of recognition of merit.

At last, a few words to the contestants. The competition is conducted to get something special in the way of a building for the owner. *So give your entry character and charm.* This does not mean it has to be far out or really gooked up but it should not be a run of the mill type of solution.

Whatever the design it should be well presented, get the best rendering you can, pretty pictures are not architecture but a good design deserves the best. Don't think a good rendering will cover up any sloppy thinking. The jury knows the score and will still notice any weak points even in a good presentation. There is a time for questions in the course of the program and contestants can ask them then or not at all.

Follow the rules as to size and number of sheets and get your entry in early, the advisor will love you.



Shown above Award Winning Design . . .

First prize of one thousand dollars was awarded to two young Fort Lauderdale architects, Charles Duemmling and Edward R. Bywaters. The Competition, limited to Broward County Architects, was well supported by them. The Advisor sent out over sixty programs. There were thirty-three registered entrants and twenty-three design entries.

Pre-Qualify...

(Continued from Page 18)

State laws require rigid qualifications for the architect who prepares the drawings and specifications for school buildings. These laws also require that engineers performing design services for public building have certain qualifications. Such laws are designed for the protection of the public interest, yet the people who actually construct school buildings have no legally prescribed qualifications. Is this consistent? Chapter 63-500 is at least a beginning in the direction of safeguarding the public interest from irresponsible and incompetent contractors on school buildings and should prove to be a valuable device in expediting contract awards, in restricting bidders to those competent to do the job, and, most important of all, in helping school boards get better quality work for the taxpayers' dollar spent on school construction.

Book Review...

The Houses of St. Augustine, 1565-1821 is the first and only comprehensive book covering notes on the architecture for that period in St. Augustine and hence in Florida.

The book published by the Saint Augustine Historical Society, 22 Saint Francis Street, St. Augustine; is authored by Albert Manucy. It is an important contribution to Floridana, of interest to all architects and other professionals in the building fields and to all students of Florida history.

Albert Manucy is a native of St. Augustine, whose ancestors came to the city in 1777. He is a recognized authority on Spanish colonial history and has a number of books to his credit, including *Artillery Through the Ages*, *The Fort at Frederica* and other historical works.

A graduate of the University of Florida (BAE 1932; MA 1934) he has been affiliated with the National Park Service since 1938 in various professional capacities. His most recent work embraces the planning and development of museums at the New Orleans War of 1812 battlefield and the early French and English sites in Florida and Georgia; also restoration projects at St. Augustine's Castillo de San Marcos. In 1962 he visited Spain on a Fulbright Research Scholarship to delve into Spanish colonial archives.

Conference...

(Continued from Page 8)

9:45 A.M.—*Florida State Department Personnel in Vocational and Technical Division.*

11:45 A.M.—*Reactor Panel.* Moderator—Dr. E. L. Kurth, Assistant Director for Program Planning and Coordination. Architect participation invited and desired.

Afternoon Session

Andrew J. Ferendino, A.I.A, Presiding.

1:30 P.M.—*Implications for Campus Development.* John Shaver, AIA, Salinas, Kansas.

2:00 P.M.—*Instructions to the Committee.* Dr. E. L. Kurth, Assistant Director for Program Planning and Coordination.

2:15 P.M.—Committee Meetings

Evening Session

6:00 P.M.—Dinner Meeting. Speaker to be announced.

8:00 P.M.—Committee Meetings

SATURDAY, JANUARY 25

Dr. Roy Bergengren, Presiding

8:00 A.M. to 10:00 A.M.—Committees.

11:00 A.M.—*Summary of Conference.* George Meggison, Architect.

Registration fee is $5.00 per person and does not include meals. Reservations should be made direct to The Causeway Inn, Courtney Campbell Causeway, Tampa, Fla.

Student Chapter . . .

The Student Associate Chapter, FAA., AIA, of the University of Florida has a total membership of 45 currently. Officers are: President, Ted Schumy; Vice President, Chris Benninger; Secretary, Robert A. Morris and Treasurer, Mallory Crank.

Changes . . .

Lowell L. Lotspeich announces the opening of his office for the practice of architecture at 235 Knowles Avenue, Winter Park, Florida.

January Issue . . .

The January Issue of this publication will be the *Annual Presidents Issue* and will, in addition report activities of the Annual Convention including the Resolutions Committee Report.

Quality . . .

(Continued from Page 9)

cerns of The American Institute of Architects. Certainly I cannot report on the work of our fifty-four national committees, nor the activities of their counterparts at the local, state and regional level; nevertheless, I believe that the members of your council, both as materials men and as American citizens, will find themselves interested now and affected ultimately by the way these concerns are finally resolved.

Strangely enough, in our one hundred and seventh year, we have a national committee at work preparing a definition of an architect. There are quite a number of definitions already in existence, and I confess I have heard over drafting boards and in estimating rooms, and especially on the job, other definitions of an architect—some of them unbelievably colorful and often accurate. The purpose of obtaining a comprehensive and sound definition of an architect is to have such a definition form the basis of a model registration act useful in all states. To be legally acceptable and effective, the definition of an architect should describe his academic training as well as his professional experience. It does seem obvious, at least to us, that a professional man should be licensed to do those things for which he has been especially trained. The need for this definition, and the model law which will follow it, is an immediate, and basic concern.

In the field of education, a special commission on Education of AIA has proposed that we study in depth a new form for a school of architecture —or better said, a school for the design disciplines of the building industry. More cooperation is demanded of the architect, the structural, mechanical and electrical engineers, and the landscape architect than ever before. That these men should be well educated, cultured persons as well as technically able professionals is now universally accepted. So the new school would first of all require a bachelor or arts degree as pre-requisite for admission. Within the school, perhaps during the first year, studies would be identical for all of these design professionals including architects, engineers, landscape architects and city planners.

As each man continues in such a school, he would accept those courses designed to develop his particular interest, and hence would ultimately graduate as an architect, or engineer, or in one of the other design disciplines. A further requirement in the school would be that from time to time, men in several of these design disciplines would work collaboratively —to the end that each graduate of this school would learn to understand, respect and collaborate with others—and so be prepared for similar cooperation in his private practice. With such a worthy object in view, you can understand why this study is an immediate and major—and very exciting concern.

Day dreams and castles in the air are not necessarily bad themes upon which a talk of this kind might end. People seek a variety of conveniences and pleasures in today's complex urban life and our population is steadily expanding.

If we are to satisfy both the quantative and qualitative needs of this vast building program, we must all give a superior performance—both in our individual efforts and in greater rapport with each other—but, if I may offer one additional thought, *we must also assume a greater responsibility.* I doubt whether the most efficient discharge of our respective duties will produce an environment of quality if we define these duties in narrow professional terms.

We cannot continue to build a handful of beautiful buildings and other structures in a sea of ugliness. J. Roy Carroll, President of the American Institute of Architects has said, "Your fine materials, the most ingenious concepts and our beautiful structures can do little to enhance a community blighted by street signs, billboards, overhead wires, traffic jams, junk yards, parking lots, and garish gas stations. We are getting the reputation of being the ugliest country in the Western world and, unfortunately, we deserve it!"

Engineers, contractors and material suppliers have just as much business being concerned with the beauty of our communities as does the architect. If we can create efficient and beautiful structures in an efficient and beautiful America, we will at least have made a contribution worthy of the thousands of years of building tradition that is our legacy."

Architects of Matter

(Continued from Page 15)

or never, limited by the uncertainty principle, and, therefore, we could and should make more use of models incorporating the primary functions, which, if we have identified them correctly, will provide self-evident proof of the essential validity of the concepts. On the other hand, models incorporating many of the characteristics necessary for particular functions are already available in nature, and could be used as analogs to define essential requirements in form and structural arrangement.

5. If we, metallurgists and "materialists," are to take as our province what I call "the architecture of matter," the deliberate assembly of available materials and principles to perform *preconceived* functions, then thought must be given to the principles of dealing systematically and quantitatively with the organization of complex functions and phenomena. As a preliminary step, we might begin by re-examining the growth processes that nature uses to solve its complex problems in form and function.

6. Since the aspect of form has not been discussed, I shall conclude with a final example of the intricate structures designed to house microorganisms in the sea (Fig. 9) (**6**) and with a quotation from Alan Watts: "Without losing their normal breadth of vision the eyes seem to become a microscope through which the mind delves deeper and deeper into the intricately dancing texture of our world" (8).

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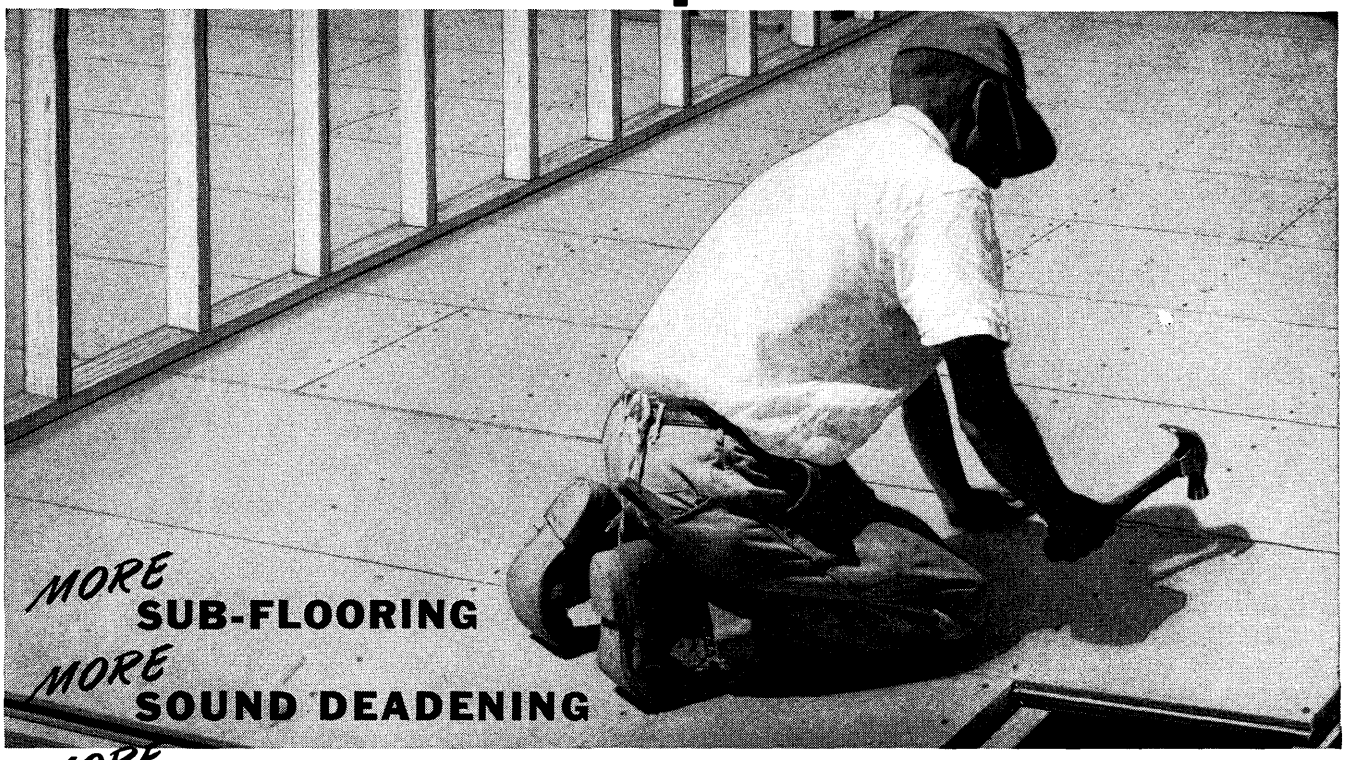

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- **A SHIFT IN THE FOCUS OF FEDERAL RESEARCH** seems to be in the making. For years, the emphasis of the billions spent annually by the government has been on defense programs. Now Administration policy makers expect to place more emphasis on basic research. They are thinking about the areas that should be studied . . . the resources to be devoted to this work . . . etc.

  The shift could have very broad implications for industry. New products and processes may be devloped faster, in as yet untapped fields, when they no longer must be by-products of defense work. For a time officials will grope their way.

- **THERE'S A SUBTLE CHANGE IN ANTITRUST POLICY UNDER WAY** in Washington. It stems from certain conclusions drawn about the so-called "administered" prices. That they exist no one wants to deny. But it's now felt that they are not as important as originally thought. The downward drift in major materials until this year demonstrated that the forces of the market may be more important than the price-setting power of a few dominant coporations.

  Implications for policy? That from here out the policing agencies — Justice and Federal Trade — will concentrate more on old-fashioned type cases of monopoly or price-fixing — and less on trying to prove that prices are administered.

- **PEACE AND PROSPERITY** — that will be Kennedy's program for next year. He'll hammer away at this theme no matter who proves to be the GOP nominee. His strategists feel it will be effective against Goldwater or Rockefeller. "You never had it so good" has worked well in the past for many Presidents. But to make his slogan pay off, the economy has to be firmly on an uptrend. That's why Candidate Kennedy will keep on pressing for his tax-cut program.

  The Republicans have already opened up on Kennedy . . . to slow him down before he can get his 1964 campaign rolling with unstoppable momentum. The GOP's big guns have been pounding his foreign and domestic policies — spending . . . civil rights . . . balance of payments . . . Viet Nam . . . Castro and Cuba . . . etc.

...And On Earth Peace, Good Will To Men...