

ALUMNI REVIEW

CALIFORNIA INSTITUTE OF TECHNOLOGY

Vol. 5 No. 1

September, 1941



Never too busy to be Good Neighbors

THERE are a lot of workers in the Bell System — about 350,000 of them. That's a big family and it likes to be a friendly kind of family.

Whether it be the installer in the house, the people in our offices, the operators or the line-man on the roadside helping to rescue a stray kitten for a worried youngster, telephone workers are close to the public and the tradition of the job is helpfulness.

Even in these days when the needs of defense place sudden and increasing demands on telephone workers, they are never too busy to be good neighbors.



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ALUMNI REVIEW

ALUMNI ASSOCIATION, INC.
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THE EDITOR'S COLUMN

PRELUDE . . . In this first issue of the fifth year of the Alumni Review, your Editor wishes to make the traditional but sincerely believed commentary that "This year's efforts will be bigger and better than last year's." In the case of the Alumni Review and of the Alumni Association itself, this trend of constant growth and improvement is no mere gesture. In the relatively short period of its existence, the Alumni Association has achieved a membership goal unequalled on a percentage basis, by any college or university in the country. An especially interesting feature of this membership list is that almost ten per cent of the total are life members. And this mark has not been achieved by super-safeness but rather by a series of activities by and for Alumni, also unequalled by other like organizations. True our Alumni body is rather homogenous as to interests and geographical location, and this is our natural advantage. But we think the program of dinner meetings, field days, seminar week-ends, dances, football rallies, and publications has been the main reason for the constantly increasing growth and interest in Alumni membership.

And the Alumni Review likewise has grown. From a rather humble start five years ago, it can now stand with the best in the country. Surely it is not the largest, nor perhaps does it have the best articles, nor the most distinguished contributors, nor is it published as frequently as some. But we exchange issues with several of the leading schools of the country and we can without reservation feel proud of the comparisons.

NOTICE: Incidentally, this will be your last issue of the Review if you fail to send in your 1941-42 Alumni dues. We should like to send the Review to all graduates of the Institute, paid members or not, but postal regulations and finances forbid this. So now it's up to you.

ABOUT OUR AUTHORS

Howard W. Finney, '32, who contributes a timely article on defense contracts, is an Alumnus who has drifted away from the field of science and engineering into that of public accounting. For the past several years he has been associated with Price, Waterhouse, and Company in Los Angeles, and one of his aims in contributing the article was to bring busy engineers up to date on some of the highlights of the all-important question of the day — how to get defense contracts.

Fred S. Scott, '30, presents in this issue the result of considerable time and effort in running down the names and last-known addresses of Alumni in active military service. Fred compiled the list with fear and trembling because of the high possibility of errors of omission and commission (no pun intended) that exists, and the article is presented with the certainty that a barrage of corrections will ensue. But we think it is of great interest to note how many Alumni are in the service and what a large number of relatively high rankings they hold. Fred Scott incidentally has long been an active Alumni Association worker, now holds a Captaincy in the Chemical Warfare Reserve, and is employed by the Union Oil Company in a technical capacity. He is known to undergraduates at the Institute as the donor of the Scott Tennis Trophy, for which annual competitions are held.

in other words

by JOHN CLINTON



Well, the Hispano-Plymouth was practically leaning against the garage wall, its headlights rakishly askew, its beautiful body caked with the white dust of the Mojave, the good salt mists of Oregon, and the balsam spots of Washington. "I'm tired, John!" said the Hispano-!

* * *
I patted it on the radiator, scratched its headlights and went in and telephoned my favorite Union Oil Minute Man—Champ, down at Foothill and Haskell. "Come and get it, Champ," I said.

* * *
For the most certain, economical and prompt cure of *after-vacation-itis* in your pet motor vehicle is a Stop-Wear lubrication job . . . as served staunchly and exclusively by Union Oil Minute Men.

* * *
When they bring your buggy back you'd never recognize it. You can see the difference in how it shines, and in how neatly dressed are the tires, running boards, etc.—how the glass gleams.

* * *
You can *hear* the difference in the quiet-as-a-mouse way it operates — no birds or rattles. And you can *feel* the difference in the slick way it shifts, steers and rides.

* * *
And along with all this, they give you a written guarantee against faulty chassis lubrication good at any Union Oil station anywhere for 1000 miles. That means if a squeak develops, due to chassis lubrication they make it disappear at no cost.

* * *
So if your car looks thin and weak after the summer, call your neighborhood Minute Men at the Union Oil station. Just say "Stop-Wear . . . come and git it!"



DEFENSE CONTRACTS

By HOWARD W. FINNEY, '32

Price, Waterhouse & Co.

Many graduates of the Institute already are acquainted with some of the procedures required by the Federal government in fulfilling contracts, but much of this experience has been with engineering and production, and little with the financial and accounting aspects. This article was written with the hope that a general discussion of defense contracts, with emphasis particularly upon financing and accounting would be beneficial to all.

METHODS OF PURCHASING

There is a distinction between the purchasing systems of the War and Navy Departments; purchasing by the Army is decentralized while that of the Navy is centralized. The Army purchasing agencies are the Air Corps, Chemical Warfare Service, Coast Artillery Corps, Corps of Engineers, Medical Corps, Ordnance Department, Quartermaster Corps, and the Signal Corps. The Navy generally purchases its supplies through the Bureau of Supplies and Accounts, but local offices may purchase emergency requirements and perishable products, while certain branches make their own purchases.

With a few exceptions, contracts in excess of \$500 must be in writing. There are two principal types of contracts, the fixed-price contract and the cost-plus-fixed-fee contract, commonly referred to as cost-plus. The latter type is negotiated, while the former generally is used in open competition, although it also may be negotiated. The cost-plus-percentage-of-cost contract used during World War I is now rare, evidently being against the policy of the government and in some instances prohibited by law.

Fixed-price contracts usually are awarded to the lowest responsible bidder, but when such contracts are negotiated an "escalator clause" sometimes is inserted. This clause states that if a substantial rise in costs occurs after execution of the contract, the contractor will be reimbursed for the additional cost of labor and material, the amounts of reimbursement being determined by applying percentages of rise to the estimated costs. There is no standard escalator clause, but a clause suggested by the National Defense Advisory Commission bases the percentages on various indexes of the Bureau of Labor Statistics. The clause does not apply to materials furnished by the government or for which the contractor had firm quotations prior to signing the contract.

Cost-plus contracts are signed on the basis of estimated cost and fixed fee, the contractor eventually receiving actual cost plus his fixed fee. The contract may provide additional remuneration, as in the case of the Air Corps standard supply contract, where any decrease in actual cost from estimated cost is split 50-50 with the contractor, up to a total remuneration of 7 percent of the estimated cost. The fees on cost-plus contracts have averaged about 6 or 7 percent of the cost.

Both the War and Navy Departments ordinarily purchase all supplies and construction by the method of bid and award, but the secretaries of both departments are authorized to

negotiate contracts without competition if the need is urgent, or if competitive bidding is not feasible, although the authority of the Secretary of the Navy to negotiate contracts extends only to the acquisition, repair or conversion of complete naval vessels or aircraft. Negotiations of contracts is desirable in many instances because it is speedy and flexible, and work on the supplies may be started before all details of the contract are finally determined.

During World War I there were many different forms of contracts and by 1918 several hundred varieties had made their appearance. The ensuing confusion resulted in the War and Navy Departments establishing a few standard forms, so that now there is a reasonable number of forms covering the purchasing of supplies. However, contracts for erection of defense plants and facilities are appearing in a large number of varieties.

EFFECT OF POSSIBLE PRIORITIES UNEMPLOYMENT UPON PURCHASING

The OPM recently took steps to forestall possible unemployment because of the effect of priorities upon factories not working on defense orders. The new plan, approved by the Army and Navy, contemplates:

1. Special treatment designed to spread defense work wherever practicable into communities or industries faced with unemployment because of lack of materials for non-defense production.
2. Changes in general purchasing policies, including a requirement that a statement as to the percentage of work to be "farmed out" be placed in every contract over \$50,000.
3. A requirement that a detailed statement as to subcontracting intentions be submitted with contract proposals of \$250,000 or more.

The statement of the bidder as to the minimum percentage, on a dollar value basis, which he will guarantee to subcontract is to be weighted favorably in valuing bids, and the percentage is to become a part of the final contract. More exhibits of specific items, broken down into components labeled with a description of machine tools, equipment and operations required for production, are to be provided and placed in a larger number of centers readily available to manufacturers. Calls for bids for large quantities are to be broken down into optional units to permit smaller concerns to bid for appropriate quantities. The contracting office may divide awards so that part will go to others than the low bidder. This feature of split bidding and multiple award was adopted by the Quartermaster Corps as early as August, 1940. At that time the Quartermaster Corps adopted another speed-up policy, that of calling for bids f.o.b. point of origin in preference to f.o.b. point of destination, with material furnished by the government being delivered to the plant without cost to the contractor.

In furtherance of the plan to forestall priorities unemployment, the Defense Contract Service, initially a unit of the

Production Division of the OPM and with offices at all Federal Reserve Banks and branches, was given the status of an independent bureau in the OPM on August 19, 1941. The Defense Contract Service, in addition to its previous duties of advising on contracting and financial problems, and assisting on engineering problems, is to give special attention to communities threatened with priority unemployment by investigating production possibilities. Where practicable the OPM will recommend to the Secretaries of War and the Navy a remedial program that may include any or all of the following:

1. Negotiated fixed-price contracts up to 15 percent above current quotations (presumably to take care of any local higher operating costs which may be encountered).
2. Organization of a responsible local defense association or corporation, so that manufacturers may jointly handle defense work they could not perform individually.
3. Elimination of bonds for bids or performance.
4. Inspection at the plants of the products involved to facilitate prompt payment.
5. Reimbursement of prime contractors for additional costs resulting from extension of such policies to their subcontractors.

FINANCING SUPPLY CONTRACTS

Both the War and Navy Departments will advance payments to contractors before commencement of performance in amounts not exceeding 30 percent of the contract price, and both will make progress payments during the performance of the work. However, the government prefers the use of private financing and dislikes to make advance payments except on a showing that private financing is unavailable. Late in 1940 Congress passed an act permitting the assignment of claims for money due or to become due under government contracts. A contractor is thus able to secure private financing in advance of the time he could obtain payment from the government. Contracts themselves cannot be assigned.

FINANCING DEFENSE PLANTS

Four plans are available for the financing of complete plants, additional capacity or equipment for the performance of supply contracts. Lease or erection of such a facility is made the subject of a separate contract and not incorporated in supply contracts.

Plan I. Government Owned

This plan is used when the government desires a permanent interest, such as in plants whose products are useful only for war and which might be maintained as standby capacity upon termination of the emergency. Under the plan the government erects the plant, holds title and operates itself or under a management contract, or leases to a private manufacturer.

Plan II. Emergency Plant Facility (EPF)

A contractor may preserve a future interest in a proposed facility by negotiating a contract with the Army or Navy whereby the contractor erects the facility and is reimbursed for the full cost, including land, in 60 equal monthly installments, the payments to be accelerated if supply contracts run out before the expiration of the 60 month period. By assigning the claim for reimbursement to a bank or the RFC, the con-

tractor can borrow the necessary funds to erect the facility and hold title until the end of the 60 month period, when the facility is to be transferred to the government. If the supply contracts are terminated the government pays the balance of the costs, takes title and assumes any construction obligations if the facility is not completed. On such termination, or at the end of the 60 month period, the facility may be permanently acquired from the government upon payment of the original cost less an agreed depreciation, or at a negotiated price. Reimbursement to the contractor does not contain any element of profit; for this the contractor must look to his supply contracts.

The EPF contract was developed to encourage private financing and recognizes that the cost of excess facilities should be borne by the government, with the government entitled to any value remaining in the facility after the emergency.

The reimbursing payments may be included in income for tax purposes, but if so included they can be offset by the amortization deductions described under Plan III.

Plan III. Privately Owned

Here the contractor supplies his own funds, holds title and privately operates the facility. No reimbursement of the cost of the facility is made other than for normal depreciation included in the product price. However, for tax purposes the contractor may substitute for the normal depreciation ordinarily deducted from gross income in determining taxable income, an amount each year sufficient to amortize the cost of the facility, including land, over a 60 month period. To avail himself of this election the contractor must obtain a Certificate of Necessity from the OPM and either the Secretary of War or the Secretary of the Navy. A Necessity Certificate states the facility is "necessary in the interest of national defense".

If the emergency is terminated before the expiration of the 60 month period, or the facility has ceased to be necessary, the contractor may elect to amortize over the shorter term, or if he has been depreciating the facility on a normal basis, he may elect to amortize over the emergency period. In such cases taxes previously paid on income are to be recomputed to reflect the increased amortization. A contractor is also able to discontinue the amortization over a 60 month period at any time he desires and thereafter change to normal depreciation.

To qualify as an emergency facility, construction or acquisition must have been completed after June 10, 1940, and only so much of a plant then in construction which has been erected after that date will be included in the Necessity Certificate. To obtain a Necessity Certificate application must be made within 60 days of the beginning of construction or date of acquisition (the time limit was originally extended to February 6, 1941).

The rapid amortization described was enacted into law to permit contractors to recover costs of defense facilities before payment of taxes, as in many instances the expanded capacity will be excessive after termination of the emergency and in such cases the facilities will no longer be productive. Nevertheless, manufacturers who completed defense plants prior to June 10, 1940 in anticipation of supply contracts, or to accel-

erate deliveries under then existing contracts, are denied the tax advantages.

Under Plans II and III a Necessity Certificate is required in all cases, and one of two other certificates sometimes must be acquired to obtain amortization. A taxpayer being reimbursed for the cost of an emergency facility must obtain a Certificate of Government Protection, indicating that the United States is adequately protected as to the disposition of the facility. A contractor not being reimbursed should obtain a Certificate of Non-Reimbursement, thus establishing for tax purposes that a Certificate of Government Protection is not required. These two latter certificates are obtained in a manner similar to that for a Necessity Certificate, and all three are issued to the Commissioner of Internal Revenue. A subcontractor need obtain only a Necessity Certificate.

Plan IV. Defense Plant Corporation

When a manufacturer wishes to preserve a future interest in a plant, but does not desire to finance under Plan II, he may enter into a contract whereby the Defense Plant Corporation, a subsidiary of the RFC, pays for the plant, holds title and leases to the manufacturer. Upon the termination of the lease, and in some cases during the term of the lease, the contractor may obtain title by paying the original cost less agreed depreciation, or a negotiated price.

The annual rental may be \$1, in which case the lessee will not include as a cost a charge for rent, or the rental may be large enough to amortize the cost of the plant over its useful life. The latter type of lease is used when the entire output of the plant is not to be sold to the government, and the rental charge will be apportioned over the total production.

ALLOWABLE COSTS

The Act of March 27, 1934 (Vinson Act) limited the profit on naval vessels and Army and Navy aircraft to 10 per cent of the cost on awards over \$10,000. Subsequently, this act was modified to allow a 12 per cent profit on aircraft and then again modified, permitting only 8 per cent on any naval construction under the act and limiting the contracts covered to those where the award exceeds \$25,000. However, under the Excess Profits Tax Act (the Second Revenue Act of 1940) the profit limiting provisions of the Vinson Act were suspended so long as the excess profits tax remains in effect. Prior to the suspension of the profit limiting provisions of the Vinson Act, Treasury Decision 5000 was issued to regulate the determination of excess profits under the act. Part of this regulation was concerned with definition of the allowable elements of cost, and this portion has continued to be utilized as a definition of costs in Air Corps cost-plus standard supply contracts.

T.D. 5000 describes the usual elements of direct cost and goes into the subject of indirect costs at some length. Unallowable items include entertainment expenses; dues and memberships other than those of regular trade associations; donations in excess of those to local charitable organizations which constitute ordinary and necessary business expense; losses on other contracts; profits or losses from sales or exchanges of capital assets; extraordinary expenses due to strikes or lockouts; fines and penalties; amortization of unrealized appreciation of assets; expenses, maintenance and depreciation of excess facil-

ities vacated or abandoned, or not adaptable for future use in performing contracts; increase in reserve accounts for contingencies, repairs, compensation insurance (except as provided with respect to self insurance) and guarantee work; Federal and State income and excess profits taxes and surtaxes; cash discounts earned up to 1 percent of the amount of the purchase, except that all discounts on subcontracts subject to the act will be considered; interest incurred or earned (except up to 4 percent interest paid for financing facilities or working capital where indebtedness was incurred to perform supply contracts); bond discount or finance charges; premiums for life insurance on lives of officers; legal and accounting fees in connection with reorganizations, security issues, capital stock issues and the prosecution of claims against the United States; taxes and expenses on issues and transfers of capital stock; losses on investments; bad debts; expenses of collection and exchange.

T. D. 5000 is not a guide to be followed in all instances, as the regulation expresses that "no definitions of the elements of cost may be stated which are of invariable application to all contractors or subcontractors". The above unallowable items indicate the type of costs which generally cannot be recovered under cost-plus contracts, except out of profit margins.

ACCOUNTING REQUIREMENTS

Under cost-plus contracts contractors are required to keep adequate records. The following, taken from a War Department standard construction contract, is typical of such requirements: "The Contractor agrees to keep records and books of account, on a recognized cost accounting basis, showing the actual cost to him of all items of labor, materials, equipment, supplies, services, and other expenditures of whatever nature for which reimbursement is authorized under the provisions of this contract. The system of accounting to be employed by the Contractor shall be such as is satisfactory to the Contracting Officer". As far as construction contracts are concerned, little difficulty is experienced in collecting costs.

Difficulties may be experienced in cost accumulation when a contractor has a number of supply contracts in progress, or has commercial work in progress along with government contracts. According to T.D. 5000 the following are essentials in contract accounting:

1. "The profit and loss upon a particular contract or subcontracts shall be accounted for and fully explained in the books of account separately on each contract or subcontract.
2. "Any cost accounting methods, however standard they may be and regardless of long continued practice, shall be controlled by, and be in accord with, the objectives and purposes of the Act and the Act of March 27, 1934, as amended, and of any regulations prescribed thereunder.
3. "The accounts shall clearly disclose the nature and amount of the different items of cost of performing a contract or subcontract."

The regulation specifies the method of apportioning indirect expenses, subject to the requirement that all items which have no relation to the performance of the contract shall be elimi-

(Continued on page 15)

ALUMNI CALLED FOR MILITARY DUTY

By CAPTAIN F. S. SCOTT, '30,
Chemical Warfare Reserve.

The impact of the national emergency on the supply of engineering talent has been frequently described in the Alumni Review but little has been said of the many alumni who have been called to active duty in the armed forces of the United States.

It will be recalled that during the war of 1914-1918 the Institute served as a training school for the military forces and that shortly after that war a senior Reserve Officers Training Unit was established for the undergraduates under the supervision of officers from the Corps of Engineers. This training was discontinued in 1929. Some of the facilities are still on the campus, notably the old Dorm and cafeteria, but other buildings in the vicinity of the present tennis courts have been removed.

Many of the alumni continued their military studies after graduation and attended two week training camps during the summer. These men have been gradually called to active duty as the armed forces have expanded and have been training the selectees as they have been called to the colors.

The following tabulation lists the present rank, class, and military station of all the alumni now on active duty. The writer is somewhat reluctant to publish the list because it is doubtlessly fraught with omissions and errors due to the rapid expansion and changes in the national defense program. It is planned to publish a revised list in a future issue of the Review and correspondence on the matter should be addressed to the writer's attention in care of the Alumni Association. In the interest of secrecy the stations of naval personnel are not listed.

CORPS OF ENGINEERS

Major D. P. Barnes, M.S. '30, Fort Belvoir, Virginia
Major M. C. Brunner, '25, 4th Air Force, Tucson, Ariz.
Major L. J. Claterbos, Washington, D. C.
Major T. C. Combs, '27, Office Under Secretary of War, Washington, D. C.
Major J. C. Krouser, '25, 13th Engineers, Fort Ord, Calif.
Major D. C. MacKenzie, '22, U. S. Flying School No. 1, Macon, Ga.
Major J. T. Mercereau, '24, Fort Belvoir, Virginia
Major J. E. Shield, '22, U.S.E.D., Honolulu, T. H.
Captain Ben Benioff, '22, oZne Q. M. Office, 74 New Montgomery St., San Francisco, Calif.
Captain James Boyd, '27, Army & Navy Munitions Board, Washington, D. C.
Captain R. C. Blankenburg '27, 19th Engineers, Fort Ord, Calif.
Captain A. W. Dunn, '29, 391st Depot Co., Fort Ord, Calif.
Captain W. B. Grimes, '29, Fort Belvoir, Virginia
Captain H. Y. Ingersoll, '26, 1st Engineers, Fort Devens, Mass.
Captain Carl Krauser, '25, 13th Engineers, Fort Ord, Calif.
Captain O. S. Larabee, '25, Engineer Board, Fort Belvoir, Va.
Captain L. E. Lynn, '29, 19th Engineers, Fort Ord, Calif.

Captain James Mercereau, '24, Fort Belvoir, Virginia
Captain W. H. Mohr, '29, 84th Engineers (Cam.), Fort Belvoir, Virginia
Captain E. H. Ross, '28, 10th Engineers, Fort Lewis, Wash.
Captain W. R. Shuler, '32, West Point '36, Fort Belvoir, Va.
Captain G. M. Webster, '22, R.O.T.C. Oregon State College, Corvallis, Oregon
1st Lt. A. P. Banta, M.S. '28, U.S.E.D., Mobile, Alabama
1st Lt. Robert Bard, '35, 115th Engineers, Camp San Luis Obispo, Calif.
1st Lt. J. E. Joujon-Roche, '28, 19th Engineers, Fort Ord, Calif.
1st Lt. G. W. Lambertson, Co. A, Bn. 29 E.T.B., Ft. Leonard Wood, Mo.
1st Lt. J. C. Monning, '33, 19th Engineers, Fort Ord, Calif.
1st Lt. O. F. Reinen, jr., '29, Hawaiian Department, T. H.
1st Lt. E. H. Ross, '28, 19th Engineers, Fort Ord, Calif.
1st Lt. V. W. Rodgers, '27, 19th Engineers, Fort Ord, Calif.
1st Lt. L. O. Scott, '29, Instruction, Fort Belvoir, Virginia
2nd Lt. F. S. Hale, '27, C.Q.M., Fort Worden, Wash.
2nd Lt. R. G. Macdonald, '33, Instruction, Fort Belvoir, Va.

AIR CORPS

Major K. R. Crosher, '28, Salinas Field, Calif.
Captain R. A. Philleo, '27, A. C. Basic Flying School, Bakersfield, Calif.
Captain Paul Dane, Wright Field, Dayton, Ohio
Captain W. Stuart Johnson, '26, Procurement Office, Santa Monica, Calif.
1st Lt. J. H. Maxson, '27, March Field, Calif.
1st Lt. J. W. Towler, '30, Mather Field, Calif.
1st Lt. Art Lowell, '38, Barrage Balloon School, Paris Island, S. C.
2nd Lt. R. W. Winchell, '39, Randolph Field, Texas
2nd Lt. G. Van Dyke, '40, Randolph Field, Texas
2nd Lt. M. E. Hines, '40, Randolph Field, Texas
2nd Lt. R. E. Fleming, '40, Randolph Field, Texas
2nd Lt. W. W. Stone, '40, Kelly Field, Texas
2nd Lt. B. M. Tobin, '40, Albany, Ga.
2nd Lt. F. C. E. Oder, '40, Pendleton, Oregon
2nd Lt. G. B. Weir, '40, Stockton, Calif.

COAST ARTILLERY CORPS

Major G. I. Miller, '24, Fort MacArthur, Calif.
Captain O. H. Barnes, '26, Fort MacArthur, Calif.
Captain R. H. Bungay, '30, Fort Scott, Calif.
Captain Richard Darling, '27, Camp Callan, Calif.
Captain S. L. Seymour, '26, Camp Callan, Calif.

NATIONAL GUARD

2nd Lt. E. B. Crossman, '31, Instruction, Fort Benning, Ga.

FIELD ARTILLERY CORPS

Corp. Langdon Hedrick '42, 146th F. A., Tacoma, Wash.
Corp. Walter Munk, '39, 146th F. A., Tacoma, Wash.

(Continued on page 16)



COMMITTEE ON INDUSTRIAL RELATIONS PROJECT

The Industrial Relations Section is supervised by this Committee appointed by the Board of Trustees of the California Institute. (From left to right) Edwin F. Gay, Arthur H. Young, William C. McDuffie, Robert D. Gray, William B. Munro, Chairman, and Robert A. Millikan discuss plans for coming year. Max Mason and Reese H. Taylor were unable to attend.

INDUSTRIAL RELATIONS SECTION 1940-1941

The fundamental purpose underlying the work of the Industrial Relations Section is to aid in the gradual improvement of relations between employers and employees in Southern California through the substitution of facts for unsupported opinions insofar as this is possible.

It is only in very recent years that the possibility of a rational approach to a subject with so many controversial aspects has been realized. Handling men is vastly different from handling machines—as many engineers have come to learn. Yet, despite the apparent inconsistencies in the reactions of individuals, there are demonstrably successful ways of using certain techniques; there are other ways of employing the same techniques that produce reactions as predictable and violent as those of sodium and water.

A great deal of work has already been accomplished and far more remains to be done on problems of employer-employee relations. Work that contributes to the developing techniques of personnel administration and collective bargaining can and should be as objective, as fact-finding, and some of it as experimental as that of any physics laboratory.

The term “industrial relations” embraces many subjects; it is concerned with every point of contact between the worker and his boss. The direct contact begins when a man applies for a job and ends with his exit interview. Between these two points, the industrial relations department of a company may be concerned with testing and placing him; training, rating, and promoting him; setting his salary; fixing his hours; protecting his health and safety; administering benefit plans, such as life and medical insurance, pension, and thrift plans, for him and his dependents; discovering his grievances and adjusting

them; bargaining with his union; and, in general, creating and maintaining a high morale that makes and keeps a good employee.

Some of the problems suggested by the activities above are more tangible than others. Each step forward in the field of industrial relations is in the direction of finding concrete solutions for specific problems. Here are three examples:

Setting salaries has traditionally been a procedure hard to justify and often strongly influenced by whim or custom; systems of job evaluation are now being developed for the establishment of salary standards which are rational and consistent and which can be justified to employees and stockholders.

The hiring and placement process formerly depended upon the subjective judgment of interviewers; now, testing programs with batteries of tests for aptitudes, intelligence, skill, and temperament put additional information at the disposal of the placement officer.

Company policies on hours, wages, vacations, holidays, and working conditions have many times been vacillating and inconsistent; the increasing prevalence of written agreements is serving in a businesslike manner to clarify and stabilize practices which the employer and employee have mutually established.

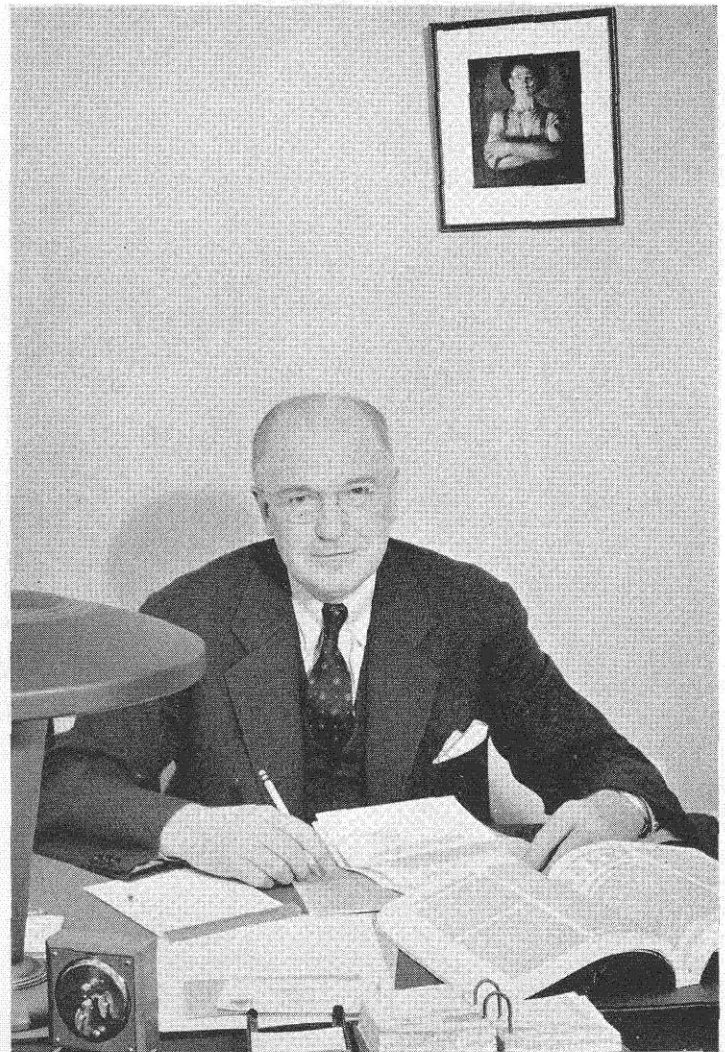
In dealing with the broad problem of industrial relations, the Industrial Relations Section of the California Institute has, during its first two years of existence in a five-year experimental period, initiated a variety of activities:

1. Training students at the California Institute who may develop into supervisors and executives.
2. Aiding directors of industrial relations and other executives charged with the duties and responsibilities of personnel



ROBERT D. GRAY

The official record says "Associate Professor of Economics and Industrial Relations and Director of the Industrial Relations Section," but students, alumni and Sponsors say "Bob". He came to the California Institute in August, 1940.



ARTHUR H. YOUNG

From his "retirement" on a lemon ranch in Carpinteria, Mr. Young was drafted to help organize the Section and has remained with it as Lecturer on Industrial Relations and Toastmaster for the dinner-discussion meetings.

administration by maintaining a library of materials which they may consult, and by furnishing speakers to discuss technical subjects at meetings of the Industrial Relations Association of Los Angeles.

3. Assisting top management in the formulation of sound industrial relations policies through a series of dinner-discussion meetings.

4. Extending and improving policies of good industrial relations by an intensive research program.

5. Improving public education on matters relating to industrial relations through speeches made by Professor Gray and Mr. Young.

It is expected that all of this program will be continued during the coming year and it is hoped that it may be further broadened by the initiation of intensive work with leaders of the labor movement.

According to the original plans for the Industrial Relations Section, four activities were to be established and maintained:

1. Instruction.

2. Field and research studies in industrial relations.

3. A library of materials relating to labor problems.

4. Periodic conferences for the discussion of these problems.

It was on the basis of this program that financial support was provided by a generous grant from the Earhart Foundation and by contributions from more than sixty individuals, industrial concerns, and trade unions. The Sponsors of the Section are drawn from many of the widely diversified manufacturing and commercial enterprises in Southern California including public utilities, oil companies, aircraft manufacturers, building contractors, banks, and newspapers as well as representatives of the steel, cement, automobile, electrical, textile, hardware, and various other industries operating in this locality.

In appraising the accomplishments of the Industrial Relations Section it should be realized that some of its achievements will be cumulative and are not subject to precise measurement at the present time. The scope and intensiveness of the research program for example, depend on the mutual trust and confidence established between the staff of the Section, on one hand, and the sources of information—unions, employers, trade associa-

tions—on the other. Much of this development can come only over a period of time.

The major accomplishments of 1940-1941 may be summarized as follows:

1. *Staff.* By August 1940 the staff of the Industrial Relations Section had been reduced by transfer and resignation to Mr. Young and Professor Gray. During the year it has been necessary to secure and train a clerical, library, and research staff, consisting of four women and two men. Mr. Veysey, who was a research fellow in the Section in 1939-1940, has returned to the Section as Instructor in Industrial Relations for 1941-1942.

2. *Improved Physical Facilities.* For more than a year the Industrial Relations Section was housed in two small rooms in Dabney Hall. In January 1941 the Section moved into its present quarters in the basement of Culbertson Hall. These quarters provide increased office space for the clerical and research staff, a joint office for Mr. Young and Mr. Veysey, a private office for Professor Gray, a special room for the Library, and a larger general room which is used for classes, conferences, and as a laboratory for the Time and Motion Study course. Adequate storage facilities are also available.

3. *Instruction for Senior and Graduate Students.* Through five general classes and one more specialized course, the Section provided instruction for 131 students, very close to the maximum which can be handled effectively.

4. *Course in Industrial Relations for Alumni.* The services of the Industrial Relations Section were extended to the alumni of the California Institute through two special classes offered at night to 31 students. While these classes have been discontinued in view of the much larger program of Engineering Defense Training, it is expected that they will be revived in the future.

5. *Expansion of the Library.* The increased space available for the Library has enabled the Section to expand its collection of materials relating to industrial relations and to make this collection readily available to students and alumni of the California Institute and to representatives of the Sponsors of the Section.

6. *Research Program.* A research program directed at both immediate and long-run objectives has been initiated. The Section completed a survey of company policies for employees entering the armed forces under the terms of the Selective Service Act and assisted the Industrial Relations Association of Los Angeles in its survey of personnel policies in Los Angeles County. The studies under way at present include one directed at methods of selecting, training, and rating supervisors and another one analyzing the contents of union agreements.

7. *Research Fellowships.* In order to provide a means by which qualified and promising junior employees of the Sponsors may secure specialized training in industrial relations, the Section has established research fellowships. Any Sponsor may nominate a research fellow who, if his nomination is approved by the Section, will be assigned to a research project under the direction of Professor Gray and Mr. Young.

8. *Engineering Defense Training Courses.* The Section has supervised the offering of eight night classes in production engineering and production supervision as part of the Engineering Defense Training Program sponsored by the United States Office of Education. During the summer the Section organized an additional full-time course in production engineering. Most of the subjects offered under this program have never been available at the California Institute.

9. *Increased Contacts.* Practically all of the activities of the Section have resulted in increased contacts. In addition, Professor Gray and Mr. Young have accepted many invitations



A clerical and research staff has been assembled in Culbertson Hall to make surveys, answer inquiries, assist at conferences, and maintain records of Engineering Defense Training Courses.



Many seniors, graduate students, and alumni attend classes in Industrial Relations in the Conference Room of the Section. In this photograph, Arthur H. Young is lecturing to the advanced graduate class on "Selection and Placement of Employees".

to speak on various problems in industrial relations to a wide variety of organizations located in Southern California.

ORGANIZATION

The Industrial Relations Section operates under the general supervision of the Committee on the Industrial Relations Project appointed by the Board of Trustees of the California Institute of Technology. William B. Munro, member of the Executive Council, is the Chairman of the Committee. Three other members of the Executive Council also serve on the Committee on the Industrial Relations Project: Max Mason, Chairman of the Observatory Council; William C. McDuffie, Trustee; and Robert A. Millikan, Chairman of the Executive Council. The Committee includes Edwin F. Gay, former Dean of the Harvard Graduate School of Business Administration, now Associate in Economic History at the California Institute and member of the Research staff at the Huntington Library, and Reese H. Taylor, a Trustee of the California Institute, President of the *Union Oil Company*, and one of the Sponsors of the Section. Two members of the staff of the Section have been appointed to the Committee: Robert D. Gray, Associate Professor of Economics and Industrial Relations and Director of the Section, and Arthur H. Young, Lecturer on Industrial Relations.

The staff of the Section is appointed by the Trustees of the California Institute on the recommendation of the Executive Council and the Committee on the Industrial Relations Project.

During the past year Professor Gray has served as the administrative head of the Section. Professor Gray is a graduate of the Wharton School of Finance and Commerce of the University of Pennsylvania. For more than ten years he participated in many of the research studies made by the Industrial Research Department of the University of Pennsylvania and for a few years taught part-time in the Geography and Industry Department of the Wharton School. During the three years immediately preceding his appointment to the California Institute, Professor Gray taught in the Economics Department of the University of Connecticut and for more than a year was

special research assistant for the Life Office Management Association.

Mr. Arthur H. Young, Lecturer on Industrial Relations, has had a lifetime of work in industrial relations. For many years he was Manager of Industrial Relations for the International Harvester Company, leaving this to become Industrial Relations Counsel to Industrial Relations Counselors, Inc. For a few years he served as Vice-President in charge of Industrial Relations of the United States Steel Corporation.

Mr. Victor V. Veysey has been added to the staff of the Section as Instructor in Industrial Relations. Mr. Veysey was graduated from the California Institute of Technology in 1936, received the degree of M.B.A. in 1938 from the Graduate School of Business Administration at Harvard University, was employed as Research Fellow in the Industrial Relations Section of the California Institute, 1939-1940, and continued his graduate training at Stanford University in 1940-1941. In addition to his contribution to the instructional program of the Section, he will participate in its research activities.

The secretarial, library, and research staff consists of Miss Mary Harper, Secretary of the Section; Miss Joy Tweedie, Librarian; and Miss Evelyn Hilburn, Stenographer. Mr. Gerald G. Chappell of the *Union Oil Company* and Mr. Harold W. Dornsife of the Standard Oil Company of California are Research Fellows in the Section. Mrs. Manon Edmonds is the Secretary in charge of the Engineering, Science, and Management Defense Training Courses in Production Management, a continuation of the Engineering Defense Training Program.

INSTRUCTION

In integrating the instructional program of the Industrial Relations Section with the established curricula at the California Institute, an attempt has been made to offer a program giving a broad understanding of industrial relations to as many students as possible, accompanied with intensive training for a smaller

number who may desire a limited degree of specialization in this field.

The broad training in industrial relations is offered through two courses. The seniors at the California Institute, especially those in the Engineering Division, may take as one of their electives in the Humanities Division the course "Introduction to Industrial Relations." In this one-term course the students examine the causes of, and proposed remedies for, some of the labor problems present in our modern industrial economy: unemployment, industrial accidents, illness, old age, wages, hours of work, and industrial disputes. In appraising solutions to these problems, the students consider the history and functions of organized labor, the efforts of employers to solve labor problems especially through the techniques of personnel administration, and the role of government in regulating labor conditions. Through this course, which was offered each term of last year, 63 students received a background which will familiarize them with some of the industrial relations problems confronting supervisors and executives in industry.

Graduate students at the California Institute are also given an opportunity to secure some basis for a broad understanding of problems of industrial relations. During the first two terms of 1940-1941 the Industrial Relations Section provided instruction in that part of the course in Business Economics dealing with industrial management. In presenting the subject of industrial management to two sections of 48 students, the staff

of the Industrial Relations Section emphasized the problems involved in establishing and administering a sound wage policy, one of the prerequisites for a satisfactory industrial relations program. The relation of the personnel department and its functions to the internal organization of an enterprise was also stressed.

The instructional facilities of the Section were further expanded during part of 1940-1941 in order that the alumni of the California Institute could participate in the activities of the Section. At the request of a group of alumni, two sections of the graduate course were offered at night to 31 students. With the introduction of the Engineering Defense Training Program, however, it was necessary to discontinue these classes "for the duration."

Three specialized projects offered an intensive training in industrial relations by the Section.

1. During the third quarter, an advanced course in industrial relations was organized for 20 graduate students. This course covered some of the technical problems in selecting and training employees. A study was made of the policies of employers, unions, and government with respect to industrial relations in selected industries: railroads, coal mining, men's clothing, petroleum refining, and aircraft.

2. Other intensive training was provided by the employment of six student assistants who participated in some of the research activities of the Section.



Students, alumni, and Sponsors consult the Reference Library of the Section. Pamphlets and reports published by companies, unions, and research and governmental agencies are available in files at left. Some periodicals, especially union newspapers, are shelved at center back. Company magazines and books are in bookcases at right.



Executives, labor leaders, and members of the Caltech faculty discuss at dinner in the California Club "Why Employer-Employee Relations?" preceding the address of Thomas Roy Jones, President of American Type Founders. Four such meetings are held each year for discussion of important aspects of industrial relations.

3. The most intensive training was provided by the establishment of two Research Fellowships. The holders of these Fellowships are engineering graduates who have had several years of practical business experience. Sponsors of the Section are invited to submit recommendations, the final choice remaining with the staff of the Section. These Fellows are assigned by their companies to work in the Section on a specific research program. During the past year, Gerald Chappell of the Union Oil Company and Harold Dornsife of the Standard Oil Company of California have taken some of the regular courses offered by the Section and have worked under the direction of Professor Gray and Mr. Young on a study of "Methods of Selecting, Training, and Rating Supervisors." As other research projects are initiated, the Sponsors will be given further opportunity to place promising and well-qualified junior employees with the Section in order that they may obtain specialized training in certain phases of industrial relations.

The instructional program for 1941-1942 will closely parallel that of last year. It cannot be further expanded because the enrollment in each section has already neared the maximum that can be taught effectively.

RESEARCH

One research project was completed during 1940-1941: a survey of company policies for employees entering military

service, the results of which were published in Bulletin No. 4-A, "Company Policies on Military Training and Service." Copies of the study were mailed to the Sponsors of the Section and to the companies who cooperated in the making of the survey. In addition, many requests for this publication were received from other interested organizations, the largest number being from various units of the War Department and from Selective Service officials.

The Section assisted the Industrial Relations Association of Los Angeles in its survey of personnel policies in companies operating in Los Angeles County. This study was published by the Association under the title "Industrial Relations Survey."

During the coming year publications will be released covering some of the results of two important research projects which were started in 1941:

1. Methods of Selecting, Training, and Rating Supervisors.
2. Analysis of Contents of Union Agreements in Effect in Los Angeles County.

The Committee on the Industrial Relations Project authorized the study of "Methods of Selecting, Training, and Rating Supervisors" because this project involves both immediate and long-range objectives.

The impact of the defense program is making it necessary for many companies to expand their personnel. Difficult as it

has been in many cases to secure trained employees, it has been even more difficult to secure qualified supervisors. It was felt, therefore, that the Section could be of some assistance to many organizations in this area if it helped to develop better methods of selecting, training, and rating supervisors.

In addition to this immediate objective, it was recognized that the quality of any industrial relations program is largely determined by the supervisors, especially those who directly represent management in dealing with the workers. It is the manner in which such supervisors interpret company policies that largely determines the attitude of employees toward the organization. Many of the petty grievances which fester in the minds of employees until they resort to passive restriction of output or to more violent actions, such as striking, arise out of the daily contacts of a supervisor with his subordinates. Because of the belief that no industrial relations program can be successful without good supervision and because of the belief that all organizations can achieve a high quality of supervision regardless of type, profits, or size of the company—which are facts which may restrict other components of a personnel program, such as benefit plans—considerable stress will be placed on this project.

The results of the study will be made available in printed form to the Sponsors and to the companies which cooperate in the study. Some immediate results may be achieved before the study is completed, since it is planned to hold a series of conferences on the subject. Those who participate in the conferences will have a chance to discuss their problems in training supervisors with others who have dealt or are dealing with a similar problem.

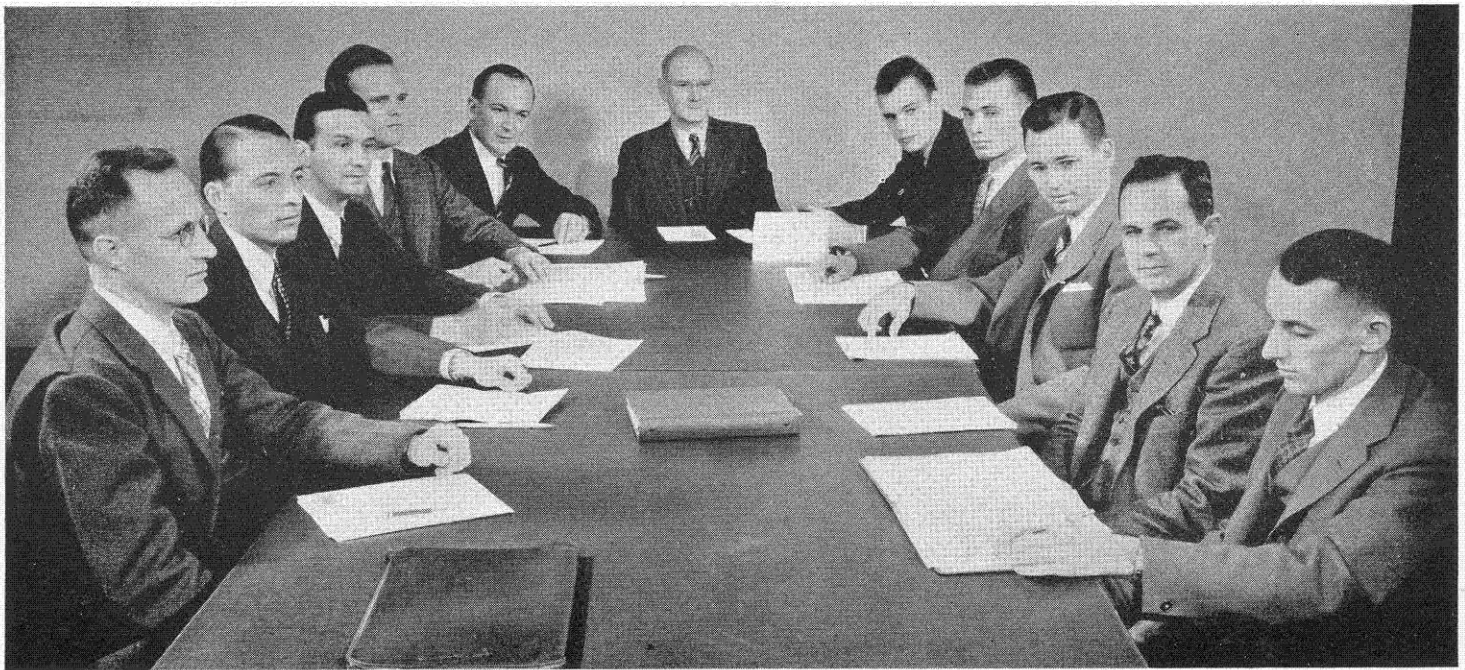
The study of the provisions of union contracts in effect in Los Angeles County may develop into a permanent feature of the work of the Industrial Relations Section. At the present time union agreements are being collected and an index of the

most important provisions is being prepared. When this work is completed, it will be possible for the Section to answer specific inquiries concerning various ways in which similar provisions are written and the extent to which they prevail in various industries. A publication will be issued as soon as possible dealing with the most important provisions. It is also expected that when agreements are renewed from time to time the Section will make further analyses and issue bulletins dealing with significant changes in the contents of union agreements. This project may be further broadened to include studies of the effects of certain provisions. A conference was held in June to discuss methods of indexing union agreements. It is planned to hold similar conferences of small groups of interested persons in 1941-1942.

LIBRARY

The Library constitutes a source of information on industrial relations to be used by the research and teaching staffs, Sponsors of the Section, students and alumni of the California Institute, and others interested in the material being assembled. Its new and larger quarters permit its continued growth in volume and in service.

Three types of material are included: periodicals, pamphlets, and a comparatively small number of bound books. Among the items of special interest are the contracts, constitutions, newspapers, journals, and strike bulletins published by the unions. Many companies have sent copies of their employee magazines, insurance and pension plans, and other publications. Publications of federal, state, and local governments as well as those of the International Labour Office are available, and pertinent publications of research organizations in universities and of such private institutions as the American Management Association, National Industrial Conference Board, Industrial Relations Counselors, National Bureau of Economic Research, and the Brookings Institution have been obtained for the files. There



"Recruits" from local industries who serve as part-time instructors in their special fields for Engineering Defense Training Courses attend a "faculty meeting" presided over by Professor Franklin Thomas. Training in specific as well as general aspects of Production Management is offered "for the duration".



The camera plays an important part in Time and Motion Study Course, one of eight night classes in Engineering Defense Training Program. Here one of the instructors "takes" a drill press operation while students with stop watches record the "times". Substantial improvements in method of performing operation will be discovered when film is analyzed frame by frame.

is also a collection of samples of industrial tests for selection of employees.

To be truly effective, the Library must be complete. That noticeable progress has been made toward this goal is evidenced by the increased amount and variety of material acquired and the number of sources tapped among educational, industrial, governmental, and labor organizations during the last year. Part of the growth during 1940-1941 can be measured by the number of bound books which increased from 160 to 402 and by the number of periodicals which expanded from 160 to 235. Last year information was available on only 108 companies; now data on 201 companies are in the files.

The number of unions represented has increased from 51 to 96. The total volume of pamphlet material, which with the periodicals makes up the bulk of the Library, jumped from 3,000 to 4,400 and the number of cards in the catalogue from 12,000 to 20,225.

Perhaps the most important accessions to the Library during 1940-1941 were the special studies, proceedings, and legislative series published since 1919 by the International Labour Office and many of the psychological tests used in the selection of employees.

No fundamental change in the program for the Library is contemplated. Continued and persistent effort will be made to

enlarge its coverage. When an inquiry from a member of the staff or from a Sponsor reveals a lack of information, immediate steps are taken to fill in the gaps in the collection. In order that the Library may continue to expand and be of increasing service, it is requested that additional material relating to the problems of industrial relations be supplied to it by companies, unions, and governmental, educational, and research agencies.

CONFERENCES

The improvement of relations between employers and employees cannot be attained as fully as necessary merely through the instruction of students who may eventually hold executive positions and through the results of research studies and the use of a collection of materials on problems of industrial relations. It is vitally important that techniques be improved and used properly and that technicians in personnel administration have access to complete and up-to-date information; but it is even more important that those who determine the major policies of a company have an awareness of the role of good industrial relations in the successful operation of any enterprise.

In order, therefore, that it may offer a complete program to industry in Southern California, the Industrial Relations Section sponsors a series of dinner-discussion meetings at which important phases of managerial and labor problems are pre-

sented to representatives of top management for discussion by men of conspicuous ability. Union leaders are also invited to participate. A full and frank discussion of the subject under consideration is facilitated by the fact that no notes are taken and no reports are made. It is anticipated, however, that from time to time some of the papers presented at these meetings may be published.

The four meetings held during 1940-1941 are listed below:

DATE	SPEAKER	TOPIC
Nov. 19, 1940	Mr. Fowler McCormick, International Harvester Co.	Policy and Procedure in Industrial Relations.
Feb. 20, 1941	Professor Elton Mayo, Harvard University.	Securing Cooperation at Different Levels of Authority.
April 29, 1941	Panel: David Babcock, Garner Beckett, John M. Cowan, Edwin F. Gay, Lloyd Mashburn, J. E. Wallace Sterling, Arthur H. Young, Chairman.	What the Defense Program Means to the Los Angeles Area.
May 21, 1941	Mr. Thomas Roy Jones, American Type Founders, Inc.	Why Employer - Employee Relations?

The program of four meetings for 1941-1942 is now being organized. It is planned that the speakers will include a representative of government, management, unions, and educational institutions. The meetings may be further broadened to include one devoted primarily to representatives of the unions and another for representatives of the various educational institutions in Southern California.

ENGINEERING DEFENSE TRAINING COURSES

When in the fall of 1940 the California Institute of Technology joined with most of the other engineering schools of the country in offering Engineering Defense Training Courses sponsored by the United States Office of Education, the Industrial Relations Section was asked to supervise the courses in Production Engineering and Production Supervision. Under the supervision of Professor Gray and under the general direction of Professor Franklin Thomas a staff of 11 part-time instructors was selected to teach eight classes in Industrial Organization and Scientific Management (2 sections), Time and Motion Study, Cost Analysis and Control, Rate Setting, Personnel and Industrial Relations (2 sections), and Foreman Conferences and Instructor Training. The first series of classes, which met for 18 weeks, ended on May 16th, 1941 when 118 certificates were awarded to students who had completed the classes. These subjects were immediately repeated and the present series of the classes expires on September 20th, 1941.

In order to take advantage of class-room facilities at the California Institute during the summer, a special ten-week course in Production Engineering was given under the supervision of the Industrial Relations Section, June 16th to August 23rd. The students in this course were given an integrated group of subjects: Industrial Management, Time and Motion Study, Cost Accounting, Industrial Relations, and Tool Engineering. Twenty students received certificates for completing these subjects satisfactorily.

The following instructors participated in the various classes offered:

Edmund F. Beuter	Procter & Gamble Mfg. Co.
Hugh F. Colvin	Union Oil Company of California
Trevor Gardner	Milwaukee Gas Specialty Co.
Robert D. Gray	California Institute of Technology
Victor J. Hydar	Lockheed Aircraft Corporation
Wilbert E. Karrenbrock	University of Calif. at Los Angeles
Burt C. Kendall	Food Machinery Corporation
Thomas W. Kendall	Pacific Gas Radiator Company
William Kushnick	Anchor Hocking Glass Company
Harding Palmer	Lockheed Aircraft Corporation
Donald G. Saurenman	Vultee Aircraft Corporation
Victor V. Veysey	California Institute of Technology
Fred E. Wagner	U. S. Rubber Company
Edward M. Wales	Vega Airplane Company
Douglas Watson	Procter & Gamble Mfg. Co.
Arthur H. Young	California Institute of Technology

All of these courses were conducted at no expense to the Section. While it is probable that the work of the Section was somewhat retarded because of the time spent by various members of the staff on these courses, it is felt that this diversion of effort was justified by the national emergency and by the long-range benefits accruing to the Section through the contacts established by the courses.

The most interesting results have been obtained in the courses in Time and Motion Study. For this subject it has been possible to develop a laboratory including 16mm. motion picture equipment. In addition to its regular class-room use, this equipment has been utilized to develop a file of motion pictures for the Library. Some films have been completed on examples of work simplification and methods improvement, operation of standard machine tools, and the administration of certain psychological tests. It is planned to produce other films illustrating methods of production control, inventory control, accident prevention, and training of employees. These materials will strengthen the courses in Business Economics and Industrial Relations as well as the program of evening classes.

Courses in various aspects of production management will probably be offered during 1941-1942 under the Engineering, Science, and Management Defense Training Program. The Industrial Relations Section has submitted a proposal to the United States Office of Education offering to supervise three groups of classes to be given in consecutive 12-week terms. The list of subjects to be given will be made available upon the request of persons interested in enrolling in such classes.

GRADUATE SCHOOL OF DESIGN MERGED WITH INSTITUTE

Final arrangements have been made for merging the activities of the California Graduate School of Design with those of the California Institute of Technology. Officials of both institutions at recent meetings completed details of the consolidation and announced that beginning with the Fall term, 1941, work in industrial design would be offered as a part of the regular graduate work in engineering at the California Institute.

When the California Graduate School of Design was established in Pasadena in 1937, under the sponsorship of a group of public-spirited citizens of Southern California, it provided the first opportunity on the west coast for graduate instruction in industrial design. During the past decade, industrial design has been one of the most rapidly expanding and attractive fields in the United States. The combination of sound engineering practice with intelligent functional design, utilizing new materials and new methods, has attracted increasing numbers of specialists, and the possibilities of future extension seem almost indefinite.

During the four years that the California Graduate School of Design has been in operation, it has done invaluable pioneering work in the west in this new field, under the guidance of its Director, Dr. Walter Baermann. At the present time, however, with the world situation so unsettled and with industry increasingly occupied with national defense, it has become clear that the work begun so well by the School of Design can be more effectively carried on by adding it to the program of an older institution which has wide connections already established with the technical side of industry.

For that reason it has been decided that the wisest course is to bring the essential work of the California Graduate School of Design into the graduate engineering curriculum of the California Institute. Such a combination has the advantage of offering to engineering graduates of the Institute the opportunity to qualify themselves for work in a field closely allied to engineering. At the same time, it is believed both that the reaction of the course in design upon the regular curricula of the Institute will be wholesome, and also that the standing of the Institute will be an important factor in attracting graduates of other engineering schools who wish to prepare themselves for careers in the expanding field of industrial design.

In general, the essential program of the California Graduate School of Design will be followed, and under substantially the same faculty personnel, with the exception of Dr. Walter Baermann, who has resigned.

Mr. Albert B. Ruddock of Pasadena, Chairman of the Board of Trustees of the California Graduate School of Design, paid high tribute to Dr. Baermann's leadership as the School's Director and expressed very keen regret at his resignation. The Trustees of the School, Mr. Ruddock declared, deeply appreciate the professional ability and personal devotion which Dr. Baermann brought to his work, and they recognize his understanding of the economic and social meaning of "design" and

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DEFENSE CONTRACTS

(Continued from page 4)

nated from the amounts to be allocated. Indirect factory expenses are to be distributed on the basis of direct labor; indirect engineering expenses on the basis of direct engineering labor; administrative and general expenses on the basis of costs of manufacturing and installation. Bidding, general selling and general servicing expenses allocated to a particular contract are to be distributed to that contract either in the proportion which the contract price bears to the total sales (including contracts completed) during the period of contract performance, or in the proportion which the sum of the manufacturing and installation costs attributable to the contract bears to the total of such costs during the period of performance. However, if standard cost accounting is employed by the manufacturer, no objection will be made to the use of such standards if entries converting standard costs to actual costs are used and fully explained, and the final result clearly reflects the actual profit.

AUDITING BY GOVERNMENT

In cost-plus contracts the government reserves to its representatives the right to inspect all books, records, vouchers and memoranda of every description concerning the work performed. This reservation is sometimes inserted in fixed-price contracts.

Examinations made under this authority are complete and thorough. For many construction projects the field auditor actually conducts an audit of some items coincidentally with performance. Labor is checked on the job and the field auditor's check is reconciled with the foremen's time cards. Differences then are straightened out before the payroll is made up. Material receipts likewise are audited concurrently with their receipt by the contractor. In some instances arrangements are made with the prime contractor so that the War Department verifies the labor and material of the subcontractor, thus eliminating duplication of work. The field auditor's work also extends to the auditing of tools and equipment, freight and other expenses, and on at least one large construction job, to purchases before the contractor's purchase orders are placed. By these means the audit of construction contracts is substantially finished when the project is completed. In the case of larger supply contractors verification of costs proceeds in a manner similar to that for construction jobs, and auditors are permanently stationed at the contractor's plant. In the words of the Treasurer of one large aircraft company, "We do all our work with government auditors looking over our shoulder".

his success in transmitting that meaning in the training of students.

NEW WEATHER STATION

Completion of the new Caltech weather station of meteorology atop Mudd Laboratory has recently been announced.

This weather station, which is probably the only one of its kind in any school in the United States, is equipped with the most modern apparatus available. Automatic instruments record wind direction and velocity, temperature, and sun-intensity every minute, 24 hours a day.

The staff of this station is composed of 86 students in meteorology, many of whom are from the Army Air Corps and the Navy. These men each spend at least one three-hour shift a week between 7:30 p.m. and 7:30 a.m. in the weather station taking observations. During the day, they study all aspects of assimilating weather data, learning even to repair and adjust the delicate mechanisms of the automatic recording instruments.

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MILITARY SERVICE

(Continued from page 5)

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Ist Lt. James Bradburn, '32, Rochester Ordnance Division,
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ALUMNI PLACEMENT ACTIVITY

According to information recently released by Professor Donald S. Clark, Director of Placements at the Institute, the year ending July 1, 1941, was the most active one the Placement Service has ever seen, primarily due to defense activities. Interviewing by company representatives began in December, 1940, for positions for those men who were to receive degrees in 1941, and continued through June, with several departments reporting nearly 100 per cent placement well before the middle of June.

The accompanying tables show first, the placement of men receiving degrees from 1936 through 1941 by departments, and second, the requests and placements handled by the Placement Service for full-time positions during the year ended July 1, 1941. With regard to the latter, requests were received during the year for men to fill 399 full-time positions, some of the requests being for several men. Seventy-two of these positions were filled by applicants to the Placement Service. Because of the increased number of applications filed by those who wished to better their positions, more men could be referred to these openings.

The present national situation is reflected in the small number of men who were unemployed during the past year. On July 1, only 13 men were registered as unemployed. Five of these had not received degrees, and seven of the remaining eight had received degrees in electrical engineering and physics. As of July 1, the Placement Service had 77 applications in the

file for betterment positions. This is much larger than ever before and the rate of filling these applications is correspondingly higher.

	Requests	Men Sent		Filled	
		*B	*U	*B	*U
Aeronautics	0	0	0	0	0
Biology	2	0	2	0	0
Chemistry	37	41	32	1	4
Chemical Engineering and Applied Chemistry	28	35	18	3	1
Civil Engineering	52	48	21	7	10
Electrical Engineering	52	70	25	5	6
Geology	5	0	7	0	0
Mathematics	0	0	0	0	0
Mechanical Engineering	93	72	39	9	2
Physics	9	13	17	1	1
General	45	96	45	8	11
Geophysics	3	3	3	0	1
Sales	26	19	20	0	1
Teaching	19	10	4	0	0
Time and Motion Study	5	5	5	0	0
General Drafting	8	10	9	1	0
Meteorology	1	0	0	0	0
Miscellaneous —					
Non-Technical	12	10	8	0	0
Industrial Engineering	2	0	0	0	0
Totals	399	432	255	35	37
Grand Totals	399	687		72	

*B-Betterment — U-Unemployed.

PLACEMENT OF MEN RECEIVING DEGREES 1936-1941 BY DEPARTMENTS

	1941	1940	1939	1938	1937	1936
Biology	*4 — 75%	16 — 63%	7 — 100. %	8 — 88%	8 — 25%	9 — 100%
Chemistry	20 — 95%	18 — 83%	11 — 72.7%	15 — 80%	10 — 80%	17 — 94%
Applied Chemistry	32 — 97%	23 — 96%	18 — 72.7%	25 — 92%	12 — 83%	17 — 76%
Geology	17 — 88%	23 — 74%	20 — 75. %	16 — 75%	19 — 100%	8 — 100%
Mathematics	5 — 60%	3 — 67%	6 — 66.7%	5 — 80%	2 — 50%	5 — 60%
Physics	31 — 81%	25 — 76%	30 — 60. %	22 — 77%	34 — 68%	26 — 81%
Total Science	109 — 88%	108 — 79%	92 — 70.7%	91 — 83%	85 — 74%	81 — 84%
Aeronautics	27 — 93%	32 — 97%	20 — 85. %	14 — 100%	4 — 100%	26 — 85%
Civil Engineering	10 — 100%	19 — 84%	20 — 85. %	21 — 86%	31 — 97%	23 — 100%
Electrical Engineering	32 — 94%	43 — 77%	33 — 66.6%	30 — 90%	33 — 79%	38 — 61%
Mechanical Engineering	38 — 100%	51 — 96%	47 — 89.4%	43 — 79%	27 — 93%	28 — 75%
Mechanical Engineering (Aeronautic Option)	14 — 100%	11 — 100%	5 — 100. %	29 — 93%	28 — 93% —
Meteorology	9 — 89%	9 — 89%	5 — 100. %	5 — 40%	6 — 100% —
Total Engineering	130 — 96%	165 — 90%	130 — 82.3%	142 — 85%	129 — 91%	115 — 78%
Total All Departments	239 — 93%	273 — 85%	222 — 77.5%	233 — 84%	214 — 84%	196 — 80%

* First figure refers to number of degrees, second figure to per cent known employed.

..... OF INTEREST

... Dr. Verner F. Schomaker, senior research fellow in chemistry, has been awarded a John Simon Guggenheim Research Fellowship for the current academic year. Dr. Schomaker will continue his investigations in the field of molecular spectroscopy as the result of the grant, which amounts to approximately \$2,500 Professor Royal W. Sorensen, 1940-41 of the American Institute of Electrical Engineers, testified in August before a United States Senate sub-committee hearing in Los Angeles on the question of locating defense industries in this area . . . Dr. Richard

C. Tolman left last month after a short vacation in Pasadena to resume his duties as vice-chairman of the National Defense Research Council. He is on leave of absence from the Institute . . . Professor H. J. Frasier of the Geology Department was another expert testifying before the Los Angeles hearings of the Senate sub-committee on defense resources. He stated, "The Southwest is abundant in potent metals and materials vital to this nation's defense program . . . and they should be developed. We have a great opportunity to do this through private capital, but naturally this capital wants to be assured of a profit."

A field trip sponsored by the Department

of Vertebrate Paleontology and financed by the Carnegie Institute recently completed a ten-weeks field trip over a wide area in four Western states. The expedition was led by K. A. Richey and included David Douglas and Professor John Stock from the Institute. Among the fossils brought back to the campus for classification and study were those of three-toed horses, primitive bear-like dogs, peccaries, and camels, which once flourished in the Pacific Northwest. Also found were the remains of Titanotheres remains, a large, rhinoceros-like animal of 40-million years ago . . . Professor Robert Gray of the Industrial Relations Department left for Chicago early in September to serve as technical adviser to the five-man Fact Finding Committee appointed by President Roosevelt to obtain data for settlement of the threatened strike of over a million trainmen in the Railway Brotherhoods. The investigations will probably occupy most of the rest of 1941, and in Professor Gray's absence, Arthur H. Young is serving as head of the Industrial Relations Section . . . Professor George R. MacMinn recently published a book on "The Theater of the Golden Era in California," the result of several years research in California archives. The book, which deals with the romantic period of the State's history following the Gold Rush was printed by the Caxton Printers, Ltd., of Caldwell, Idaho . . .

Alumni in the Pasadena area are invited to attend the Sunday evening Cal Tech musicales presented every Sunday evening at 7:30 in Dabney Hall Lounge. Recordings of classical and modern music are played and discussed by authoritative commentators . . . Professor Arthur H. Warner of U.C.L.A., who received his Doctor's degree at the Institute, has been called by the Army to do research work at the M.I.T. radiation laboratory. Warner has specialized in high-voltage X-ray work . . . Professor Fritz Zwicky recently returned from an expedition with an Institute party to the 12,000-foot altitudes in the high Sierras near Mono Lake to make experimental observations of stars. Some nights the temperature dropped to 10 degrees below zero, but Zwicky was rewarded for his efforts by the discovery of a dozen new supernovae, or "exploding suns."



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Membership Report

The Alumni Association has enjoyed a healthy membership the last several years. There have been some 3400 graduates since Throop College was founded; we have records in our files of about 3100 Alumni, graduates and non-graduates, of whom 1150 were active paid members last year.

Our Alumni Association, having as it does over 30 per cent of the school's Alumni of record on its active list, is far ahead of any other college alumni group in the country. This evidently means the Association is of real value to its members, particularly as a means of making and strengthening the contacts of Tech men with their fellows.

Incidentally, if you have not yet mailed in your 1941-42 dues of \$2.50 to the Alumni Association, please do so. We wish to thank those of you who have already done so, and to assure you of an active year and a continuation of the high standards of our meetings, seminars, and our quarterly publication.

Stu Johnson, '26,
Membership Chairman.

NEWS OF CLASSES

1913

R. W. Parkinson, Chief Engineer for the Caribbean Petroleum Company, has returned to his old home in Santa Monica for a vacation from his work in Venezuela.

1915

Herb Holt, secretary of the Alumni Association Board of Directors, was the victim of a spectacular accident on the Pasadena Parkway several weeks ago, although he managed to escape without personal injury. While driving to town during the rush hours, a rear wheel came off his car, dropping the rear of the car and bursting the gasoline tank. Sparks from the dragging axle ignited the gasoline and the car burst into flames, tying up traffic for some time.

1918

A. E. Davidson is designing high-voltage electrical equipment for the U. S. Bureau of Reclamation. He is a line officer in the Reserve Corps of the United States Navy, and is president of the local officers association. He recently returned from a period of active duty on the East Coast.

1920

Russell M. Otis recently joined the staff of Lane Wells, to be in charge of electrical

CHAPTER NEWS

COLORADO

Dear Mr. Editor:

I am enclosing several news items about Cal-Tech alumni in Colorado which I thought you might like to print in the next issue of the Alumni Review.

I wish to call particular attention to the news item in regard to the election of Cecil Killgore as Secretary-Treasurer of the Colorado Chapter of Cal-Tech Alumni. Will you please see that he is listed on the alumni records as the Secretary-Treasurer of the Colorado Alumni Chapter? His address is "U. S. Bureau of Reclamation, Denver, Colorado." He succeeds the writer in the office of Secretary-Treasurer; I have held that office for the past several years. Mr. Killgore is very capable, and I predict that he will be a good man for the job.

We have a group of about 15 active members in Colorado. We have not been meeting at regular intervals, but have been meeting from time to time on special occasions such as the night of the annual football banquet. At different times, a number of dinners have been given in honor of men who were leaving Colorado or in honor of professors who were passing through this part of the country.

I regret to say that we do not have a very good record in paying dues. Most of the men feel that the dues are too high for non-resident members. I hope we will have a better record in the future.

I have been well pleased with the issues of the Alumni Review that I have seen. If I can be of any help to you by sending in more news items or by helping in some other way, let me know.

Wishing you continued success in the publication of the Alumni Review,

I am,

Yours sincerely,

Tom Noland, '29.

research, working on special technical problems. For the last few years he has been an independent research counselor and patent attorney.

1923

Basil Hopper was recently appointed Manager of Refineries in charge of all refinery operations for the Union Oil Company. Hopper had previously been Supervisor of Process Research for Union.

1924

Fred Groat recently left the Consolidated Edison Company (Brooklyn) and is now with the Rural Electrification Administration in Washington, D. C.

1926

W. Stuart Johnson, Chairman of the Membership Committee of the Alumni Association Board of Directors was recently awarded a Captain's Commission in the Army Air Corps, Procurement Division. Johnson completed an intensive course in aeronautical engineering given at the Institute last summer, and will report for duty at Santa Monica, October 16.

Jack Fahs is still employed by the DuPont Company in Wilmington, Delaware.

1927

Dr. Thurman S. Peterson has completed a textbook on "Elements of Algebra" to be published by Harper and Bros. about December 1941.

Major Theodore C. Combs is currently chief of the Construction Equipment Control Unit, Construction Section, Purchase and Contract Branch, Office of the Under Secretary of War, in Washington. He writes that his office is in the newest and reputedly the finest building in Washington, but that the air conditioning is not working very well yet. Combs is remembered as a former editor of the Alumni Review and President of the Alumni Association.

Captain James Boyd is on duty with the Army and Navy Munitions Board, Office of the Under Secretary of War, in Washington, working on problems in strategic minerals. He is on leave as Professor of Geology at the Colorado School of Mines.

Robert T. Ross was voted by undergraduates the most popular assembly speaker during the entire 1940-41 year at the Institute. Ross, now in the psychology department at Stanford, was the author of an article on "The Validity of Personality Tests" in the Alumni Review for March, 1941.

1928

Baker Wingfield, formerly with the Bureau of Standards, is now with the F.W.A., still in Washington, D C

1929

Bob White has been confined to his home for several years. He will welcome visitors at 630 South Oxford, Los Angeles, where he is convalescing.

Kenneth Kingman is now Superintendent of Distillation at the Union Oil Company's Oileum Refinery.

Homer Reed has recently been promoted to the position of Supervisor of Process Research for the Union Oil Company, being located at the head office in Los Angeles.

Nicholas M. Oboukhoff, Ph.D., '29, was the subject of a recent feature article in the Oklahoma City Times for his contribution

NEWS

Have you any bit of news about yourself or fellow Tech men? Marriages, births, promotions, job change, papers published, or new honors received are all items of interest to the rest of us so write your information on a penny postcard and address it to the Editor,

CALTECH ALUMNI REVIEW
Pasadena, California

as a Russian-born engineer to American technology. Dr. Oboukhoff, now research professor of electrical engineering at Oklahoma A. and M. College, had a career in Russia, before coming to this country, serving on the faculties of the University of Irkutsk, the Institute of Technology of Tomsk, and as dean of the electro-mechanics division of the Harbin Polytechnic Institute. He came to the United States in 1927, and after receiving his doctorate in 1929 has been associated with the Oklahoma school.

Dr. Oboukhoff has presented numerous papers before the Oklahoma Academy of Science meetings, some of which have later been published. He was elected a vice-president of the Academy for the current year. Another paper was presented at the annual winter meeting of the American Mathematical Society held last year at Baton Rouge, its title being "On the Validity of the Total Differential as the Principal Part of an Increment of a Function of Two or More Independent Variables."

1930

Fred S. Scott was recently transferred from the Research Division to the Division of Economics and Planning at the head office, Union Oil Company.

Roland Hodder has come to the Coast on business several times in the past year from Houston, Texas, where he is working with the Brown Geophysical Company.

Deane Carberry is on active duty as a Lieutenant in the Civil Engineer Corps of the Navy, with headquarters in San Francisco. He is on leave of absence from the Denver office of the U. S. Bureau of Reclamation where he is an associate engineer.

1931

Jeff Wineland is the proud father of a pretty baby girl, Judith Laura, born April 28, 1941. She is known in Denver circles as "Miss America of 1961".

Everett Trostel has been appointed Conservation Engineer for District 5 (Pacific Coast area) for the Conservation Division of the Office of Petroleum Coordinator. His headquarters will be in the Subway Terminal Building, Los Angeles. Trostel was formerly engaged in petroleum engineering work for Union Oil.

1932

David Wong, now head of the designing department of the Burma Road, has the duty of keeping this famous artery open for the transportation of supplies.

Wong says the traffic becomes more of a

problem every day. The road was designed for 10-ton trucks and bridges have been strengthened to handle 15-ton trucks.

"Our records show an average of 300 trucks a day starting on the 600-mile road and that will soon be increased to 600 a day."

Wong describes some of the difficulties encountered in keeping the road open. There is one suspension bridge that has been bombed by the Japanese 18 times. Once the entire floor fell into the river, but the longest period of broken traffic across the Mekong River, spanned by the bridge, was 15 hours.

Wong was called in 1939 to work on the road and in 1941 was appointed head of the designing department of the road.

Cecil Killgore was recently elected Secretary-Treasurer of the Colorado Chapter of Cal-Tech Alumni.

J. H. A. Brahtz, Ph.D. '32, is on active duty as a Lieut-Commander in the Civil Engineer Corps of the Navy. He is on leave of absence from the Denver office of the U. S. Bureau of Reclamation where he is director of the photo-elastic laboratory.

1933

Louis Goss has been working on airport design for the U. S. Engineers office at Los Angeles since last January when he re-designed his position in the South Pasadena Engineering Department. On May 10, he and his wife, Edith Ann Goss, became the parents of a 7½-lb. baby boy.

1934

N. A. Christensen, M.S. '34, is now Dean of Engineering at the Colorado State College in Fort Collins, Colorado.

1935

Charles Thomas sends the following letter from Dayton:

"The June 1941 issue of the Alumni Review has just reached me here, apparently delayed because I have not previously notified you of my change of address.

"I am now living at 176 Willowood Drive, Dayton, Ohio, and my present position is factory representative for Lockheed in charge of the Dayton office. As you probably know, Dayton is the location of Wright Field, which is the headquarters for all the engineering work carried on by the Material Division of the U. S. Army Air Corps, and you can well imagine we have a great deal to do with that these days.

"I occasionally see some other Cal. Tech. men here, both those who are stationed here permanently and those who come in to visit. At the Division, I have seen Roscoe Mills, who is working in the Propeller Lab. and also Major Howard McCoy, who has just completed his second tour of duty at Cal. Tech. for further research in aeronautics. Also established at Wright Field now is Captain Paul Dane who was in my class as an undergraduate and who has just completed a year of graduate study on an assignment by the Air Corps. Bill Harris was in visiting several months ago and I understand is now working for one of the Pump Companies in this area.

"I read Dickinson's article on air transports in the June issue with considerable interest."

Norman B. Dewees and wife Sally Redington Dewees announce a special first edition of "The Dewees Twins in Pasadena" in two small volumes, "Donald Norman Steps Out," and "Mary Katherine Follows." The twins were born August 12. Since

April, Dewees has been working for the Lyman Mfg. Co. in West Hollywood.

Dr. Arthur Engelder writes from Tucson that after having been in the practice of medicine and surgery for a year, he has had more babies, and more other patients, than he dreamed possible. In addition to his regular practice he has been in charge of medical examinations for the NYA in the Tucson area, and is chief medical examiner for the Selective Service Boards in Pima County

1936

Walfred E. Swanson, assistant area engineer with the U. S. Engineers at Hill Field, Ogden, Utah, was elected first president of the Utah post of the Society of American Military Engineers which was organized recently at Salt Lake City.

Frank Davis, Tech football captain in 1934 and 1935, is now Chief Test Pilot for Vultee Aircraft. He was at the controls of the first Vultee Vengeance dive bomber completed for the Royal Air Force as it took to the air after its christening by Lord and Lady Halifax at the Vultee plant in July.

Victor Veysey and his wife Janet are the proud parents of a baby daughter, Ann, born September 11 in Pasadena.

Hugh Colvin, Review editor, moved into his new home at 2425 West Blvd., Los Angeles, September 1, and is now engaged in extensive landscaping operations in the back yard.

Maurice Sklar was married last June 7 to Miss Jimmie Marie Burrowes of Beaumont, Texas. He is working in West Texas as an assistant seismologist for Shell.

Theodore Vermeulen is now employed by the Shell Development Company at Emeryville, California.

The following letter was received from Clarence Goodheart, who is an instructor in the Department of Electrical Engineering at Texas A. & M. College:

"In order to maintain my ancient rights to criticize all and any editors, I enclose \$2.50 for dues for the coming year. Really though I have nothing to kick about.

"I am still trying to teach electrical engineering to Aggies, and to educate the population in general with regard to the glories of California. So far no great success has been secured except in the case of one little girl, who married me."

1937

Holloway Frost is now employed by the Socony-Vacuum Oil Company, C. A., and is working on a seismograph crew in eastern Venezuela.

William Fielder, M.S. '37, was recently married. He is a geology instructor at Carleton College, Northfield.

Tom Harper is now a junior in the Medical School of the University of Colorado. He is active in tennis, and ranks among the best players in Colorado.

1938

John D. Farneman is now associated with Edward S. Sievers, Southern California representative for the Weston Electrical Instrument Corporation, with offices in Los Angeles.

1940

Walter Larson is now an Army Aviation Cadet at Montgomery, Alabama.

Alumni Business and Professional Guide

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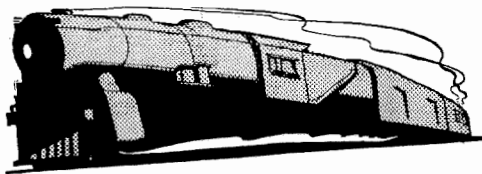
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