

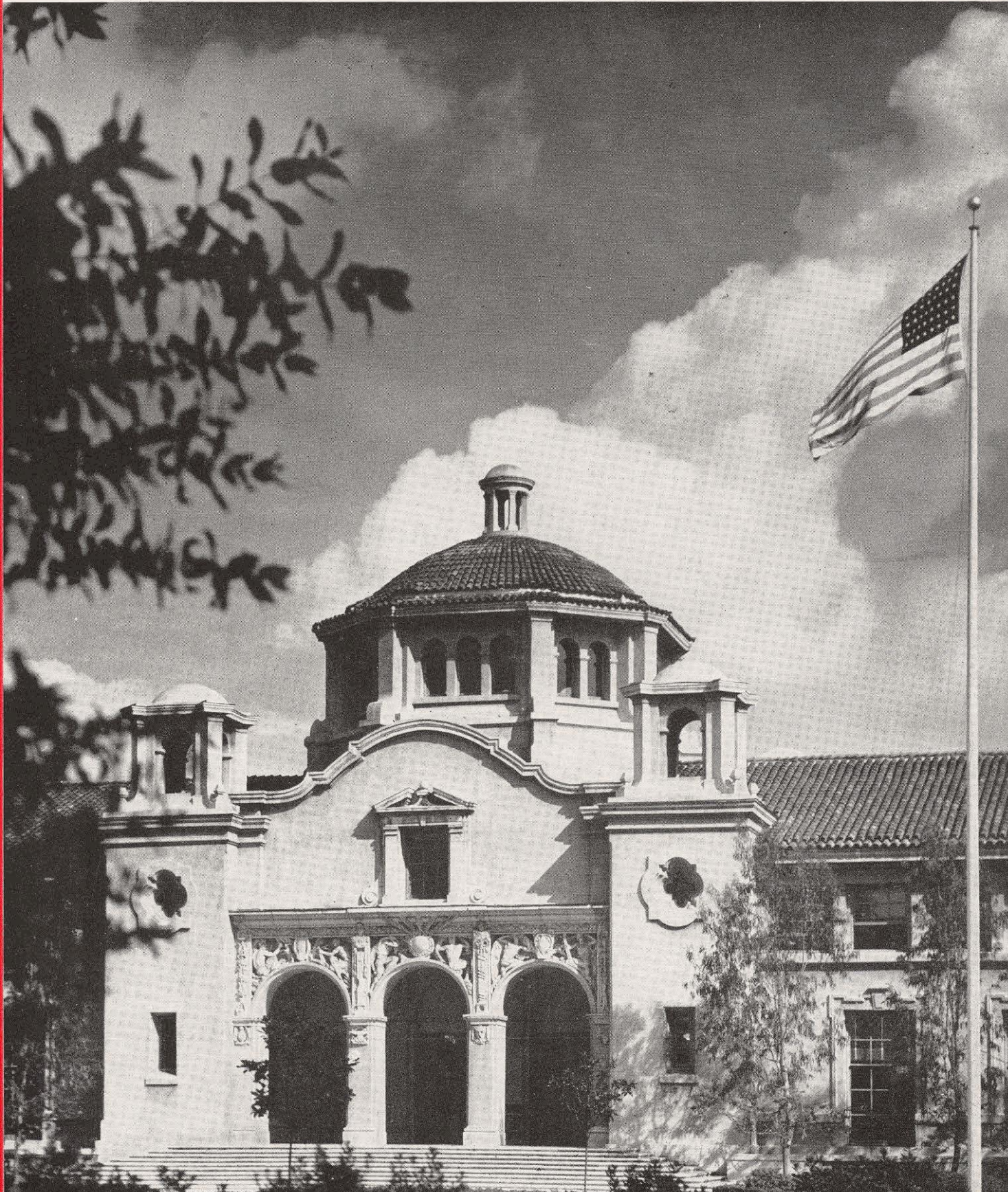
ALUMNI REVIEW

CALIFORNIA INSTITUTE OF TECHNOLOGY

Vol. 4 No. 3

March, 1941

FOURTH ANNUAL SEMINAR WEEK-END • APRIL 5-6





“My! How Handy!”

“A pump right in the kitchen! What’ll they think of next?
You’re a lucky woman, Josephine.”

LUCKY? Yes—compared with toting heavy pails of water from an outside well. But if Josephine was lucky, what about her granddaughter of today, with her modern electrified kitchen?

With electric lights, granddaughter doesn't have to fill and clean lamps. With her electric refrigerator, she doesn't have to keep the butter and milk in the cellar in warm weather. Her electric cleaner makes it unnecessary to tear up the carpets every spring and lug them out and beat them. With her electric range, she doesn't have to cook over a hot stove. And the furnace keeps the house at the right temperature without her going near the cellar.

Even if electricity's contributions to better living had stopped here, we'd still recognize it as one of the greatest benefits of our century. But electricity goes much further. In every branch of industry it helps to make manufactured articles available at such low prices and in such quantity and variety that more millions of people can enjoy them.

For more than 60 years General Electric scientists, engineers, and workmen have been making electricity more useful—creating for all of us hundreds of comforts unknown to any former generation. Their efforts today are producing More Goods for More People at Less Cost.

*G-E research and engineering have saved the public from ten to one hundred dollars
for every dollar they have earned for General Electric*

GENERAL  **ELECTRIC**

952-10

ALUMNI REVIEW

ALUMNI ASSOCIATION, INC.
CALIFORNIA INSTITUTE
OF TECHNOLOGY

VOL. 4, No. 3 MARCH, 1941
PASADENA, CALIF.

Published four times a year — September, December, March and June by the Alumni Association, Inc., California Institute of Technology, 1201 East California Street, Pasadena, California. Annual Subscription \$2.50, Single Copies \$0.65. Entered as second class matter at the Post Office at Pasadena, California, on September 6, 1939, under the Act of March 3, 1879.

All Publishers Rights Reserved.

STAFF

Hugh Colvin, '36 *Editor*
Union Oil Bldg., Los Angeles

Robert Barry, '38 . *Business Manager*
5023 Denny Ave., No. Hollywood

George Langsner '31 G. Austin Schroter '28

Albert Atwood '32 William H. Mohr '29

Bill Birdsey '34 Lawrence Baldwin '35
Theodore C. Combs '27

CONTENTS

MARCH, 1941

INDUSTRIAL DESIGN ENGINEERING by J. Paul Youtz	2
GOVERNMENT AND WELFARE by Professor E. L. Thorndike	5
THE VALIDITY OF PERSONALITY TESTS by Robert T. Ross	7
OVER THE VENEZUELAN ANDES by Ed Layton	9
INDIA by Sid Zipser	12
HIGHLIGHTS OF THE FOURTH ANNUAL ALUMNI SEMINAR WEEK END	14
OF INTEREST	20
NEWS OF THE CLASSES	23

EDITORS' NOTES

ABOUT OUR AUTHORS

Dr. Edward Lee Thorndike, Professor of Psychology at Teachers College, Columbia University, has long been noted for his studies in psychological testing, and still more for his efforts in the advancement of culture and general well-being. Never satisfied, in the true scientific spirit, with time-worn reasons advanced for human behavior or definitions of culture or attainment, Professor Thorndike has spent most of his life endeavoring to bring fresh viewpoints to the fields in which he has labored, and judging by the comments of the press and of his contemporaries has been markedly successful.

While in Pasadena this spring, Professor Thorndike presented three lectures on the subject of "Welfare" at the Athenaeum, talked at a student assembly, and attended many seminars and discussion groups. One example of his interest-provoking studies cited several times during this period was the apparent fact that not many people exist who are not doing approximately what they want in their occupation. A prize example of this, uncovered in a recent survey, was that of a railway crossing guard who liked his job of raising and lowering the gate so much that on his day off he would go down the line a few miles and watch a friend raise and lower his gate. Another survey reported on was a study of 400 unemployed persons, of which psychological tests indicated only two had creative-type minds.

Continuing in the field of psychology, Robert T. Ross, '27, Assistant Professor of Psychology at Stanford University, discusses the validity of personality tests. Present-day personnel departments, especially in large industrial organizations, have been making increased usage of personality tests in the selection of job-applicants, and Dr. Ross discusses some of the values and limitations of these tests.

No articles in the December issue, or perhaps in any preceding issue, attracted such widespread comment as Sid Zipser's story of his photographic tour of the Orient. Or could it have been the picture that accompanied the article? At any rate, Sid continues his expedition in this issue, with the accompaniment of six of the best travel pictures we've seen anywhere. Since returning from his trip, Sid has supplied Asia and the National Geographic magazines with several examples of his art, and has won several prizes in photograph exhibitions.

Another interesting series started in the December issue was Ed Layton's story of his experiences in Venezuela. Ed also is back in the Review, this time with the narrative of a trip over the famous Trans-Andean highway.

LIFE VISITS TECH

LIFE Magazine in its March 17 issue paid a tribute to the Institute by devoting several pages of pictures and comment to life at Tech. "Here," said the editors, "students study not the sciences, but Science . . . and watch Masters tackle basic problems."

WILL
SEE
YOU
AT
THE
ALUMNI
SEMINAR



SATURDAY
& SUNDAY

APRIL
5 & 6

INDUSTRIAL DESIGN ENGINEERING

By J. PAUL YOUTZ, '17, *Research Fellow in Physics*

Whatever may have been true in the early days of American industry, the pressure for enormous production rates and low cost leaves no place for designs that ignore the latest products of the chemist, the toolmaker and today's habits of living. Manufacturing facilities involving millions of dollars of investment and the productive ability of thousands of trained workmen cannot afford to guess at public acceptance of their products. A new profession resting on the shoulders of the engineer, guided by the needs of the merchandiser, and seeing with the eyes of the artist, is making industry more productive and its very output more attractive, more effective for those who must live and work with it.

From time to time in ages past, some outstanding genius has combined the (1) knowledge of the science of his time with (2) a feeling for materials, (3) an understanding of the needs and the habits of his time, all held together with (4) a constructive form of art, and the result was a Leonardo da Vinci or a Christopher Wren. Many others more obscure because of a weakness in one or more of these four qualities, have lived to make some additional small contribution to the progress of the world. But only in the age of mass production, low manufacturing and distribution costs and startling new materials like the plastics can the work of one person really affect every one, quickly and decisively.

The economical, efficient use of material always is a thing of beauty, certainly to the engineer. The proper forming and application of those materials as applied to everyday living goes far to make such a product sell in vast quantities. A visit to those stores specializing in articles of mass distribution and low cost indicates the trends in habits and the buying preferences for graceful, light, colorful, inexpensive, practical objects. No longer is it the privilege only of the wealthy to have beautiful things, new things — unless the very possession of those things is indeed a new form of wealth.

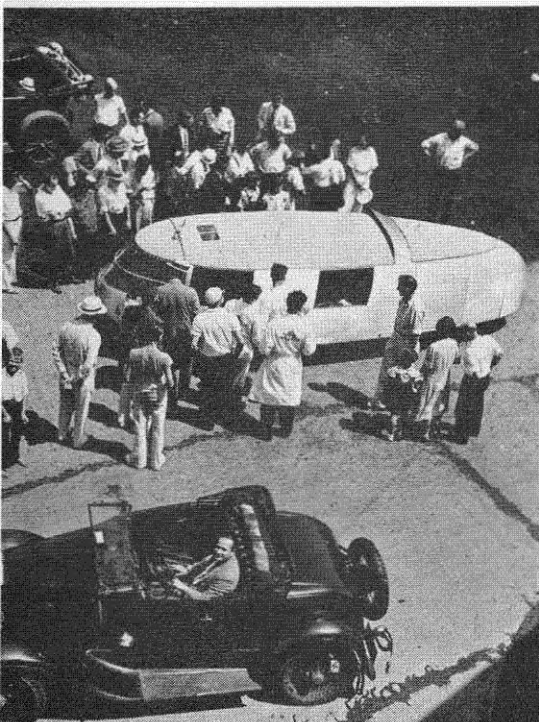
The United States of North America is a new country as a nation, new in its ideas, its method of life and its wants. We

who live within its boundaries have no interest in or reverence for antiquity for its own sake, but we will often go to the extreme for some new development. In fact, the whole world is rushing for something new, a new color for milady's toenails, a new coiffure, the latest in clubs and restaurants, books, autos, homes, "New Deals," "New Orders," and new debts. Obviously these are not all better, cheaper, or larger, and frequently they are even masquerading under a false use of the word "new." Nevertheless we all recognize the word "new" as potent in everything from a real estate subdivision to an Easter costume.

Much waste can occur when newness means only something different. To be different may mean only being odd, not better. However, a better thing will not be odd for long, and it is the Industrial Design Engineer's job to see that all our new things are really better so that our quantity production experts will never have to face the high cost of a few odd sales but rather only the problems and economies of mass acceptance.

An artisan takes pleasure and pride in a well-conceived and well fabricated object, but his pride continues on to its successful performance in service. While art for art's sake may teach us to make clay birds to ornament the chimney tops of an office building or a museum's shelves or even the odd corners of the home, the *artisan* has given us the flight of birds for our own locomotion, including unfortunately all of nature's problems with the predatory varieties. Art patrons today are the masses who work with their hands to buy labor-saving devices, instead of those who are wealthy but no longer care to fill a vast dwelling with art bought and executed on commission. Today real art is in the mail order catalogue, because of mass production and efficiency born of low prices; in fact, it was there well before it found the exclusive shops. Art is no longer a thing for the few, the product of those remote from modern life, working by whim, starving for fame. Today lawn-mowers, refrigerators, autos, office equipment, labor-saving devices for the home are beautiful, not with only a shell of beauty, but designed to be a harmonious unit, doing their work efficiently and looking smooth and business-like.

The few hundred autos that were in fact horseless carriages were queer things even when thought of as oddities, and oddities they would have remained except for the halting year-by-year struggle of mechanics and salesmen and owners to re-design them, and the last six years' efforts of artists to re-style them. Today one large motor manufacturer alone will employ hundreds of designers trained as artists, and many *retrained* as engineers, making the product a harmonious whole, "fitting the purse," satisfying a love for beauty and color, and offering the elegance of the salon. The first auto no doubt gave its inventor worry enough without considering balance of form and harmony of color. The engineer, by making functional improvements, simplified the manufacturing operations and made a smoother, better balanced product. The designer contributed a better balanced exterior and thus forced the use of still better balanced mechanisms. Thus the two have steadily grown to-



Left: *An interesting example of the product of the inventor and designer contrasted with the contemporary product of the engineer and manufacturer, 1933.*

ward each other.

Many years ago a much revered professor of machine design at the Institute cautioned his class that many things that looked all right might be quite wrong, but nothing that looked all wrong could possibly be all right, at least mechanically. This strong appeal for the approval of the eye is a powerful appeal to the pocketbook — witness the beauty shops and the benzine buggies — and of course a real sales appeal does much to keep the factory running at a profit.

Back in 1920 industrial design came from artists, architects and sculptors, even stage and costume designers. The manufacturers were nearly forced to give up design attempts because of the mannerisms of the designers and their pride in a complete lack of knowledge of engineering and production problems. But a few designers were quick to learn, and the factory heads have been patient teachers.

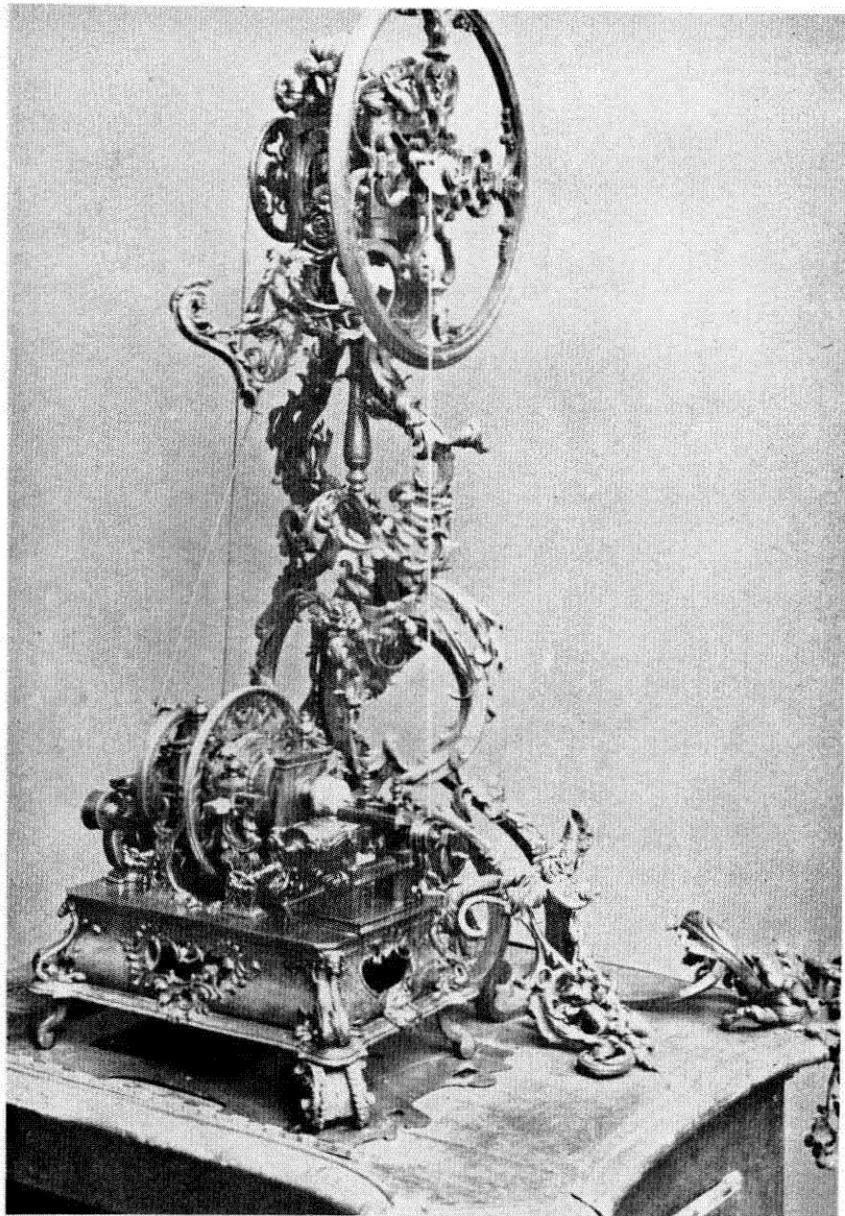
Many are the industrial stylists and far too few are the real industrial design engineers — but while the first, like the stage designer, may change the American scene with a new wrapper for the old locomotive, the real industrial design engineer understands the problems of the mechanical and the structural engineer, the production man and the sales engineer, and works with them on the design just as an electrical or civil engineer must work with the related branches on the plans of a power plant, factory, or school.

“EYE APPEAL” IN DESIGN

Many engineers, and in fact most of the buying public, today cannot tell you just what constitutes good design. When asked, they will most often describe “eye appeal” for their definition. If they mean the factors of good taste that appeal without imposing on our consciousness directly, they are partly right. If they mean a device which works smoothly, silently, efficiently, and looks the part, they are again partly right. When you get the comments of the production man in the tooling division, you will appreciate the following from the magazine, “Product Engineering,” written by Ken Lane:

The designer bent across his board,
Wonderful things in his head were stored.
And he said as he rubbed his throbbing bean,
“How can I make this thing tough to machine?
If this part here were only straight
I’m sure the thing would work first rate.
But ’twould be so easy to turn and bore
It never would make the machinist sore.
I better put a right angle there
Then watch those babies tear their hair,
Now this piece won’t work, I’ll bet a buck,
For it can’t be held in a shoe or chuck.
It can’t be drilled or it can’t be ground
In fact the design is exceedingly sound.”
He looked again and cried — “At last —
Success is mine, it can’t even be cast.”

Industry rightly expects a real job of good design to mean low cost production for volume sales. Ask the salesman and you will find he thinks of “good design” as something that makes people have a friendly feeling toward the product, a



Above: An intricately ornamented “rose engine” designed in Germany in the Seventeenth Century for metal engraving. The ornamentation was intended to disguise the nature of the machine in a mistaken effort to “beautify” it.

desire to have it near them, that offers something new and fresh in style, that fits into the purchaser’s scheme of living, and keeps them as good repeat prospects.

The “something new” design period (even when the selection, color scheme and all, was referred to the new girl in the file room) hit American industry about 1934. Judging from some of the results, especially as to color and balance, quite a number of talented young ladies must have worked for the many heavy industries, because many of the results were a big improvement over the ideas of the superintendent of production. After spending thousands of dollars on new drawings, contemplating thousands more in new jigs and tools, occupying the best minds in financial, sales and production departments on the problems for weeks, it was indeed fortunate that the file clerk could be familiar with buying habits of the nation, the preference for color in each geographical district and price class, that her knowledge of form and balance had been perfected by careful study, her judgement well-trained to decide whether the banker, the sales manager or the sales superintendent was backing the wrong design.



Above: *An illustration of the progress in design from the inventor's model (on right), through the merchandiser's improved type, and finally to the industrial designer's finished container in plastics (on left), which combines distribution packages as well.—Designed by Virginia Merrill.*

Good tools are obviously beautiful to a good mechanic because of their ability to turn out the work. Their appearance, due to the utilization of new processes and materials such as profiled steel and electric welding with their resultant lighter weight, lower cost, quicker delivery, does not directly concern the mechanic. Yet offer him a job in a new plant where they have all the latest tools, and he will think and speak first and often about the *new* plant, brag about the *latest* thing, etc., even though the new tools may not turn out more or better work than he turned out on the big, heavy and expensive power wasters he used before. If he does turn out more work and take better care of his tools, it will be largely because of some change the new surroundings have produced in him. Living with modern design produces a feeling of which we all are capable but the exact reasons for which few can analyze, and it is no doubt this for which we strive in our search for the "New."

DESIGN AND PERSONALITY

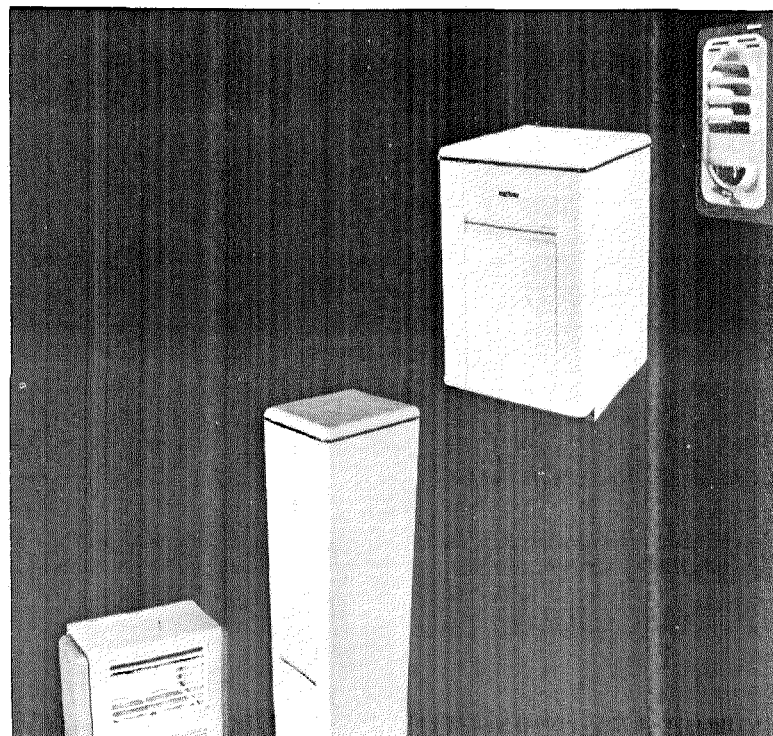
The household reflects the personality of those individuals who form its very heart, but the surroundings, in turn, influence the personalities in their daily contacts with each and every function contributed by these minor items. The pleasure and convenience of a well-equipped establishment often are responsible for the pleasing personality ascribed to the hostess. Articles of good taste and good design, satisfying proportions and over-all attractive appearance cost no more to manufacture than many of the atrocities marketed for those who do not appreciate simplicity and the straight-forward application of sound functional principles.

March, 1941

For those who do not now appreciate these advantages, the design engineer makes it possible for the manufacturer to offer the appeal of a saving in cost and a more efficient and more durable product. The builders of early steam engines, faced with a pride in their product and in a distorted sense of the methods of improving that product, tried giving the customer vast expanses of cast-iron scroll work, elegant capitals and pedestals on fluted columns instead of truly structural parts designed for their function in the machine. Early German machinists so embellished their tools that it was quite impossible to discover their purpose for many years after they had been incorporated in the collections of some of the large museums. The engineer is primarily interested in function, and his task and that of the industrial design engineer are much alike; namely, that of getting the lowest cost and the greatest efficiency available to the greatest number. The techniques of the designer, the renderings of the artist, the dreams of the inventor, and the analysis of the merchandiser are all vital parts of an industrial engineering design project.

Design applied to aviation finds function, freshness, and simplicity an essential part of the engineering. In fact, aviation has taken up all the tools of the Industrial Design Engineer as its own, not as a guiding method, as in the automotive industry, but as the underlying expression of all its design and presentation. It is fitting that America's newest and most vital industry should have taken advantage of the forward steps offered by the methods of the Industrial Design Engineer in studying and presenting his problems and their solutions. As time goes on, all industry will benefit from the more graphic and exact expression of functionalism.

Below: *Design of a complete line of gas heating equipment showing two automatic water heaters and two circulating heaters, one designed for recessed installation in the building wall. These products were designed to eliminate the need for castings and expensive details.—Courtesy Day and Night Water Heater Company, Designed by Baermann and Lewis.*



GOVERNMENT AND WELFARE

PROFESSOR EDWARD L. THORNDIKE

Columbia University

Editor's Note: During February and March, Professor Thorndike, noted psychologist from Columbia University, gave three public lectures at the Institute on "The Psychology of Welfare." We print here the bill of specifications for the welfare of a human individual which was presented at the first lecture, and the closing portions of the lecture on "Government and Welfare."

The possession and use of power tends to justify itself to the possessor, and to progress toward tyranny, benevolent or otherwise. This is still true if power is held as a representative, or as a trustee, or as an annointed servant of God. It is still true if it is held by a group or a party, or a government. The relation of ruler to ruled is easily confused in the ruler's mind with the relation of owner to owned. The ruler thus taxes his subjects to pay for his personal pleasures, or rents them out as the Hessians were rented out to George the Third, or kills them to gratify his aims of conquest. "I can spend 70,000 men in this campaign," said Napoleon. These and other facts support the contention that no man is good enough to rule other men. But somebody must.

There is a wide range of reputable opinion concerning the proper scope of government. At one extreme are those who would confine government to its primary historic function of protecting the group against attacks from without and from the acts of bad men within, plus extensions to protection against pestilences and other preventable diseases, bad money, extreme ignorance, and misfortune. At the other extreme are those who would have government control education, recreation, transportation, communication, the instruments of production, the planting of crops, the distribution of commodities, customs, creeds and even many details of personal life.

The last always claim that their extensions of the scope of government are in the interest of welfare. But the evidence that the actual consequences of any given extension are better for welfare than what private enterprise and private philanthropy would have done with the tax money is not convincing. We may say roughly that welfare in Europe in 1850 was not much greater than in 1450, but increased very rapidly till about 1910. Real wages, for example, came to be about twice as high. This period from 1850 to 1910 was a period of social legislation and extension of government control, but it was also a period of extraordinary advance in science and technology. The rise in welfare may have been caused by the latter much more than by the former.

Various principles have been proposed for deciding what activities should be turned over to local, sectional, and national governments. But none of them are absolutely sound. And few of them are important in comparison with the question of the intrinsic merit of the activity. It is important to get iodine into the diet of the mountain states, and to do it cheaply. But whether it is done by federal legislation, state legislation, a combination of grocers or private philanthropy seems secondary.

A Bill Of Specifications Of A Good Life For Man

1. Maintenance of the inner causes of the joy of living at or above their present average.
2. Food when hungry, and drink when thirsty.
3. A diet that is physiologically adequate.
4. Protection against pain-causing animals.
5. Protection against disease-causing organisms, poisons, and other causes of disease.
6. Protection or insurance against accidents and disasters, such as floods, earthquakes, wars, for which the person in question is not responsible.
7. Protection against extreme shocks, fear, and strains.
8. Some room or place where he can rest undisturbed, protected from the elements and from bad or uncongenial men.
9. Enjoyable bodily activity, especially when young.
10. Enjoyable mental activity, including esthetic pleasures.
11. Opportunity for human society.
12. Opportunity for courtship, love, and life with one's mate.
13. Opportunity to care for children and to be kind to human beings and animals.
14. The approval of one's community, or at least the absence of scorn or contempt.
15. The approval of one's self, self respect, the absence of shame and remorse.
16. Opportunity to have friends and affection, if deserving of them.
17. Opportunity to be a friend and give affection.
- 18a. Opportunity to exercise power over some persons, animals, things, or ideas, making them do one's will.
- 18b. Opportunity to serve a worthy master.
19. Membership in organized groups, and the right to participate in activities or ceremonies which are (or at least are thought to be) important.
20. Opportunity to compete with one's peers winning in about 50 per cent of the trials.
21. Opportunity to compete with one's own past record, and, if deserving, to have the pleasures of achievement and success.
22. Occasional opportunities for adventure, risk, and danger.
23. Something to be angry at and attack.
24. Protection by society (via customs, laws, and government) in what is regarded by the existing moral code as a good life.
25. Freedom to discover and publish verifiable truth.

Recent investigations in psychology strengthen the arguments for control by business enterprise rather than government, in so far as business relies on stimulation by rewards and government relies on coercion by punishments. The investigations in question find that punishment is very weak as a means of preventing bad habits. The bad habit often gains more strength by its occurrence than it loses by being punished. The golden rule in managing men is to get them to do the right thing, and reward them therefor. That is one main reason why free labor is better than slave labor, and free enterprise is better than forced production.

The most important task of government in the twentieth century is the maintenance of peace between nations. No people now gains by waging war, even if they win it. Were the French people better off in fact or in prospects after the World War than before it? Was the England of 1920 richer, happier, or nobler than the England of 1910?

Reason, common sense, and history seem to agree that the aim of a government should be not to win a war, but to stop it. And this seems as true of economic or trade wars as of military wars. But old customs are so strong that nine out of ten people do not think so.

Winning a war was a reasonable solution five thousand years ago when, after a day or two of clubbing and cutting, you killed and ate your male opponents, and took their goods and women.

But today a sane and intelligent government, acting as a wise trustee for the people of any nation, should realize that a world at peace working to produce material and spiritual goods and paid fairly for doing so would be better for that nation than a world in conflict. Indeed such a peaceful world would be better for that nation than a world entirely subjugated by it and held in slavery by force.

And what shall we say of a government that confiscates the property and lives of its citizens to destroy the property and lives of another land, leaving both gutted of all save glory, the glory of a victory for one and the glory of a valient struggle for other? The psychologist sets no great store upon glory. He sees too much of it in the patients of insane asylums, and in bullies, fanatics, cranks, and the cheap type of agitators. Glory seems to him a drug, rather than a food for the soul. He much prefers health, comfort, and achievement to glory. He prefers peace with honor to victory with glory. But many people do not.

It is not the logic or rational self-interest of a nation, or of a government acting as trustee for the nation's welfare, that makes it go to war. It must be its psychology.

Psychologists have barely begun to study the motives of nations and governments, but I may venture some suggestions concerning certain neglected psychological causes of trade wars and military wars.

SELLING WOODEN NUTMEGS

People and rulers are often moved by the passion to outwit, outsmart, get the best of a bargain. They enjoy selling another nation wooden nutmegs, so to speak. They suffer from the vices of the confusion of a feeling of personal superiority with the fact of actual long-time benefit to themselves. Business has been outgrowing this. Fifty years ago Andrew Carnegie pointed

out the folly of this caveat emptor way of doing business and laid down the rule of "Make sure that every contract was to the advantage of both parties."

Science and technology early saw its folly. They do not try to trick a plant into bearing more fruit by giving it adulterated fertilizer, or to trick water into turning mill-wheels by a painted dam. In all their labors to use nature for the welfare of man, they never try to deceive or bluff her. Should not governments make more use of the methods of science and technology?

People and rulers are also moved by the desire for bigness, the passion to magnify their nation, in population, in territory, antiquity, etc. This gives rulers a pleasing sense of greater power, and citizens a pleasing sense of greater importance. Pleasing, but largely specious and vain. A wise Roman would have felt pride, not that Rome ruled so much of the world but that she ruled it so well. We should feel our personalities exalted not by the quantity of life and action in the United States but by their quality.

In the old times of increasing population this passion for territorial expansion could at least excuse itself as a means toward making good homes for its sons and daughters, but now when hardly a nation in Europe has a large enough birth rate to maintain its population, the excuse is very weak.

People and rulers have far too much faith in coercion by punishment. They honestly think that just as reward strengthens a tendency, so punishment weakens it. They honestly expect that if we punish a nation for acting unjustly, it will surely in the future act more justly.

But recent experiments by psychologists show that such a beneficial effect of punishment is very doubtful. (Shock experiments) If you reward a child for acting fairly, or honestly, or courageously, the reward will strengthen the tendency to act so. But if you punish him for unfairness, dishonesty, or cowardice, the punishment may not weaken these tendencies one jot or tittle. Under certain conditions it may, but often it won't. Whereas rewarding good tendencies is almost universally beneficial, punishing bad ones rarely is. The case of nations is more complicated, but I can see no grounds for expecting greater efficacy of punishment.

Coercion in general has been much overvalued. Probably we cannot get along without it, but certainly we cannot do much good by it. Persuasion is better. Education is better. Attraction to the right cause by reward is better.

A psychologist's ideal of the foreign policy of a government is that it should in general adhere to Grotius' doctrine that small nations have equal rights with large and to the live and let live doctrine of liberalism, should modestly try to direct the energy of other nations into channels useful to them and to the world as a whole, should cooperate with them and reward them when they use their energy so, should refer any disputes that do arise to a court or board of arbitration, should come before such a court with clean hands, and should not evade its decisions.

Many of you will regard this as utterly impracticable; and probably you are right. But the facts which lead psychology to advocate such an ideal in place of sharp trading, the use of dishonest propaganda, and force, are worth your serious consideration.

THE VALIDITY OF PERSONALITY TESTS

ROBERT T. ROSS, '27

Of recent years there has appeared on the American scene a new phenomenon known as the Personality. With characteristic American zeal, we have immediately set about measuring it. Indeed we have tried to measure it before we quite know what it is or where it comes from. But this may not be a deplorable state of affairs; perhaps through continued measurement we may discover what personality is, but we must not be carried away by the appeal of statistics or our unhappy tendency to attach euphonious labels to things which we really know little about.

On the other hand, we are faced with the empirical necessity of regimenting large groups of men and women so that they will function most efficiently, and the personality test has been called upon to make its pragmatic contribution to the problem, whether or not the psychologist knows or understands just what the personality test is really doing. Many psychologists feel the same puzzled concern for this child of their laboratories as the hen who has hatched a duckling, which in turn, for reasons incomprehensible to the hen, has been able successfully to swim. The personality test has, in many instances, been able to produce results which the psychologist did not expect and does not wholly understand.

The unfortunate part of the situation lies in the fact that many psychologists and more non-psychologists, impressed with the empirical success of some of the tests, have apparently concluded that the personality test is an infallible and precise device, and on the basis of that conviction lead both themselves and their unfortunate subjects into serious psychological blind-alleys.

In the light of this state of affairs, it seems worth while briefly to consider where the personality test comes from, how it is constructed and particularly some of its limitations and misapplications.

ORIGIN OF QUESTIONS

Now the first thing to remember about a personality test, and a fact too often overlooked, is that it did not spring full-blown from the distilled essence of scientific wisdom, nor was it found one spring morning under a cabbage leaf. Some patient psychologist, somewhere, wrote down a group of questions, some of which he found in text-books, some on old notes in his pocket, some from the questions of his students, some from his own and his colleagues' experience, and some he just made up for the fun of it. This is the first form of the personality test. The next problem for the author of test was: which questions should be kept and which should be thrown out.

Of course, the choice of questions to be included in the first form of the test was not entirely haphazard. Supposing the psychologist were interested in measuring what is vaguely known as "neurotic tendency," he might include such questions as: "Do you frequently feel that you are about to 'go to pieces'?" "Do you have pronounced mood swings?", "Are you bothered by a persistent feeling of anxiety?", and the like. On the other hand, he probably would not ask, "Do you prefer to put on your left shoe first?", or "do you prefer green wall-paper to

blue?" The questions which he includes in his test in some way reflect what he considers to be the characteristics of the neurotic personality which differentiate it from the so-called normal personality. But, in general, he is at liberty to include whatever questions suit his fancy.

But a decision as to what questions he is to retain in his test and which one he is to throw out is not so arbitrary a matter. In general, there are two major methods of item selection. In the first method, the test is submitted to a group of experts, and each expert is asked to rate each question, say on an eleven-point scale, as to how indicative of neurotic tendency he considered each response to be. The psychologist can then assign to each possible response a weight which will represent the consensus concerning the degree of "neuroticism" of a person who may give the response under consideration.

THE NEUROTIC PERSONALITY

In a sense, such a test is merely an elaborate definition by experts of what constitutes the neurotic personality, and the person who takes such a test indicates by his responses how well he conforms to the definition. It may be that of the five hundred questions which the psychologist submitted to the experts for their consideration, only one hundred could be selected with sufficient consistency in the opinion of the judges to justify their use. Of these, fifty, say, are answered by the subject in such a way as to indicate neurotic tendency. We cannot, therefore, conclude that the subject is fifty per cent neurotic, but only that, *of the definitional elements included in the test*, the subject conforms to the neurotic pattern in his answers to half. It may well be that had the psychologist submitted 10,000 questions to the judges, they might have selected five hundred with sufficient consistency. And it may happen that the subject now responds "neurotically" to all of the additional four hundred items. The reliability of the diagnosis depends, therefore, upon the inclusiveness of the definition presented by the test, and it becomes important that the test include a sufficient number of items to preclude large shifts of diagnosis if the length be increased. On the other hand, it is senseless to judge the utility of a test by picking out any single item and holding it up to ridicule. The diagnosis "neurotic" depends upon the presence of many minute traits of behavior. To the extent that the subject exhibits this constellation of traits, he is presumably neurotic.

The second method of choosing items is somewhat more empirical. In this method the psychologist finds, say, five hundred persons who have been diagnosed as "neurotic" and gives them the first form of the test. He then finds a group of five hundred other persons who are as comparable to his neurotic group as possible in all traits except "neuroticism" and gives them the test. In the preceding method the expert defined the neurotic *a priori*; in this method, the neurotic is allowed to define himself, and those items are selected for retention in the test in which (statistically) a significantly different proportion of the "neurotic" group have given a certain response from that of the "normal" group. Thus if 68% of the neurotics responded

that they frequently crossed the street to avoid meeting people and only 43% of the normal group so replied, the question would be retained on the basis that a person who said he often crossed the street was more apt, in this trait at least, to belong to the neurotic than to the normal group.

TESTS ESSENTIALLY DEFINITIONAL

It should be clear then that the personality test is essentially a definitional device and that the score on the test indicates how well the subject conforms to the definition presented by the test. The great difficulty is, of course, that the constellation of behavior traits which make up any psychological characteristic is so complex that no test can hope to include them all. In medical diagnosis the problem is often much simpler. If we wished to make a test for small-pox, we could include such questions as: "Do you have a fever?", "Do you have a sore throat?", "Do you have pustules?", "Do you have a backache?", etc. No single question would make diagnosis possible, yet if the whole test were "correctly" answered, we could say with some considerable assurance that the patient had smallpox. If on the other hand, he answered "yes" to "Do you have a fever?" and "Do you have a sore throat?" and "no" to the other limited number of questions which we have included in our "smallpox" test, we could be reasonably certain that he did not have smallpox. We would not be justified, however, in saying that he was not sick. In a similar fashion, if the subject does not answer all of our "neurotic" questions in pure "neurotic" style, he may not have a "neurosis" as defined by our test, but he may still have behavioral and psychological maladjustments which interfere with his happy and efficient living.

On the other hand, it should be obvious that complete conformance to the definitional intent of the test does not guarantee the presence of the trait which the test purports to measure. In the matter of neurotic tendencies, for example, it may be that there are characteristics of the personality which remain unsampled by the test and yet so influence the personality as to offset the usual action of the traits measured, so that a person may conform to the definition of neuroticism as given by the test and still show few or none of the major maladjustments of the typical neurotic. The better the test, the greater the probability that those persons who score high on the trait measured by the test will conform to the clinical picture of such a personality; but this is only a probability and remains so by virtue of the fashion in which tests are constructed.

THE PROBABILITY FUNCTION

On the other hand, since we are dealing with a probability function, we expect to find amongst those scoring high on a test a greater proportion of persons exhibiting the trait which the test is designed to measure than amongst those scoring low on the test. The better the test, the higher the probability that the differentiation has been successful.

In the light of these facts it should be clear that it is possible for a personality test to make some contribution to our understanding of an individual or a group, and that the validity of the contribution depends as much upon the interpretation of the score as upon the score itself. If we have sufficient data concerning the construction of the test, we are forearmed and forewarned in the interpretation of results obtained by its use.

But all too frequently the psychologist who constructed the test fails to give the necessary details about the test construction while he waxes enthusiastic over his claims for his test and gives the impression that he has perfected an instrument far more valid than more objective criteria would indicate. On the other hand, personnel workers are so anxious to find a valid and reliable instrument for the measurement of personality that they are apt to let their hopes interfere with their better judgment and base conclusions on test results which are misleading and sometimes false.

SINS OF INTERPRETATION

One of the major sins of test interpretation is to assume that the test results are infallible. The most extreme example of this type of thinking of which the writer is aware was encountered in the personnel department of a large industry. In this department the practice was to use a certain personality test which purports to measure, among other variables, one called "paranoid tendency." There is considerable room for discussion as to just what the test does measure by this variable, but even its authors would probably hesitate to claim that a person having a high "paranoid" score is psychotic. On the other hand, Freud (who apparently had no use for personality tests) in another connection made the statement that it is possible that the psychotic state which is known as "paranoia" is probably the result of repressed homosexual tendencies. Putting the test and the theory together, with complete disregard for the invalidity of either or both, the personnel director whom this story concerns purported to diagnose homosexuality by the presence of a high "paranoid" score on a personality test. It is obvious what serious consequences could ensue. The writer went to the trouble to obtain some examples of high paranoid scores from unquestionably sexually normal men and some low paranoid scores from some overt homosexuals. The naivete which led to this implicit faith in the personality test is much too common in test interpretation, and although it may not lead to the absurdities and serious consequences which are implicit in the example given, it is apt to becloud the real contribution which the personality test man make with the mists of misinterpretation and misuse.

A second misunderstanding in the use of personality tests is the assumption that the test measures more than its author claims for it. This type of error is especially frequent in interest tests such as the Strong Vocational Interest Test or the Theatre Interest Test developed by Lacklen and Miller. These tests present to the subject a great variety of activities in which he may or may not be interested. With the Theatre Interest Test, for example, about 250 activities are listed including chemistry, stamp-collecting, singing, and living in the country. The test has been standardized on a group of actors and a group of non-theatrical college students. It is possible to get a score which will indicate whether the subject's interests are more in conformity with those of actors or with those of the unselected group. If, however, a subject makes a high score on the test, it is all too easy to assume that he has dramatic ability, whereas all that can legitimately be said is that he would probably find the association with theatre people pleasant. It will require much more analysis and validation of existing interest tests

(Continued on page 16)

OVER THE VENEZUELAN ANDES

ED LAYTON, '24

Editor's Note: This is the second in a series of articles by Mr. Layton relating his experiences in Venezuela. The first appeared in the December, 1940, issue.

During my stay in Venezuela it was my good fortune to visit the Andean mountain country. For company I had a Venezuelan-Englishman educated in the U. S., Albert Carstens, whose knowledge of the language and customs contributed largely to the success of the trip.

Leaving Maracaibo just before noon by amphibian plane, we flew almost directly south and in a little less than two hours landed at a little airport in a mountain valley some 25 miles from the city of San Cristobal. A car was waiting to take us into town, and after an overnight stop there we traveled roughly northeast over the Trans-Andean Highway for two days by station-wagon and bus to Mototan, making overnight stops at Merida and Valera en route. A modern gasoline-propelled rail car at Mototan carried us to the lake port of La Ceiba where we caught a diesel passenger boat to Maracaibo.

The Andean mountain country is entirely different from the low, hot, humid territory bordering Lake Maracaibo. The climate is invigorating, the cities and towns are clean and attractive; even the people are much different. Averaging lighter in color than the lake-country peons, they are mainly Indian and Spanish-Indian. Their craftsmanship is apparent in the attractive wrought iron balconies and ornate doors of the houses, the hand-made furniture displayed in the shops, and the saddleries with their nicely done leatherwork. They are much more courteous and helpful toward foreigners and do not seem to resent their presence as is the case in other localities.

Lacking accurate information, I judge the elevations of San Cristobal and Merida at about 5000 feet. Both attractive cities, they are ringed with mountains which are obscured by clouds morning and evening. In December the weather was pleasantly warm during the day, but a coat was required after sundown.

Most of the hotels along the route of the Trans-Andean Highway were built some twenty years ago, soon after the highway was completed. Although travel has increased tremendously, hotel accommodations have not been expanded, and consequently rooms are hard to locate. In San Cristobal we put up at a rather obscure, side-street hostelry which was typical of the smaller places. With its front wall against the sidewalk, the front door led through a hallway to the large central patio, the middle of which was open to the sky, and which served as lobby, dining hall, and what-have-you. The guests' sleeping

rooms occupied the four patio walls, with kitchen and living quarters for the staff further back.

Our sleeping room was some ten feet wide by fifteen feet deep with a fourteen-foot ceiling. The ten-foot-high narrow doorway, equipped with the usual double doors, opened on the patio, as did the single window. Furniture consisted of two steel single cots with thin mattresses, a dresser, a tiny cracked mirror, porcelain washbowl and pitcher set, and a thunder-mug. The single 20-watt electric lamp high in the air was usable only at night, since the power lines in these mountain towns are energized only during the evening and early morning.

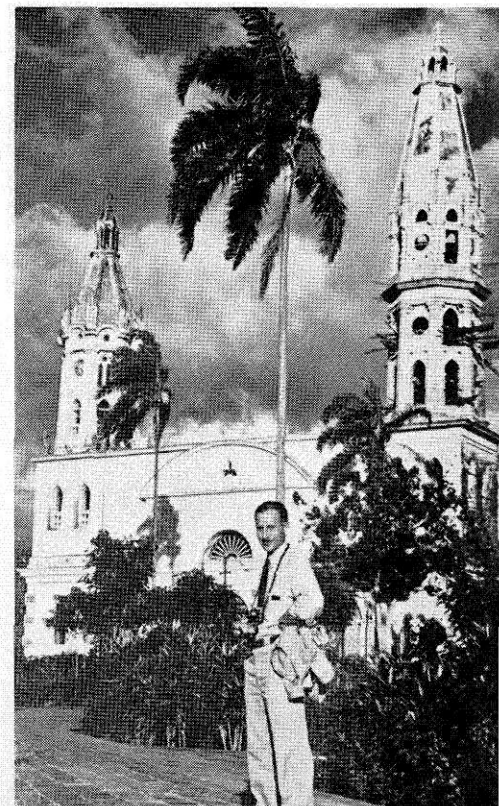
VENEZUELAN PLUMBING

With no plumbing in the individual rooms, there were four modern lavatory fixtures at various points on the inner wall of the patio, so that while we were eating breakfast next morning, other guests were washing and shaving virtually in the "dining room". A single toilet and bath room was available for all the guests. About 10x15 feet, it was floored with glazed tile and equipped with lavatory, shower and modern flush toilet. The typically Venezuelan toilet paper disposal system was included, which consists of a box or paper carton on the floor beside the "growler" into which the used toilet paper is dropped. This system had its origin in the older days when the sewer piping as first installed was much too small and would clog with paper. Since its replacement with new and larger piping, signs have been posted in most of the hotels requesting that toilet paper be thrown into the hoppers, but the force of years of habit is apparently too strong, and the box is always well occupied. Or, in the event that no box is provided, they throw it on the floor.

The food served to us at San Cristobal, although typically Venezuelan, was better than the average obtained during the remainder of the trip. Dinner consisted of soup, sliced tomato



Right: *The author in front of San Cristobal's uncompleted Cathedral.*



Left: *Typical Andean farming area on steep alluvial slope.*

salad, fried chicken, a green vegetable, the ever-present boiled white rice, white bread and butter, fresh milk or coffee, and some sort of pudding which I didn't eat. The butter, as was the case throughout the mountain region, was unsalted, but could hardly be termed "sweet," since if not entirely rancid, it was fairly ripe. The tomatoes were bright red, as they should be, and with good flavor. Because the native tomatoes served frequently at the company mess halls in the oil fields were never red, but only green to pink, I showed such pleasure at the sight of the bright red fruit that the proprietress shortly showed up with a whole platterful. We really put them away.

NO GUARD RAILS ON ROAD

The highway between San Cristobal and Merida was an almost continuous series of switchbacks. We zigged up one side of a mountain range and zagged down the other; followed a stream along a valley floor for a short distance; then repeated the climb and descent. The road was dirt or gravel, hard, and surprisingly smooth, and we frequently passed maintenance crews at work. We even saw a tractor or two pulling road machines. Over most of the route two cars can pass easily, but there are many narrow places and the many sharp turns must be taken slowly and carefully. There are no guard rails or road signs of any kind, unless the occasional roadside crosses are interpreted as warning signs.

Whenever a person dies by violence in Venezuela, it is customary to erect at least a cross and frequently a tiny shrine at the site of the tragedy; and this tradition applies to automobile accidents as well as to knifings, etc. Occasionally our driver would call our attention to a cross at the edge of the road where it skirted a cliff with the remark, "Juan went over there with a bus last month," or some similar observance calculated to set our minds at ease.

Our driver was apparently entirely capable—at least he got us to Merida. He should have been, since he drove a regular run between San Cristobal and Caracas, a four-day trip each way. But it was at least a couple of hours after we started before I was able to relax, since my impression was that he was taking all the hairpin bends, uphill or down, at a speed just barely short of the sliding point. In addition, he had never been told of the advantage in using second or low on down grades—all he used was brakes. So about every 50 miles we pulled up for a brake adjustment job, generally at a farmhouse or tiny village where we all drank coffee while waiting. Except at the ancient walled Spanish fortress town of La Grita, where he decided on a more or less complete brake overhaul. When we saw him taking off wheels and drums, we found a little hotel and had lunch. This conveyance, a '38 or '39 Dodge station

wagon, had two horns, the original equipment electric device and one of the inevitable rubber bulb contraptions. Since the electric horn was out of order during the first part of the day's run it was necessary to keep pumping the "hooter," which made driving largely a one-hand affair. However, we never quite hit anyone on the turns.

Arriving in Merida about 7:30 p.m., after thirteen hours on the road, we found both the "better" hotels full, but finally located accommodations in an obscure pension which offered a single room with four steel cots. Since there were four passengers, consisting of a minor government official, a stray American steel salesman, my partner and myself, and it was the last room, we all shared it. Not until we had been asleep for a short while did we discover that the beds were populated and the remainder of the night was anything but pleasant. The Venezuelan official, however, didn't seem to mind—he probably knew in advance what to expect.

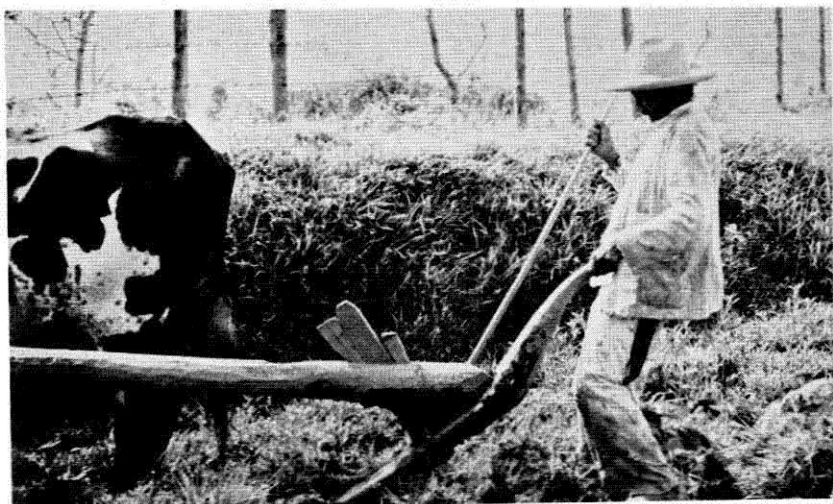
The city of Merida, besides being the capital of the State of Merida, is also the cultural center of the Andean region, and boasts an institution of higher learning, the University of Merida, which offers courses in liberal arts, pharmacy, law and perhaps others. The main plaza, flanked by the University, the Cathedral, State government building and business houses, has a large equestrian statue of Simon Bolivar, the national hero.

CAESAR AIDS A BOTTLENECK

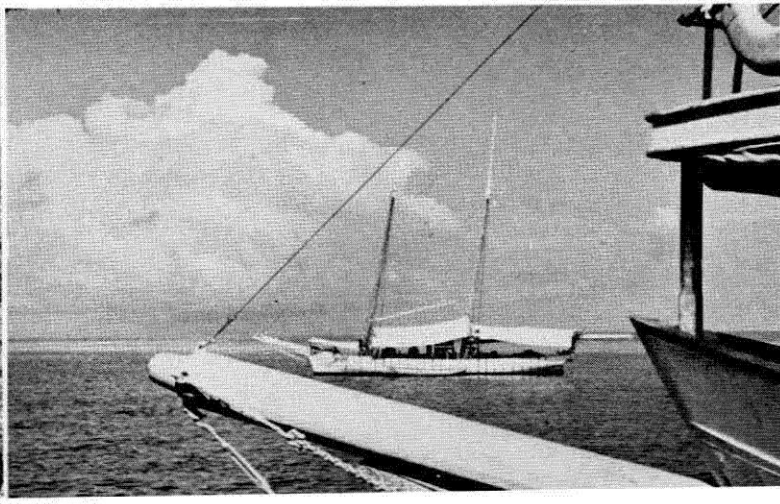
There is a story about these statues. Every town has at least one plaza, and at its center is a Bolivar memorial. The small villages have busts, while the larger places have full-length figures or imposing statues such as Merida's. But it seems that things were not always thus. As the time approached to celebrate the centennial of Bolivar's birth, a few years ago, many communities realized that they had neglected to acquire even a bust of the Libertador. Orders were immediately placed, I believe in Europe, and of course the statue-makers were swamped, since the time was short. Then one of the statue purveyors had a brilliant idea: Bolivar resembles Caesar. Captions on the many stock busts of Caesar were changed, the busts were shipped and erected in the plazas, the centennial was celebrated and everyone was satisfied.

Merida has a beautiful setting. It is built atop a long ridge, with a stream in the deep canyon on each side, and is completely surrounded by mountains whose tops are seldom visible through the clouds. The mountains, however, are not heavily timbered, and they are checker-boarded with cultivated fields, for the hardy mountain Indians have for generations farmed these rocky slopes almost as high as they can climb. The farmers carry on their operations in the age-old traditions of their for-

Traditional all-wooden plow used by Andean Indians.



Freight boat at La Ceiba.





Downhill from Mucuchies toward Valera.



Threshing pit where oxen tramp out grain and wind blows chaff away.

bears. The ox is the draft animal and beast of burden of the rural population, and is even frequently ridden to town. An occasional tough, wiry mountain pony is seen, and there are a few burros; but oxen do the plowing, threshing and other chores. The typical plow is all of wood and of ancient design. Harvested grain is thrown on the stone floor of a circular stone-walled threshing pit where the oxen are driven around on it until the grain is stamped out. Then on a windy day the farmer tosses the grain into the air so the chaff can be blown away.

The stony ground of the hillside farms may or may not be fertilized, but I understand that its productivity is poor. None of these farms is terraced, and since there is little or no evidence of serious erosion, the rainfall cannot be heavy. In some of the valleys, however, the soil appears rich enough, and it would seem that these areas could be developed into the vegetable gardens of Venezuela; but from what I could learn, the Indians raise only the traditional crops of corn, wheat, beans and a few tomatoes.

The typical farmhouse is stone-walled, dirt-floored, thatch-roofed, and has no chimney. Smoke from the wood or charcoal fire just seeps out through the roof. Cooking is done on an iron-topped, rock-sided stove built into one corner of a very dark kitchen.

SERAPES IMPORTED FROM ENGLAND

In this high country many mountain Indians carry or wear the typical Andean poncho-like blanket, or serape: dark blue or black on one side and brilliant scarlet on the other, and about half an inch thick. However, in Venezuela they are not hand-woven, but are imported from England and sell for some \$20.00 each. These mountains have been populated and farmed for generations; and unlike our Western mountains, it would seem impossible to find solitude, at least along the Highway. Around almost every turn there is a farm house, a tiny village, or someone walking or riding along.

Every town along the Trans-Andean has a central transportation office where passage may be engaged in private car, station wagon, bus, or even as passenger in a truck. Our station wagon having gone toward Caracas, in Merida we purchased bus tickets in the evening, gave our names and hotel, and were told we would be picked up at 6:00 a.m. the next morning. At 5:00 a.m. the bus driver woke us up and then left, presumably to arouse his other passengers. He was back before six, with no other passengers, and we climbed aboard, to spend

the next hour riding around with him attempting to pry his other fares out of bed, hurry their breakfast, or whatnot. After finally collecting them all and counting noses repeatedly to make sure, he took off for Valera.

Merida was no exception to the rule that every Andean town of any consequence has a government military checking station at its edge. A chain across the road stopped us, and a soldier leisurely examined the passenger list, with particular emphasis on identification of foreigners.

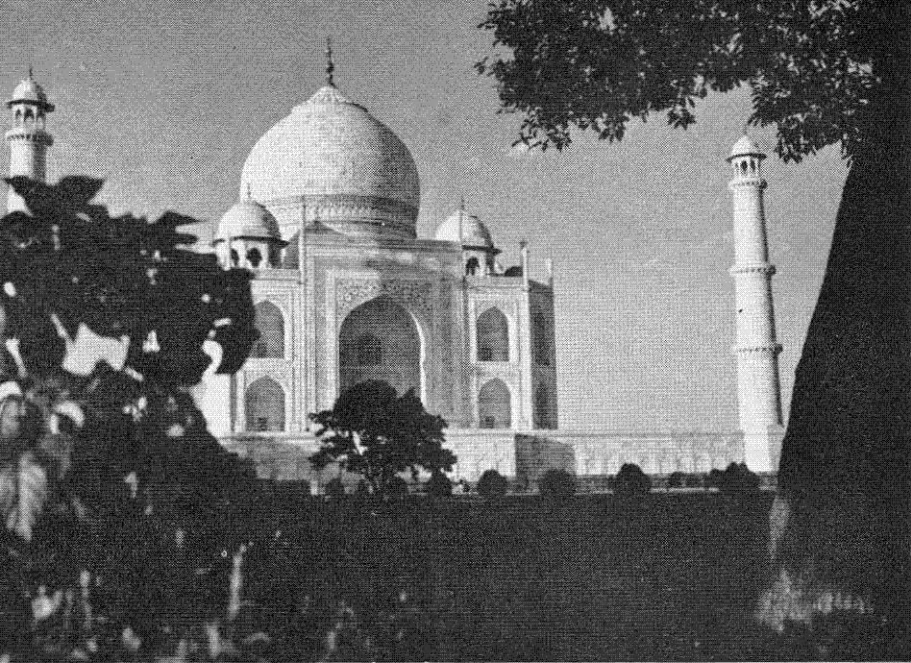
For a couple of hours or more out of Merida we climbed, via switchbacks, until we reached Mucuchies, a very small town. It had been growing colder as we climbed, and since the bus had no windows, we were more than glad to take advantage of a short stop and drink several cups of the most delicious coffee I ever tasted. Just beyond Mucuchies we crossed the top of the pass. Here the Eagle of the Andes, at 14,000 feet altitude, looks down on passing traffic, and of course the Americans always take his picture, much to the suppressed amusement of the native passengers. There was no snow, even in December, but a brisk wind made us wish for more clothes. Light snow occasionally falls at this altitude, but usually doesn't last long.

The rest of the trip to Valera, which was reached about 4:00 p.m., was all down hill. Following switchbacks at first, the road later took a winding course down a valley as the temperature climbed gradually. We passed plantations of platanos and coffee, coffee-drying yards, tobacco hung in bundles on front porches, and finally fields of sugar cane and a few cane mills.

TRAFFIC OFFICERS NEEDED

Approaching Valera, an incident occurred which is typical of the average Venezuelan bus-driver. While traversing a narrow, relatively straight stretch of road cut into the side of a hill, with a stream bed below us, we met another vehicle, an old converted bus loaded heavily with burlap bags of something-or-other. Both buses had passed turn-outs while in sight of each other, but neither stopped until within a few feet of a collision, each in the middle of the road. Our driver, of course, went through his routine of playing on all his four horns; but when that did no good both drivers got out and stood in the road shouting and gesticulating at each other. Getting nowhere, each got back in and appeared to be preparing for a nap behind the wheel. Time seems to mean nothing to the Venezu-

(Continued on page 17)



INDIA

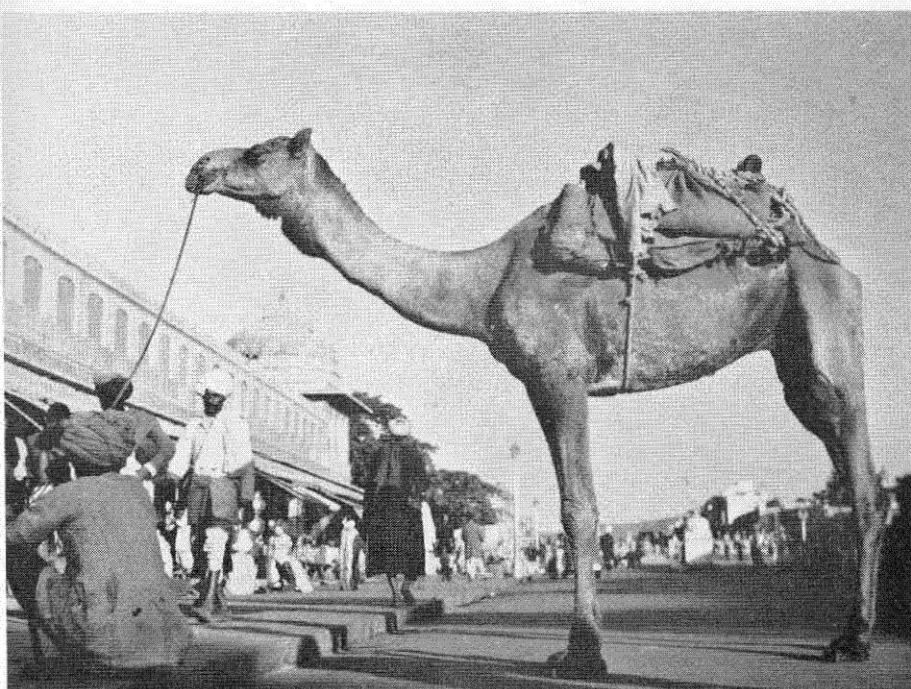
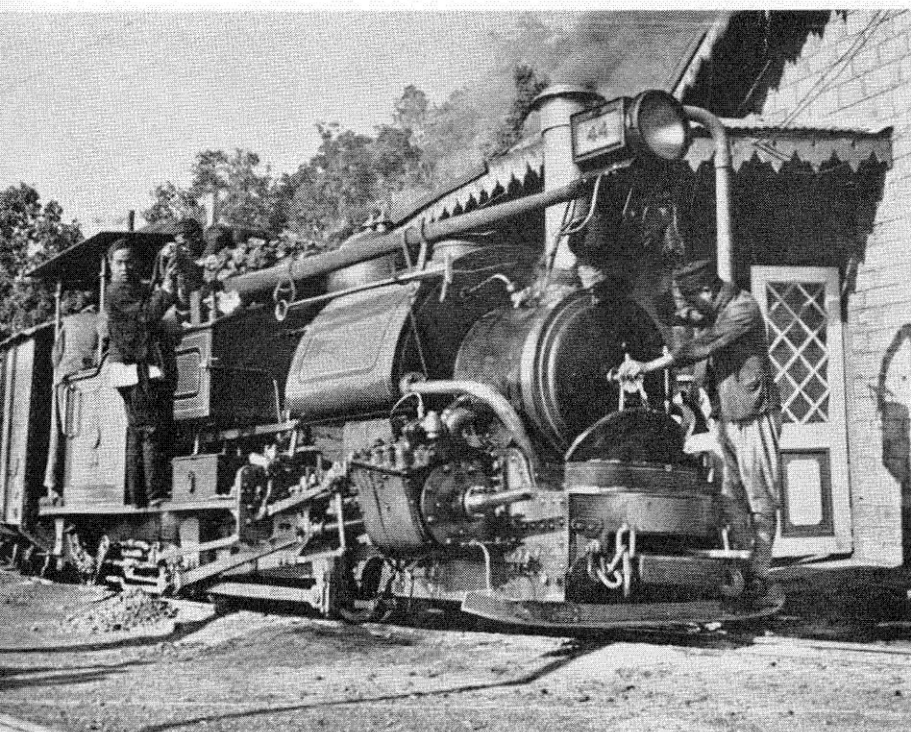
By SID ZIPSER, '30

Editor's Note: This is the second in a series of articles by Mr. Zipser on a photographer's tour of the Orient. The first appeared in the December, 1940, issue.

India is renowned as the land of infinite contrasts and extremes. Riding a train across its hot plains, I roared past roads where camel caravans and ox carts stopped to stare at the iron monster. There were palaces and temples of astounding beauty, size and riches, and mud-walled villages and slums where whole families lived in a single room and as one Hindu explained to me, "They do not have a window because there is an old saying among the poor that 'a window would mean another blanket which they can't afford'."

The trains, too, are varied. Among other things, three different gauges add to the confusion. And the beds are absolutely individual, in fact, each person brings his own, a servant usually being hired to take care of the roll and luggage. At night, the bedding is unrolled on the long, thinly upholstered seats and you have the choice of leaving the windows closed and suffocating, or of opening the window and having a torrid blast of unconsumed carbon blown down your neck, ears and throat.

Of course, there are a few better trains, a very few, and many worse ones. Probably the most inefficient and charming one ascends from the plains of Bengal and twists and pants and squirms up a narrow gauge track that turns on a 49-foot radius, describes figure eights, spirals, and in the



Above: The Taj Mahal at Agra—surrounded now, as originally, by a beautiful garden.

Center: Toy-like locomotive of the Darjeeling Himalayan Railway Company — a comic opera affair which climbs and twists as no respectable locomotive would dare.

Below: A camel lends an atmosphere of enchanting unreality to the pink-walled city of Jaipur.

Above: *Singh's observatory at Jaipur—with two marble elephants made for the present Maharajah.*

Center: *Jaipur—a corner of the brass bazaar.*

Below: *An entrance to the Pearl Mosque at Agra.*



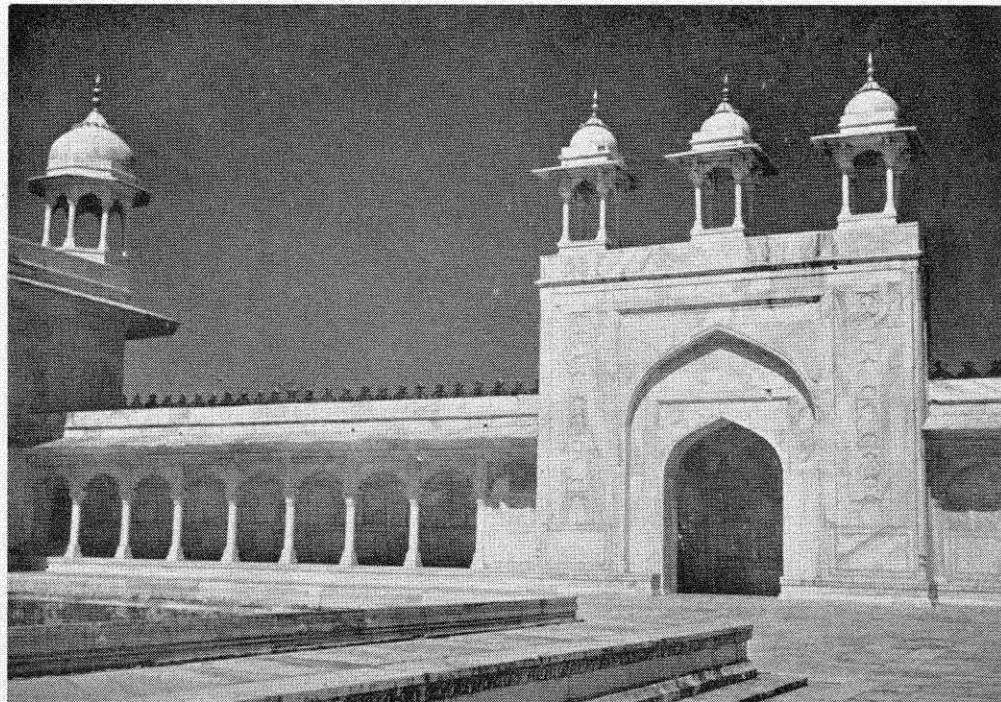
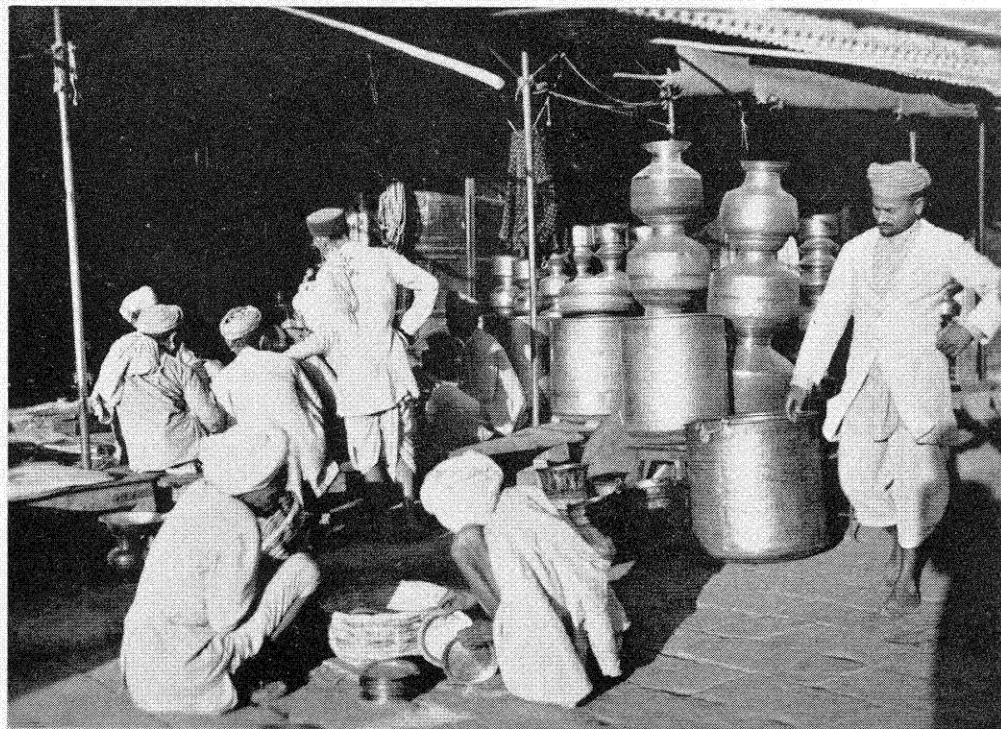
steepest places, zig-zags backwards and forwards up "Y" sections. One attendant rides the cow-catcher to work the sand-box and console any animals or children that might be frightened.

Finally, in a little more than twice the time required by the bus, or three times the period of a private car, you arrive at Darjeeling, gateway to Tibet, Nepal and Bhutan. The "most marvelous scenic view in the world" is supposed to unfold before you but all I saw were thick clouds that completely engulfed us. Hopefully, I arose at three the next morning, and it was raining, but I climbed higher until I was on the snowy crest of Tiger Hill and there I was fortunate enough to have the clouds break apart for the most glorious sunrise I've ever seen: far across the valley before me, and above the churning clouds, rose the great glowing chain of the Himalayas, 28,000 feet high.

CONFUSION ON THE GANGES

While most of India's great religious thought seems to have originated within the impressive humbling sights of the Himalayas, it is at Benares on the sacred Ganges that one finds the most fanatical ritualistic aspects of Hinduism. The water is supposed to be so holy that bathing in it will cure any disease or difficulty, and if a Hindu dies there he is supposed to go straightway to paradise. Naturally, with such inducements, the stone steps or ghats along the river are as crowded as Coney Island on a warm Sunday morning. Side by side, you see people bathing, drinking, washing clothes, and pushing in the charred remains of a departed relative. Within the city as well as along the ghats, you see hideously deformed beggars torturing themselves for alms and celestial favor, and dung-smearing pilgrims rolling on cobblestone streets completing journeys of sometimes hundreds of miles in this manner.

(Continued on page 18)



HIGHLIGHTS OF THE FOURTH ANNUAL ALUMNI SEMINAR WEEK END

Alumni and their friends will gather on the Institute campus Saturday and Sunday, April 5th and 6th for the Fourth Annual Seminar Week End.

The Seminar Board composed of H. Fred Peterson, Wesley Hertenstein, Fred A. Hough and Donald P. MacFarlane has organized its committees to facilitate the efficient handling of the great amount of work required to present such an Alumni affair.

Conrad Scullin, L. G. Fenner, Kenneth Belknap, Frank Wiegand, Richard W. Stenzel, Leonard L. Snyder, Frank W. Bell and Charles F. Thomas comprise the Program Committee.

GENERAL SESSION LECTURES

The general assembly on Saturday morning will be conducted by Professor Franklin Thomas and Dr. Earnest C. Watson. They will discuss the part the California Institute of Technology is playing in the National Defense Program. Professor Thomas is in charge of organizing the National Defense courses at the Institute, while Dr. Watson is Chairman of the Committee for Coordinating Research in National Defense.

Dr. Edwin Francis Gay who is a member of the Research Staff of the Huntington Library and Associate in Economic History at the Institute will speak on the problems of competing with Nazi economy if Germany is victorious in the present world war.

Dr. Alfred Henry Sturtevant, Professor of Genetics, will speak on a phase of genetics.

Kermit Roosevelt, Jr. of the Humanities Department is scheduled to talk on modern propaganda methods.

Dr. J. E. Wallace Sterling will discuss the issues confronting the United States as a result of the Axis threat. Those who attended the Seminar program two years ago will remember the interesting lecture given by Dr. Sterling at that time. His subject this year is very timely and should be of general interest to the Seminar audience.

An illustrated lecture will be given by Dr. Theodore von Karman on the causes of the failure of the Tacoma Narrows Bridge. The Government appointed Dr. von Karman to make a scientific report and study of the failure. He has prepared and tested models of the bridge and made a thorough study of the physical conditions surrounding the bridge failure. This Seminar lecture will be one of the first occasions when the results of Dr. von Karman's scientific report will be discussed in public.

Dr. John August Anderson, a member of the staff of the Mount Wilson Observatory of the Carnegie Institution in Washington and Research Associate in Astrophysics, will discuss the problem confronting the modern astronomer.

Dr. William Hayward Pickering will speak on ultra short wave technique in aircraft navigation.

Arthur Howland Young of the Institute Industrial Relations Department and former Vice-President of U. S. Steel Corporation will lecture on the importance of human relationship in the Defense Program.

Dr. John R. MacArthur will present an illustrated lecture on the art treasures of the Huntington Library. This lecture is planned for Saturday afternoon from 1:00 p.m. to 2:30 p.m. after which there will be a tour through the Huntington Library in lieu of any Humanities Departmental Seminar.

DEPARTMENTAL SEMINARS

Departmental Seminars are to be a feature of the week end again this year on Saturday afternoon. Seminars will be held in Industrial Relations, Electrical Engineering, Physics, Chemistry, Mechanical Engineering, Civil Engineering, Geology and Aeronautics. It is expected that the departmental heads at the Institute will lead and preside over the Seminars.

The Industrial Relations Seminar will consist of a discussion of the validity of testing techniques in personnel work by Professor Robert D. Gray. The schedule indicates that the new library and laboratory where time and motion studies are made will be on exhibit.

The Electrical Engineering Seminar will be presided over by Professor Royal W. Sorensen. Wendell A. Morgan will speak on the stability limit of transmission lines. George W. Dowd will present a demonstration of dynamic mechanical and electrical measurements by means of a recording oscillograph.

Dr. Earnest Watson will preside over the Physics Seminar. Dr. Morris Hassler will speak on the spectroscopic examination of materials and Professor William V. Houston is scheduled to talk on the tentative subject, "The Electron Microscope."

For the Chemistry Seminar, Professor L. Zechmeister will discuss developments in chromatography, and Dr. Eugene H. Eyster will speak on the tentative subject "Phases of Military Explosives". It is expected that Dr. Linus Pauling will be present to preside.

In the Mechanical Seminar, Donald E. Hudson will speak on the vibration dampening in metals. Mark Serrurier is to

Dr. Theodore von Karman — who will discuss the failure of the Tacoma Narrows Bridge at the Fourth Annual Alumni Seminar.



PAULING RECEIVES NICHOLS MEDAL

Dr. Linus Pauling, head of the division of chemistry and chemical engineering at the Institute and one of the world's leading theoretical chemists, received the 1941 William H. Nichols Gold Medal of the New York Section of the American Chemical Society at a joint dinner of the Section and the Society of Chemical Industry March 7 in New York.

In presenting the medal, outstanding distinction in chemical science, Professor Arthur W. Hixson of Columbia University, chairman of the jury, cited Dr. Pauling, who is 40 years old, for his "fundamental inquiry into the nature of the chemical bond." Professor Paul H. Emmet of the Johns Hopkins University spoke on "Linus Pauling — The Man", and Professor Joseph E. Mayer of Columbia University on "The Work of the Medalist." Dr. Pauling delivered the annual medal address on "The Structural Chemistry of the Future." Dr. Robert Calvert presided.

"Linus Pauling and his students started a series of researches which are responsible for most of our present precise quantitative information about the geometry of organic molecules," Professor Mayer said. "This information, in turn, has led to revision and improvement in theory. Few scientists have ever been able to claim such successful parenthood of both the experimental and theoretical bases for so wide a field.

"The influence of a scientist is not limited to the papers that

bear his name. There are few scientists who at Dr. Pauling's age can claim as many intellectual children of note. His students, or most of them, bear a clear stamp of his influence. They have carried his gospel even to the east coast, from Harvard to Princeton. Perhaps a future historian, in evaluating Pauling's work, will count their contributions to his, and adjudge their education to have been his greatest work.

"Dr. Pauling is a rarity among scientists — a chemist with mathematical and geometrical intuition. There are many physicists who are good mathematicians, and some of these work on chemical problems; some are even employed by departments of chemistry. But Pauling has that chemical sense, the respect for, and knowledge of chemical fact, which differentiates the true chemist from the physicist.

"The hundred and twenty odd articles and books by Pauling cover a wide variety of subjects, experimental and theoretical, physical and chemical. But Pauling is no dabbler. In every article one is impressed by originality and by knowledge, by ingenuity and by thoroughness.

"Pauling's papers on the nature of the chemical bond and on resonance have altered even the language of structural organic chemistry. The theory of the structure of molecules which has developed out of work by Pauling and his students is most beautifully and simply presented in his recent book,

(Continued on page 22)

discuss the problems of mounting the 200 inch telescope. Regis S. Gubser will speak on the methods used in large scale refrigeration. Mr. Serrurier is Construction Engineer in Astrophysics, while Mr. Gubser is an Electrical Engineer with California Consumers Corporation.

The Civil Engineering Seminar will have as speakers Professors Fred J. Converse and R. R. Martel speaking respectively on "Investigation on Foundations of Dock Facilities for a Naval Base at Terminal Island," and "Earthquake Forces in Terms of Design Factors."

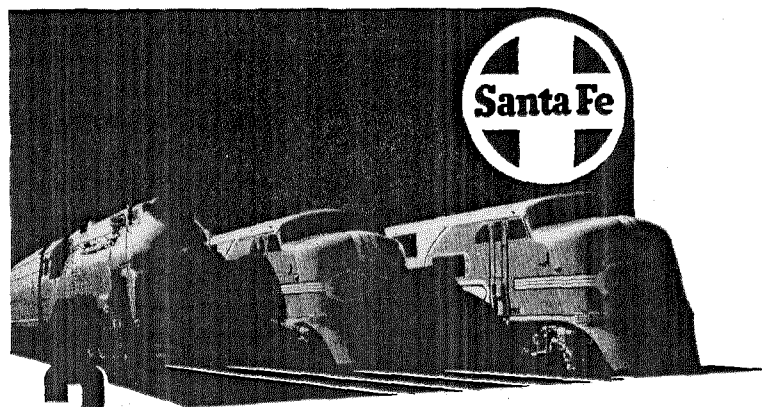
At the Aeronautical Seminar, Charles F. Thomas, '35, technical sales engineer at Lockheed, will preside. Holley B. Dickinson, '36, aerodynamics research engineer at Lockheed, will discuss manufacturing activities.

Registrations under the direction of C. M. Wakeman will take place early Saturday morning, April 5th and a registration fee of \$.50 per person will be charged. Saturday lunch may be obtained in the Student House at \$.50 per plate. This year each member of the Association will be permitted to bring two male guests.

ALFRED NOYES TO SPEAK

Alfred Noyes is to be the guest speaker at the banquet Saturday evening which will be held at the Annandale Country Club. Dr. Robert A. Millikan is expected to appear on the program during the evening. Musical entertainment will be featured during the banquet. Dinner tickets are \$1.50 each.

George Rice III is in charge of the printing for the Seminar and Paul Schaffner is handling publicity.



3 STREAMLINED TRAINS

... EACH ONE ALONE IN ITS FIELD

- ★ **Super CHIEF** ... the only all-Standard Sleeping Car streamlined train operating on a 39¾ hour schedule between Los Angeles and Chicago.
- ★ **The CHIEF** ... The only all-Pullman daily streamliner between Los Angeles and Chicago, and the fastest daily train between these two points.
- ★ **El CAPITAN** ... This silver streak is the only deluxe all-chair car streamlined train between Los Angeles and Chicago in just 39¾ hours.

★ FOR COMPLETE INFORMATION—SANTA FE TICKET OFFICES

Validity of Personality Tests

(Continued from page 8)

before they can be taken as measures of ability. The misinterpretation consists in confusing what the test measures with what it is hoped it measures. Here again it is mandatory that the person using the test understand clearly the nature of the standardization groups and the type of trait which the test measures.

A third misinterpretation is in assuming that the test measures precisely what the author claims it measures. Such a claim should not be made for a test until it has stood the test of numerous legitimate validating studies. One widely used test of neurotic tendency, for example, was so constructed that high scores were supposed to indicate neuroticism and low scores a well-adjusted personality. Validating studies showed, however, that persons scoring at both extremes of the scale tended to be maladjusted. If the intent and interpretation of the author of the scale were accepted without knowledge of the later studies, the persons using the test might very well make the possibly serious error of dismissing a behavior problem on the basis that the subject had a low score on this scale.

The necessity of being familiar with the validating studies which have been made with a personality test after it has been turned loose on the market cannot be overestimated in making legitimate interpretations of test results. It will be remembered that after Terman had constructed and standardized the Stanford Binet Test of Intelligence and had demon-

strated its ability to differentiate between groups of known intellectual characteristics, he then undertook the great validating study which is published under the title "Genetic Studies of Genius." In this study he chose 1000 children of I.Q. 140 or above, and he has now traced their development through the past 20 years. From these studies it is possible to see in actual life situations what having a high I.Q. means.

PROOF ALWAYS IN PERFORMANCE

In like manner, personality tests are constructed, standardized, and shown to be sufficiently efficient to differentiate between the standardization groups. But the proof of the test is its performance under actual testing conditions and not in differentiating between criterion groups. If a certain personality test is to be applied to the personnel of a given business or industry, it is well worth the effort to make follow-up studies of the persons testing at the extremes of the distribution of scores obtained from the test. If, for example, the neurotic tendency test referred to above had been used for the selection of personnel with the assumption that persons scoring low would be well-adjusted individuals, the test would have failed to perform as predicted by its author.

It is such conspicuous failures of personality tests to perform on a large scale that have led to the extreme criticism that the personality test is meaningless and altogether useless. This criticism is usually backed up by its proponent's quoting some single test item and asking derisively, "What can you possibly tell from that?" The answer to that particular query is given, it is hoped, in the preceding pages. As to the meaninglessness of the personality test, one can only reply that the items chosen for inclusion in the test were certainly not chosen at random, and that if their presence in the test has been justified by a standardization procedure with contrasting groups, then certainly the questions included in the test represent differing points of view of the two groups on which the standardization was based. In that sense, therefore, the test is far from meaningless. A score on the test certainly means something, and many times something important. The great problem is to define and limit exactly what the score on the test does mean. It probably does not mean precisely what its author intended it to mean, but reference to the various studies in which the test has been used will clarify its utility. Many personality tests have been proved useless, it is true, but there is no necessity for condemning them all before they are given an opportunity to demonstrate their usefulness.

A second finding also serves to lead the more impatient to discard all tests. This is the fact that in individual instances the predictions of the test fail utterly. In using an interest test for the prediction of success in the theatre, it has been found, for example, that, when the test is standardized by a group of successful actors as one group and a group of laymen as the other, if the scores of the successful actors are computed, some of them will have scores lower than those of some of the non-theatrical group. In other words, acting ability is not altogether a matter of the variables measured by the test. On the other hand, a majority of the actor group will have scores significantly in excess of those of the lay group. Such a result, as has already been explained, is to be expected on the basis



**LANE-WELLS GUN PERFORATION
"MEANS BETTER OIL WELL CONTROL"**

Lane-Wells pioneered a new technique of well control with the development of the Gun Perforator. Completion costs are lowered and the ultimate production of each well is increased. A bulletin describing the Lane-Wells Gun Perforator Service and its applications is available to engineering students. Write to Lane-Wells Company, Los Angeles, California.

LANE-WELLS



LANE-WELLS COMPANY
Technical Oil Field Services
LOS ANGELES • HOUSTON
OKLAHOMA CITY • NEW YORK

Over the Venezuelan Andes

(Continued from page 11)

elan peon, and it began to look as though we were stuck there, within a few miles of Valera, at least until one driver weakened and backed up. Within a few minutes, however, another bus pulled up behinds ours and an Army officer disembarked to locate the trouble. He ordered the bus-truck backed up some 50 yards to the nearest turnout, which the driver finally did after much grumbling; and we proceeded on our way.

We found nothing notable in Valera. A low-country town, there was much negro blood evident, and for the most part it was hot, dirty and smelly as most of Maracaibo. We stayed at a hotel which had originally been German but was now Venezuelan in all but name. The food left considerable to be desired, but at least our sleep was undisturbed.

The next morning, early, we boarded another bus and after about 30 minutes arrived in Mototan, a small village which is the inland terminus of the German-owned narrow-gauge rail-

of the probability factors which govern prediction by the use of tests.

But suppose the test is printed and distributed for use and some successful actor takes the test and fails. There is immediately raised a great hue and cry that the test is worthless. In a certain sense this criticism is true. The test is worthless if it is demanded that it measure with absolute precision in the individual case. If a subject comes to ask if he should become an actor and, having been given the test and failed it, is advised by his counselor to go into some other field, a serious error has been made. It is true that the probabilities are high that he will not be a successful actor; on the other hand, he may be one of those who may be a successful actor and still score low on the test.

The personality test, in other words, has its greatest value in dealing with the selection of personnel so that the probability of getting a group that largely conforms to the criteria implicit in the test is enhanced by the use of the test; it is, however, of doubtful value in ascribing with any high degree of certainty traits and characteristics to individuals within the group.

It is to be hoped that, as psychological techniques for the definition and measurement of human traits are perfected, the personality test will have increased utility in individual cases; until that time it should be used with care and with a full appreciation both of its limitations and of its potentialities.

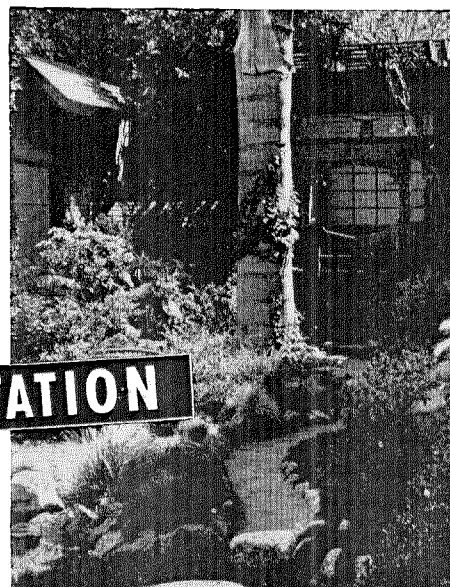
SKF puts the right bearing
in the right place."



1114 S. Hope St. PR-3168 Los Angeles

way line to La Ceiba on Lake Maracaibo. The trip was made via modern and almost new gasoline passenger car, and since we had purchased first-class tickets, we were able to sit in the front section which occupied about a third of the car's length. The rear second-class section was jammed with peons, most of them bound for one of the several villages at which we stopped en route. The trip was down hill most of the way, we did much coasting, and at every stop the car was surrounded with ragged muchachos carrying trays of "dulces" — sweets — for sale. We confined our purchases to bottled Coca Cola, which appears to be available everywhere.

The run to La Ceiba took 2½ hours. The schedule called for the twin-screw diesel passenger boat "Trujillo" to be waiting for us for the trip to Maracaibo, and our railroad tickets included the boat trip, since the boat is owned and operated by the same German company. But the "Trujillo" wasn't there, and we could not learn when it was expected. So we whiled away the time as best we could, in spite of the extreme heat, the flies, dirt and smells. No oranges were available so we again fell back on warm Coca Cola and equally warm beer. About an hour and a half later the "Trujillo" showed up — in tow. She had broken down a few miles out, and we had visions of an enforced overnight stay in La Ceiba, with accommodations of the poorest sort imaginable. However, the breakdown apparently wasn't serious, for we were able to take off about half an hour later, just before noon.



*This patio is surrounded
by the offices of Western
Precipitation
Corporation.*

You are cordially invited to visit our offices and inspect our facilities for research and engineering in the field of dust, fog, fume and mist control, gas cleaning, waste recovery and the drying of solids from solutions, suspensions, slurries and filter cake. One of the most comprehensive technical libraries in the country is also at your service. Demonstrations of Cottrell Electrical Precipitators, Multiclones, Polyclones and Spray and Dispersion Dryers can be arranged for.

WESTERN PRECIPITATION CORPORATION
1016 WEST NINTH STREET, LOS ANGELES, CALIFORNIA

INDIA

(Continued from page 13)

Then there is the serene beauty of the Taj Mahal which in itself would easily justify a trip around the world. Moslems and Hindus, more than white people, make continual pilgrimages to this tomb of Shajahan's wife which is also a shrine to the glory and beauty and rich emotion of India. A score of miles away is the vast red sandstone city of Fate-phur-sikri, carved like a jewel but suddenly deserted by the great Emperor Akbar, several hundred years ago. I met a wise Canadian missionary later who told me that he took

a group of native boys upon one of the splendid pavilions to camp for the night, all of them enchanted by the sunset and sunrise and fine surroundings, and there he told them of the glory and great humanity of their Akbar. You rarely meet the narrowminded missionaries you read about.

Delhi, the Imperial City, is the traditional and present capital of India. Moslems look not too proudly upon the new capital buildings of the British which form the seventh or eighth successive capital of the conqueror, and they recall that old saying with a gleam in their eye, that

"He who builds a new city in Delhi, shall perish in its ruins." I never realized that "ruins" could be so fascinating as they are in Delhi, and when it comes to that exquisite marble palace of Shajahan which housed the famous Peacock throne, the inscribed words alone do it justice, "If there is a paradise on earth, Oh Lord, it is this, it is this, oh it is this!"

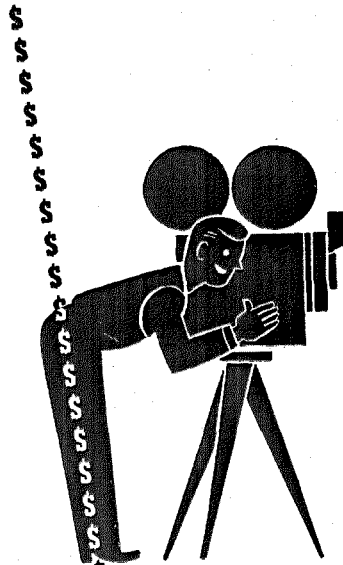
Next, I wondered down to Jaipur, the exotic capital of a rajah's province, where camels and elephants and splendidly mounted troops pass by the fantastically pink buildings of the city; and where girls and women anxiously wait for animal droppings which they eagerly scoop up in their hands and carry away in baskets on their heads, for dried dung is a precious fuel, and it also serves as a disinfectant and cleanser when sweeping out their hovels.

RAJAHS RELICS OF PAST

The rajahs are a feudal disintegrating relic of India's past, humored and publicized by Britain to help keep India divided. A few enlightened ones hardly justify their general existence, and much of their vain and vulgar display would look crude at an American circus.

I traveled southward now towards the tip of India and the island of Ceylon where I was to catch another Dutch freighter home. Bombay, Bangalore, Mysore, Ootocumund, Madura, Kandy and Colombo were visted enroute. Vast dry plains, giant valleys, crumbling fortresses, enormous carved temples were seen. Everything in India seems big, on the grand scale. Numerous sun-baked villages reminding me of Mexico were passed. Most of India's three hundred and fifty million people do not live in the cities but in countless poverty-stricken little communities of mud huts, eking out a living from the soil, taxed beyond all hope of payment even into the next generation.

From Mysore to Ootocumund, I traveled the blistering 99 miles by native bus, not seeing another white man during the entire trip, and having plenty of time to explore the wayside villages while we waited for passengers or the driver repeatedly overhauled a worn-out carburetor. I bought bananas and cocoanuts from roadside vendors who couldn't understand English and frightened one little tot who acted like he'd never sen a white man before. But the heat, the delays, the



MOVIES MEAN MONEY

\$200,000,000 or more is spent annually in the production of motion pictures and allied industries for wages, salaries, materials, supplies, electrical energy, etc. The availability of low-cost Edison electric power is one of the factors influencing the centering of the motion picture industry in Southern California.

A Community Enterprise



noise, and the gas fumes became almost unbearable. Eight long hours were required for that ordeal. Then when I longed for a bath as never before, the young grandson of twenty generations of blind goats urged me to come to a hotel where they had a "modern bathroom." It was a small room set apart by a curtain. In it were two identical five gallon pails, one on a table beside some soap and a towel, the other on the floor below an obvious framework. What upset me was the boy who blithely removed the buckets and reentered carelessly, setting one here, the other there, with no apparent discrimination.

TOURISTS SENT BY GODS

Tourists, to many Indian guides and servants, are multi-millionaires sent by the gods to dispense alms and tips to their wretched selves. And a more skillful group of wheedlers, chiselers, flatterers, and outright thieves hardly exists anywhere.

Contrasting the petty, the wretched, the fanatical, and the hateful, are many Indians of brilliant mind and tolerant outlook. From students, lawyers, business representatives, doctors, salesmen, and soldiers, I heard many poetic tales of Indian religion and history, of her scenic beauties and her industrial problems. And most of all, I heard of India's growing nationalism, of elective provinces and a National Congress representing two-thirds of India, of her great admiration for America which also rose against unjust taxation and became free, and used her resources to develop herself as a nation and to uplift the people to a more just way of life.

The two most popular leaders of democratic India are Gandhi and Nehru, two brilliant statesmen who refused the soft jobs and subsidies that have lured so many Indian intellectuals and rajahs to see Britain's viewpoint. Tempered with a respect for their worthy opponent, and with gratitude to the many fine Englishmen who have devoted their lives constructively to India, they believe now that democracies must overcome the limitations of empires and the degradations of dictatorships. They appreciate democracy even more than we do for they see age-old tragedies of intolerance and exploitation and fanatical leadership.

Patiently and skillfully, respected and

TECH "Y" ACTIVE

The Tech branch of the Y.M.C.A. has continued its expansion program during the current year, making several significant strides in the direction of assisting students on the campus to build useful, well-rounded lives. Under the direction of General Secretary John Price, several innovations have been tried out and many of the traditional activities amplified and extended.

The program got off to a fast start this Fall when one hundred forty-two members of the Frosh Class attended the three day conference at Camp Arbolado, near San Jacinto. Some twenty upperclassmen and

TELESCOPE PROGRESS

Testing of the 200-inch telescope at Palomar Mountain will be started next summer. Dr. Max Mason, chairman of the Caltech Observatory Council, reported recently. The giant telescope is to be tested with a dummy 12-inch mirror in July or August.

The huge "eye," now being polished, is not expected to be installed until the end of 1942, Dr. Mason said.

The dome and telescope mounting has been completed. The drive and control mechanisms that will operate the world's largest telescope now are being installed.

In the summer test the telescope will be counterweighted so that the test will be under true conditions — conditions that are to exist when the "eye" is finally installed.

Superintendent of construction at Palomar is **Byron A. Hill, '25**.

— T —

SCIENTISTS MEET

For the first time in history, the world's leading men of science, who meet in Pasadena in June, are going to open their sessions to the lay public for a brief peek at the scientific wonders of the earth.

Three night meetings, to be held in the Civic Auditorium, June 17, 18, and 19, will be open to the public without charge. Some of the country's most distinguished scientists will discuss scientific subjects of interest to all people in language understandable by all.

Two subjects already have been chosen. The first will concern the significance of the world's largest telescope at Palomar Mountain. Some idea of what astronomers expect to learn with this "super-eye" will be given the public.

Another evening will be devoted to a scientific discussion of the Pacific Ocean and its potential value to mankind.

Arrangements for the meeting of the Pacific Division of the American Association for Advancement of Science were completed at the Civic Auditorium recently by Dr. Paul Merrill of the Mount Wilson Observatory and Dr. W. B. Houston of the California Institute of Technology.

followed by many diverse factions, Gandhi and Nehru are adapting their country to the great hope of democracy and to a new world-wide federation of self-respecting nations which they believe as many people do is so essential today in an industrial world.



Above: *YMCA Secretary John Price offers advice.*

faculty assisted as leaders at the largest camp held in the history of the Institute. The Frosh tea dance also set an attendance record when one hundred thirty-five new students turned out to insure themselves of an excellent beginning in the social life of the school. Many of the Class of '44 insist that these two events immediately made them feel welcome as a part of the student body.

Three new groups have proved quite popular. The "Town Hall" discussion group meets in some nearby home for dinner Thursday evenings to listen to the broadcast. Some faculty member or community leader is invited to meet with the group to contribute to the discussion. The Junior-Senior "Y" meets bi-monthly for luncheons where speakers are presented on topics of current interest. Especially organized for Freshman and Sophomores was the "Friendship Seminar" lead by Dr. Hildreth Caldwell. Some one hundred thirty-five students were regular in their attendance at these four meetings.

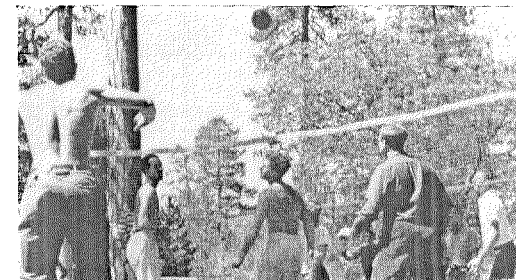
The intercollegiate calendar has been a busy one. The practice of joint dinner meetings with the Y.W. and Y.M. students before football games proved to be very popular. Meetings were held with Whittier, La Verne, Redlands, and P.J.C. Eleven students attended the mid-winter conference at Asilomar. The Tech "Y" acted as "host" to over one hundred students from the four year Southern California colleges for a get-together in February.

Greatly used are the "Y" services. Over one-half as much money was loaned from the loan fund during the first term as was loaned all last year. Eleven hundred dollars of books were sold for students last year and more than seven hundred dollars worth have already been sold this year. Although the part-time employment is lagging a little behind last year's record of two thousand dollars, some twenty students are getting substantial help.

The professional leadership and direction given by the full-time General Secretary, John Price, has proven how essential it is to the development of a program to have qualified leadership.

Last year an increased number of alumni added their financial support to this program and the "Y" is currently soliciting contributions from all alumni who are interested in seeing the activities continue. The alumni members who are giving leadership on the Advisory Board in the direction of the activities of this organization are: **Markham Salisbury '25, Donald Macfarlane '26, Stan Johnson '33 and Charles Thomas '35.**

Below: *Scene at 1940 Frosh Camp.*



. OF INTEREST

ATOM SMASHING

Atom smashing will be of great interest not only to physicists, but also the medical profession, according to **Dr. Robley D. Evans, '28**, now on the M.I.T. teaching staff.

"Since artificial radioactive isotopes of all the stable chemical elements are now available," he explained, "the domain of the new techniques of radioactive tracers is the re-investigation of all problems in all fields of science and technology in which greater accuracy would be useful.

"Ordinarily the method has approximately a million times the sensitivity of the best microchemical methods. It also has the tremendous and unique advantage of marking individual batches of any given chemical. For example, the thyroid gland normally contains a great deal of iodine, but if a subject is given an injection of one milligram of additional radioactive iodine, then the arrival of any given fraction of this injected iodine in the thyroid can be accurately determined without any interference from the overwhelmingly greater iodine already present in the gland before the experiment.

"This technique is opening a new and promising field of research and medicine. Already extensive investigations of the biochemical utilization of iodine in the formation of the hormones of the thyroid are being carried out in a co-operative project in which physicists and medical scientists are co-operating at the Massachusetts Institute of Technology."

NEWS NOTES

Development of the electron microscope has been one of the most important scientific advances of the past year. At the Institute, research on an instrument having a magnification of 7,000 diameters has been carried on by Hugh Bradner, under the direction of Professor William V. Houston.

As a giant natural memorial to the late Dr. George Ellery Hale, one of the founders of the Palomar Observatory, a Sierra Nevada mountain peak, more than 13,000 feet high and within three miles of Mt. Whitney, has been named in his honor.

Once again Dr. Irving P. Krick, the Institute's long range weather forecaster, has been named one of the ten outstanding young men of the United States by the U. S. Junior Chamber of Commerce.

Two Tech scientists, Dr. Ian Campbell, associate professor of petrology, and Dr. Horace J. Fraser, have been honored by their election to fellowship in the Geological Society of America.

Federal soil conservation officials recently inspected the Institute's laboratories, and after watching demonstrations, expressed themselves as being tremendously impressed. Especial interest was shown in the experimental flume, where study of the sediment carrying power of water is being conducted.

Stanley G. Stroud, veteran guard, was awarded the Wheaton Trophy as the feature of the annual Caltech Winter Athletic Banquet, held at the Pasadena Athletic Club. Stroud, a three year letterman, was named on the All-Conference second team at the close of the past football season.

TUITION RAISED

The 1940-41 California Institute Catalogue, which has just come from the press, contains, besides the usual minor routine corrections, several changes which will be of interest to the alumni.

The section formerly called "Extra-Curricular Opportunities" has been completely rearranged and rewritten under the supervision of the Board of Directors of the Student Body. This section, under a new title, "Student Life," gives a much more accurate and detailed description of student body organization, the Student Houses and the Throop Club, the athletic program, and undergraduate societies and clubs.

In the section "Expenses," announcement is made of a change in the tuition rate which will affect only those students newly entering the Institute next September and after.

Institute authorities explained that the change was necessitated by the fact that the average rate of return on invested funds has been dropping steadily for the past several years. Privately endowed institutions all over the country have been faced with the same difficulty, which has in general been increased by the falling off of gifts of funds for educational purposes. During the past few years there has been a steady tendency toward increasing the tuition fees of privately endowed colleges and universities. The Institute has been reluctant to follow this trend, but it has become apparent that if the tuition fee were not increased, there would be the prospect of having to curtail some of the Institute's program of instruction and research. It should be pointed out that the fee of \$360, which goes into effect for new students next fall, is considerably lower than the tuition charge at other scientific and engineering institutions of the same rank.

Realizing that many of the students at present enrolled in the Institute have planned their educational financing on the basis of the present tuition charge of \$300 a year, the Board of Trustees ruled that students now enrolled at the Institute can continue at this rate as long as they are continuously in residence and working toward a definite degree.

The new Catalogue also contains the announcement of a slight increase for next year in the charge for board and room in the Student Houses. When the Student Houses were opened, the charge was calculated to include a sum for upkeep, renovation, repairs, and the necessary replacement of furniture and other equipment. Experience has shown that that sum is not sufficient to provide for such expenses.

The Trustees stated that it is not the Institute's intention to make a profit on the Student Houses. They were agreed, however, that the charges should equal the expenses; that the rate should be set so that the Student Houses would not incur a deficit, which would involve drawing on the Institute's income from tuition or other sources. Therefore, the increase of \$17 per year in the charge for board and room is necessary if the Student Houses are to break even.

The new Catalogue records the largest enrollment in the history of the Institute — 618 undergraduates and 322 graduate students — a total of 940.

U.H.F. For Aeronautics

Use of ultra high frequency radio waves for airplane navigation is the newest contribution of science toward increasing the safety of aviation, Dr. William H. Pickering, assistant professor of electrical engineering at Caltech, informed a recent Sigma Xi luncheon at the Athenaeum.

These ultra short waves, now coming into use, and with some phases progressing rapidly experimentally, are important to aviation because:

1. They virtually are free of static.
2. They provide a freedom from false courses.
3. They are not subject to defraction, such as the longer radio waves now in general use in flying.

The physical dimensions of the transmitters and antennas for ultra short wave broadcasting are such that, if practical from an aviation viewpoint, could be easily installed on a front lawn.

Dr. Pickering reviewed progress that has been made in the application of radio signals to the problem of blind landing, disclosing that many ingenious advances already have been made.

— T —

Electro-Photography

Patent attorney and inventor — this is the dual role of **Chester F. Carlson, '30**, following his recent admission to the bar. As an employe of a firm of patent attorneys in Manhattan, Carlson has aided in safeguarding the interests of many inventors. Now, as a patent attorney, he finds himself protecting his own interests as an inventor.

He has just been granted a patent for a new method of photography that has been widely acclaimed in scientific and industrial circles and may become an important factor in the nation's defense program. By Carlson's method of photography, an image is recorded electrically instead of chemically and prints can be produced immediately without the usual development. One part of the process is exactly the same as the old stunt of rubbing a fountain pen on one's coat sleeve and picking up bits of paper with the electrical charge produced.

In Carlson's process, the camera lens forms a light image, in the usual way. This is not on the customary plat or film, but on a material that is "photo-emissive," that is, it gives off electrons where the light falls. Immediately behind this is a sheet of some film, such as cellophane, and then a metal electrode, connected to an electrical circuit so as to draw the electrons to the cellophane, which then becomes charged in the electron-bombarded areas.

After exposure, the film is drawn into another chamber, where it is sprayed with ink from an atomizer or dusted with a fine powder. This sticks to the charged areas, and the picture appears. For protection and to make an opaque print the film is fastened to a sheet of paper or a card. The system is especially adapted to reproducing drawings, typewriting, etc., but it also can be used for X-ray pictures and other kinds of photography. In such applications the advantage would be that a permanent print could be obtained almost immediately.

Carlson has been working on the process for three or four years during the time he was studying for admission to the bar. He believes that his method may become important in the defense program through use in X-raying soldiers' lungs or X-ray metals to disclose defects.

Traffic Safety Device

What decidedly strikes the observer of American conditions, is the fact of an extraordinary permeation of daily life with the accomplishments of a highly developed technic. There is hardly a field of the far reaching American civilization which does not have to thank the spirit of progressive technic for many improvements and perfections.

Singularly it affects the observer to be obliged to establish the fact at the same time, the simplest things and conditions are often not encompassed in these technical accomplishments; that, surprisingly, their practical developments have been overlooked. It is astounding, for example, that in the United States certain regulations for the control of automobile traffic have not been established, which, for instance have long been functioning in Central Europe, by virtue of official decree. These regulations lend to European automobile traffic much greater safety than exists in the United States.

In different European countries, before any passenger automobile or truck is permitted to operate, the following official regulation must be met: The conveyance must carry on the right as well as on the left side a red signal-arm, which can easily be operated from the switchboard, and which serves to indicate **unmistakably** to every driver when a left or right hand turn is to be made, or when a changeover from one lane to another is desired, as well as when one desires to go straight ahead. This apparatus **always indicates clearly** which direction is to be taken. There is not an automobile, in Europe, which is not equipped with such signal arms, which contribute to the safety of automobile travel. These are turned out serially by the automobile manufacturers and are delivered with the automobiles.

Such signal-arms, about 8-10 inches long, rest, when the automobile is following a straight line, in a slit or narrow groove, one of which is built in each side of the car. They are made of a metal frame, which is covered with red, transparent celluloid and in their hollow interior a red signal lamp is attached. As soon as the driver wishes to change his course, he conveniently turns a switch lever on the switchboard, either right or left. Correspondingly, the right or the left signal-arm immediately assumes a horizontal position and remains thus until the automobile again follows a straight line. While the red color has its advantage during the day, its value is greatly enhanced through the red signal lamp when used at night, so that it is impossible to misjudge the driver's intent as to the direction he wishes to turn.

On trucks these signal-arms are double size. Besides, they do not only remain in horizontal position when so placed by the action of the driver, but during the time the car is going around a curve, they make a slow up-and-down motion, similar to the movement of a red crossing wig-wag signal, so that the attention of every traffic participant or autoist is attracted to them and there can be no doubt at all as to the direction the driver wishes to take.

The advantages of this kind of mechanical direction-indicator for the regulation of automobile traffic are so obvious that it must be surprising to the observer of American conditions that they have not as yet been introduced in the United States, and besides that they are not as yet re-

NEW GENERATOR

Dr. C. W. Potapenko of the Institute's Physics Department recently announced development of a generator which can produce electric pulses of extremely short duration — down to nearly one-millionth of a second.

Dr. Potapenko not long ago produced the shortest radio waves ever achieved, one centimeter. He used a tiny radio tube no larger than a house fly.

Dr. Potapenko also determined that when bacteria in the human body are bombarded with ultra short electro-magnetic waves, it is the heat and not the waves which kill the bacteria.

BEQUEST

A \$1,000,000 trust fund to be eventually divided between Stanford, the University of California and California Institute of Technology was established under the will of the late Miss Lee L. Jacks, on file for probate at Monterey.

The will provides that income from the fund shall go to four surviving sisters of the pioneer family until death and then be shared equally between the three schools.

quired by law. For how impractical and above all how **inadequate** and dangerous in traffic is here the manipulation of the signals announcing the change of direction. The horizontally raised left arm of the driver indicates a turn to the left, the more or less upright raised left arm indicates a turn to the right. Aside from the fact that at night one is never sure of the direction indicated by such an unilluminated arm, so that by such misunderstanding a serious traffic accident may arise at any time, it is certainly not comfortable in winter to drive with an open window and to stretch one's arm out into the cold. (There are, indeed, States in which, contrary to the climate of the Golden State or Florida, bad winter weather is had!). Furthermore, this practice leads to the habit of steering the car with but **one hand**, while it should be made a rule that both hands rest on the steering wheel in order to insure the greatest traffic security. Also the non-illuminated imitation-hands which are attached to the left side of American buses and trucks are very inadequate with regard to a clear and unmistakable direction-indication and the recognition of the intent of the driver, since an automobile taking a right curve naturally attracts attention to its right side. It is, therefore, psychologically false to try to attract the attention of the following automobiles to the left side. It remains an undeniable fact that lighted, red signal-arms, attached to both sides of the automobile, unexpectedly fulfill their purpose while signals by means of the more or less careless raising of an unilluminated arm, or the use of an unilluminated imitation-hand attached to the left side of the automobile remain very inadequate.

It is the hope of the writer that the above remarks may serve to interest authorities sufficiently to install or cause to be installed on both sides of automobiles mechanically operated red-illuminated signal-arms and to require their use by law and thus increase traffic safety. The long experience which the European countries have had with them prove that traffic safety can be greatly increased through their use.

Dr. Hugo Gabriel,
The Athenaeum.

HOBSON HONORED

Jesse E. Hobson, Ph.D., '35, central station engineer of the Westinghouse Electric Manufacturing Co., East Pittsburgh, was named by Eta Kappa Nu, electrical engineering honor society as the outstanding young electrical engineer for 1940. The presentation was made at a dinner held at the Philadelphia Engineerin Club here in connection with the winter convention of the American Institute of Electrical Engineers. Donald G. Fink, managing editor of the magazine "Electronics", New York, and Stuart G. Hight of the Bell Telephone Laboratories, New York, were given honorable mention.

The Eta Kappa Nu Award is made annually to engineers not more than ten years out of college and not more than 35 years of age to recognize "meritorious service in the interests of their fellow men." It is felt that the careers of outstanding men who are yet in their early thirties will act as valuable guides for undergraduates and inspire new graduates to take up their professional development without delay. The selections were made by a jury of prominent engineers, headed by P. H. Chase, chief engineer of the Philadelphia Electric Company, R. E. Hellmund, chief engineer of the Westinghouse Electric and Manufacturing Company, R. W. Sorensen, president of the American Institute of Electrical Engineers and professor of electrical engineering, California Institute of Technology, F. E. Brooks, chief engineer, Bronx-Westchester Division, New York Telephone Company, and George P. Sawyer of the Cerro de Pasco Copper Corporation.

Dr. Hobson, winner of the award, has been with the Westinghouse Company since the spring of 1937, and for the past three years has been central station engineer in charge of the consulting service provided for customers' engineers in the coordination of central station equipment and in the solution of analytical problems related to system performance and operation. He has published a number of papers dealing with power system analysis and has given lectures on power system performance. He also is known as an able teacher, and has given graduate courses in symmetrical components at the University of Pittsburgh and Northwestern University.

Previous to his present connection Dr. Hobson taught mathematics and was assistant to the Dean of Earlham College and instructor in electrical engineering at Armour Institute of Technology. He was born at Marshall, Indiana, on May 2, 1911, and was graduated from Purdue University in 1932. He obtained a Tau Beta Pi fellowship which enabled him to secure his master's degree, also from Purdue. The following year he was graduate assistant and teaching fellow at California Institute of Technology, being rewarded in 1935 with a doctorate degree, magnum cum laude. He is a member of Triangle, Sigma Xi, Sigma Delta Chi, Tau Beta Pi and Eta Kappa Nu, the American Institute of Electrical Engineers, and the Purdue Club of Pittsburgh.

DEFENSE COURSES

All Alumni interested in taking some of the Institute's Engineering Defense Training Courses in Production Engineering, Explosives, Tool Design, etc., should contact Professor Franklin Thomas at once. New courses will start about the middle of May. Courses are at night, and no tuition is charged.

PAULING RECEIVES MEDAL

(Continued from page 15)

'The Nature of the Chemical Bond.'

"Pauling's continual preoccupation with geometry has brought him into conflict with another geometer among chemists, Miss Dorothy Wrinch, and has resulted in several papers dealing with the structure of proteins."

A new structural chemistry has gone through the first stages of its development during the past twenty years, Dr. Pauling declared, describing two general methods of attack.

"The first," he said "is the accurate experimental determination, by the analysis of band spectra and of x-ray and electron diffraction patterns, of the nuclear configurations of molecules and crystals. This has provided a great deal of information about the ways in which atoms are bonded together to produce substances with the great observed variety of chemical and physical properties.

"The second general method is the development of the theory of the chemical bond and the electronic structure of molecules and crystals, giving an insight into the detailed nature of the forces involved in interatomic interactions.

"After years of development the older structural chemistry has become so reliable that the organic chemist can usually write with confidence the structural formula of the substance produced by a given reaction. The new structural chemistry has not yet developed to this stage, but we may look forward to the time when the chemist can take the specifications of desired physical, chemical, or especially physiological properties, interpret them in terms of the constituent atoms, the interatomic distances and bond angles, and topological character of the structure, and deduce from these the nature of the molecule to be synthesized which will show these properties."

Dr. Pauling, who is now working on the problems of immunology in an effort to determine exactly the structure of antibodies and antitoxins, was born in Portland, Oregon, on February 28, 1901, and received the bachelor of science degree in 1922 from Oregon State College. He won a teaching fellowship at the California Institute of Technology and was awarded the Ph.D. degree by the Institute in 1925.

He was a National Research Fellow in 1925-26, and in the latter year was awarded a Guggenheim Fellowship, which was renewed in 1927. He studied with Professor Arnold Sommerfeld in Munich, with Niels Bohr in Copenhagen, and with Erwin Schroedinger in Zurich.

Dr. Pauling became assistant professor at California Institute of Technology in 1927, associate professor in 1929, professor in 1931, and chairman of the division and director of the Gates and Crellin Laboratories of Chemistry at the Institute in 1937. He lectured in chemistry and physics at the University of California each Spring from 1929 to 1933, and at the Massachusetts Institute of Technology in 1932. He was George Fisher Baker Non-Resident Lecturer in Chemistry at Cornell University in 1937-38.

Alumni Business and Professional Guide

EDWARD E. TUTTLE

'28

ATTORNEY-AT-LAW
GENERAL PRACTICE

215 West Sixth Street

Los Angeles

ESSICK MACHINERY CO.

BRYANT ESSICK '22

AIR CONDITIONING EQUIPMENT PUMPS
AIR COMPRESSORS ROAD ROLLERS
PLASTER & CONCRETE MIXERS

1950 Santa Fe Avenue

Los Angeles

G. AUSTIN SCHROTER, '28

GEOLOGIST — MINING ENGINEER

EVALUATION, DEVELOPMENT AND
OPERATION OF MINES AND MILLS

Suite 1000

315 W. 5th St.

MUtual 8316
LOS ANGELES

George Rice & Sons

GEORGE RICE III, '31

PRINTED ADVERTISING MATERIAL
Planned and Produced

FOLDERS, BOOKLETS, CATALOGS
DIRECT MAIL STATIONERY

320 Crocker St.

MI-8363

Los Angeles

AUTOMOTIVE • INDUSTRIAL • AVIATION
Ball and Roller BEARINGS
M-R-C
GURNEY • SRB
STROM
Timken - Shafer - American - RMB
RBC and Cyclops Needle Bearings
Perfect Oil Retainers
and Synthetic Products
SALES and ENGINEERING
Richmd 5285
EDWARD D. MALTBY CO. 1718 SO. FLOWER ST.
LOS ANGELES

CHAPTER NEWS

New York

A high spot in entertainment was the illustrated talk on mountaineering which the California Tech Club of New York was privileged to hear at a dinner meeting on Tuesday, February 11th. The subject was presented in an interesting and graphic manner by Dr. William R. Hainsworth (MS '18) who illustrated his talk with colored motion pictures he had taken on the successful ascent of Mt. Robson, Canada, and the Matterhorn. Dr. Hainsworth who has at least sixteen first ascents to his credit, held the group spellbound by tales of his various exploits. His modesty as well as his excellent talk impressed an eager audience in an unforgettable way.

An added feature of the evening was a series of motion pictures of Caltech and the Pacific Coast, ably taken and described by Mr. Paul R. Ames ('22). Mr. Ames' pictures, also in color, showed a real talent for filming as well as a practiced and artistic eye. A movie short taken by B. F. Fredendall ('29) showed last summer's Caltech Yachting party held on the placid waters of Long Island Sound — prime pictures proclaiming precious portrayals of plain people in playful pose and polite portrait giving proof the project was prudently planned to produce personal pleasure.

The club was privileged by the presence of Mrs. R. W. Sorensen who entrained for California shortly after the meeting adjourned. A number of new members were greeted and Mr. Ted Coleman ('26) brought greetings from the parent association. The gathering was one of the few "mixed meetings" held during the year and was eminently successful with a large and enthusiastic turnout.

B. F. Fredendall, '29.

San Diego

As Secretary-Treasurer of the San Diego Chapter of the Cal Tech Alumni Association, I received your letter to Perry Boothe with the enclosed check and the request for news items. The mention of the deadline of March 1st sure helps in knowing when to send in items. I am, therefore, submitting the following news items for this deadline.

Elections were held last December by postcard the results of which were:

President . . . Lee Pratt, '31
Sec.-Treas. . . John Gates, '36

Also, last December a Dinner Dance was held at the La Mesa Country Club and was enjoyed by all attending.

M. E. Czamanske married Miss Rae Oronen in Yuma during the Christmas holidays.

In January our former president Perry Booth was called into the Service as Civil Engineer, U. S. Navy, on drydock construction at the Bethlehem Steel Works, Shipbuilding Division. His address is 930 Walker Street, San Pedro, California.

On January 26 the writer was presented with a future Cal. Teacher by his wife. This makes it even up. One for an Oxy coach dressed in green and one to yell "to Hell with Oxy."

Our new president Lee Pratt just recently moved into the new home he built on Mt. Helix. His address is Box 1226 Route No. 1, La Mesa, California.

Lee Pratt and I have gotten together and

have outlined a program calling for meetings in March, May, July, and October. We have purposely avoided calling a meeting in June so that those who wish to may attend the Alumni Association Annual banquet at Pasadena. We also hope to work in a picnic, and a beach party. For one of the meetings we are considering inviting the wives and girl friends to the dinner and meeting and then having a dance afterwards. The meeting in March is scheduled for the 21st when we expect to have each member tell a little something of his work and the problems involved. After the meeting we will provide cards for those who wish to stay and play.

I have just completed a master card index of all the men who have ever been on any of our membership lists and expect to send questionnaires to all of them with notices of our next meeting, asking for their present address and job. In this way we can keep a running record of the members in San Diego and keep in touch with those that have been here. By the way this list of men who are here or have been in San Diego numbers over 60. We ought to get an active chapter out of that many men.

John Gates, '36.

San Francisco

Thanks for the dues to carry on our local work. At our last meeting on January 10th, 1941, the following officers were elected for the calendar year of 1941:

President . . . Louis Erb, '22
Vice-President . . . Art Allyne, '26
Secretary . . . Francis Wyatt, '34

Because Wyatt has to be in Los Angeles for the next two months I have decided to pinch hit for him at the secretary's job.

The meeting on January 10th was to celebrate the annual football banquet. We had about 20 present and installed the new officers. For amusement we smoked cigars, told stories and played bingo on a percentage basis for the purpose of balancing the budget.

We were favored with a short speech by Jack B. Sturgess, '30, telling us of the alumni activities over in Honolulu, Hawaii. Jack was on his way to South America to continue his sales engineering work in that part of the world.

A telegram was sent to the gathering in Pasadena expressing our hope for improved interest in intercollegiate football and other sports.

Manley W. Edwards, '26.

Defense Post

Dr. Albert A. Lombard, Jr., '28, assistant professor of aeronautics and mechanical engineering at Caltech, has been appointed chief of the production unit in aircraft of the United States Division of Production.

At present Dr. Lombard is on a leave of absence for government duty.

Dr. Lombard received his degree in aeronautics at Caltech. He has done aeronautical research work for the Curtis-Wright Corporation, and is the author of several technical papers on airplane design.

The appointment was announced by John D. Biggers, director of the Division of Production.

News of Classes

1915

Earl A. Burt, recently passed second in the test for the \$7,200 yearly salaried position of Los Angeles County road commissioner. As a result of his showing in the civil service tests, Burt is expected to be named permanently as assistant road commissioner of the county.

1918

Frank Capra, noted screen producer-director, passed out the cigars for the third time February 12. A 6 and three-quarter pound baby boy was the reason. The Capras have two other children, Frank, 7, and Lucille, 3.

1922

Ben Benioff, Captain in the U. S. Army Engineer Reserves, was called to a year of active duty with the Construction Quartermaster at March Field, California, commencing January 30, 1941.

Jack Shield, Captain in the U. S. Army Engineer Reserves, was called to 2 years of active duty and sailed on January 24, 1941, to Honolulu on an Army transport from San Francisco.

Glen I. Miller, Major in the U. S. Army Coast Artillery Corps, has been called to a year of active duty and is stationed at Fort MacArthur, California.

Captain Douglas C. Mackenzie, Engineers Reserve Corps, has been ordered to active duty at Savannah, Georgia.

1925

Captain Percival T. W. Scott was killed in the crash of a T.W.A. airliner in St. Louis, January 23.

Alfred Newton was the author of a series of articles on beach erosion in the Santa Monica Bay area, recently published by agencies interested in beach conservation in that area.

1926

Directors of Northrop Aircraft, Inc., at the regular meeting January 28, elevated Theodore C. Coleman from the position of secretary to vice-president in charge of sales.

Joe Matson has resigned as County Engineer of Hawaii and has accepted a position as Civil Engineer for the Waialua Agriculture Company on the Island of Oahu.

Ted Combs has been transferred from his post at the Presidio to the Office of the Secretary of War in Washington, D. C., to assist with the Army's construction projects.

1928

Ed Joujon-Roche, who is a 1st Lieut. in the U. S. Army Engineer Reserves, was called to active duty December 28, 1940. Ed is stationed at Fort Ord, California, with the 19th Engineers and has moved his family up to Monterey.

Moe W. Gewertz is resident engineer for the California Division of Highways on bridge construction near Brawley.

1929

Larry Lynn who is a Reserve Captain in the U. S. Army Engineers was called to active duty on December 10, 1940. He is stationed at Fort Ord, California, with the 19th Engineers.

Al Dunn, a Captain in the U. S. Army Engineer Reserve, was called to a year of

THE SPIRIT OF

76

by JOHN CLINTON



From now on you can call me Shock-Proof John. I've seen everything! Because the other morning when I was driving past the Union Oil station on the corner I almost fell out of my Hispano-Plymouth at what I saw.

There, drawn grandly up to the pumps was a horse and wagon! "This, I gotta see!" says I, and turned back. And when I returned I got the 2nd shock, for what do you think the hay-burner was doing?

Well sir, the driver had put four old auto wheels on his wagon, and he was having the tires filled with air! While he was doing it, one of the boys had put a bucket of water down for Dobbin to drink! It was the most unusual sight I've seen for years!

And while the situation was, to say the least, amusing, the boys at the station were doing their stuff with perfectly straight faces. I'm not sure just what the entire significance of this little drama was, but it certainly proves that the Union Oil boys are gentlemen from way back!



So, in addition to inviting you to drive your car into a Union Oil station for service, I'm now in a position to invite all horse-and-wagon operators to do likewise. It's really too bad that Union can't think up some way for horses to use 76, or Triton Motor Oil, because somehow I think life would be more picturesque (if less convenient) if we had more horses galloping by. Don't you?

UNION OIL COMPANY

active duty on February 1, 1941, and is stationed at Fort Ord, California, with the 341st Depot Co.

Tom Evans, besides complimenting the Review, added the following personal items in a recent letter.

"I have been promoted to Associate Professor of Engineering at the University of Virginia this year, and am Chairman of the Committee to Improve Surveying Practice of the Virginia Section of the A.S.C.E. I am also Chairman of the University of Virginia's Committee on Engineering Defense Training. This job is going to take some time since we are setting up evening classes here and in many other centers in the state. So far we are the only school in Virginia to have a course approved by the U. S. Office of Education. Best wishes for a good year."

1930

Bob Bungay, a Captain in the U. S. Army Coast Artillery Corps, has been called to a year of active duty and is stationed at Fort Scott, California.

Jack Sturgess spent a week in Los Angeles the middle of January. Jack has been transferred from Honolulu to Columbia, South America, by the Worthington Pump Co.

1931

J. C. Harker is now associated with the U. S. Bureau of Reclamation at Redding, California.

William M. Cogen and Miss Joan Grossberg of Houston, Texas, were married in the Texas city January 16. Mrs. Cogen is a Stanford alumna.

Perry Boothe has taken an extended leave of absence from the San Diego Electric Railway Company, and is now on active duty as a Lieutenant (j.g.) in the Civil Engineer Corps, U.S.N.R. His present job is supervision of plant expansion at the Bethlehem Steel Company's ship building division at San Pedro.

Alfred S. Voak is the proud father of a baby son born last November in Atascadero.

1932

Henry Bland Pownall, engineer for the York Ice Machinery Company, was awarded the 1940 Wolverine Outstanding Publication Award at the annual meeting of the American Society of Refrigerating Engineers in New York City. The award was for the best paper published during the year in the Society's magazine.

Chet Keachie is the author of "Military Service Provisions of Union Agreements", a monograph recently published by the Stanford University Division of Industrial Relations. Mr. Keachie is a research assistant at the Stanford University Graduate School of Business, where he is completing work on the Ph.D. degree.

1933

James Clifton Spade was married to Miss Helen Sue Stalker of Los Angeles, January 23, in Los Angeles.

Edwin Russell Kennedy announces the birth of a daughter on February 13 at the California Lutheran Hospital. The baby, the Kennedy's first, was named Virginia Louise, and weighed 7 pounds, 5½ ounces at birth.

K. V. Keeley attained a near-perfect score of 99.4 percent on a recent civil service exam for CO of Los Angeles' police radio station KGPL. Keeley is at present

radio faculty instructor for National Schools.

Trent R. Dames, '33, is Secretary of the Los Angeles Section of the American Society of Civil Engineers. He is the author of an article, "Practical Shear Tests for Foundation Design" appearing in the December, 1940, issue of "Civil Engineering."

1935

Victor Willits, now with Proctor and Gamble in Cincinnati, received a cherubic Christmas present last December 25 in the form of an 8 pound, 6½ ounce baby son, who was named Victor William Willits.

1936

Frank Wilbur Davis and Miss Frances Pfeiffer were married in San Marino on March 15. Davis is a test engineer for Vultee Aircraft Corporation.

W. E. Swanson is now assistant area engineer for U. S. Engineers in the State of Utah, stationed at Ogden.

Tyler Thompson is now at 42 Barker Road, Singapore, S.S., Methodist Mission.

Hugh Colvin is an instructor in the Industrial Organization course now being given at the Institute as part of the Engineering Defense Training program.

Perry Polentz is now a foreman in the extrusion department of the Aluminum Company of America's Vernon plant.

1937

Holloway H. Frost was married to Miss Katherine Oliver of Tulsa, Oklahoma, October 24, 1940. Since graduation Holloway has worked for Mott-Smith Corporation in the 'States', Egypt, and now Venezuela where the company is doing contract work for Socony-Vacuum Oil Co.

Patricia Louise, daughter and second child, was born in Billings, Montana, on January 25 to Mr. and Mrs. Robert M. Mahoney.

1938

Edward Frisius and Miss Raymond Urwand, of Cairo, Egypt, were married the later part of December. Frisius is now a soil mechanic at Berkeley.

Harper North has finished the Student Engineering Course at General Electric and has accepted a position in the Schnectady Research Laboratories. He will be working on acetylene generation.

Hernan Tejada is in charge of the technical department of the Compania Internacional de Radio Boliviana, a company affiliated with the International Telephone and Telegraph. Most of the work is to keep the equipment running on schedule, both radio-telegraph and radio-telephone. His working hours are from 9:00 a.m. to 12:00 noon, and from 2:00 p.m. to 6:00 p.m. He must also work when anything goes wrong. Two days before Christmas, when telegraph traffic was very heavy, lightning struck a high tension line and put it out of service. "I must say that we had a lot of fun, if fun can be called, working on the Altiplano (the Andean Plateau) at over 13,000 feet and with very cold weather especially at night. . . ."

Al Pabst is now employed by Garlinghouse Brothers, suppliers of contractor's equipment, in Los Angeles.

1939

R. B. Kimball recently transferred from the Testing Department to the Induction Motor Engineering Department at the Schenectady Division of General Electric.

EACH CAN SAY



"I WAS A CLERK"



"I WAS A LINEMAN"



"I WAS A DRAFTSMAN"

THIRTY-SEVEN years ago, in 1904, the president of the American Telephone and Telegraph Company went to work as a clerk in one of the Bell System companies.

About that time, the 18 men who are now the presidents of the Bell telephone companies were starting their careers. For, like the head of the System, they have

worked many years in the business — an average of 38 years each. Each of them can say: "I was a clerk," "I was a lineman," "I was a draftsman" — and so on.

The "know how" is here — for the every-day job of running the telephone business or to serve you in emergency. Up-from-the-ranks management is doubly important these days.



THE BELL SYSTEM IS DOING ITS PART IN THE COUNTRY'S PROGRAM OF NATIONAL DEFENSE.

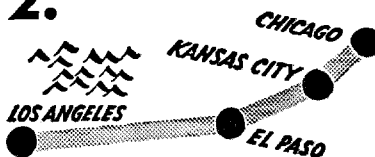
PLAN YOUR THRIFTY TRIP EAST LIKE THIS:

1.



Speed to CHICAGO on SP's friendly *Californian*—the train that "makes it fun to be thrifty."

2.



The "Californian" takes you to CHICAGO over the lower-altitude Golden State Route—more comfort per mile.

3.



Stop over at El Paso for the thrilling one-day side trip to gigantic Carlsbad Caverns.

★ ★ ★

CHICAGO \$39⁵⁰

\$65 ROUNDTRIP

...in reclining chair cars. Fares in tourist sleeping cars are also very reasonable.

4.

SAVE MONEY—HAVE FUN

ENJOY all the grand money-saving features of the "Californian".....

★

ECONOMY MEALS as little as 90c a day! Complete, delicious, served in the big dining car.

★

REGISTERED NURSE-STEWARDESS on board to make your trip a real pleasure.

★

SPACIOUS LOUNGE CAR for tourist passengers. Also special chair car for women and children.

Southern Pacific's

FRIENDLY *Californian*