affecting employed engineers, the Society's Committee on Employment Conditions formulated, and the Board of Direction adopted a plan under which the 64 local sections of the Society could serve as the sponsors of local collective bargaining agencies where such groups seem to be desirable.

The plan adopted for the American Society of Civil Engineers embodies the principle of the National Labor Relations Act that the collective bargaining group shall be composed solely of employees and shall be free from employer domination. The procedure undertaken is for the respective local sections to adopt amendments to their constitutions which shall provide for the formation of a local collective bargaining agency from the employee members of the section and such other professional engineers not members of the section as may wish to become members of the bargaining group and pay somewhat higher dues than are paid by members of the section, "preferably not to exceed $5 per year." From the employee group there shall be elected a "Committee on Employment Conditions" which as "The bargaining committee shall have the duty and power to direct all activities looking toward the acquisition of adequate compensation and satisfactory working conditions for all professional engineering employees resident within the geographical limits of the Local Section—and shall administer its functions in accordance with the general direction of those professional engineering employees who have paid the dues stipulated."

The basic definition adopted for this undertaking is:

> "The designation 'professional engineering employees,' used in the sense that persons capable of being so designated may join with others similarly capable of being so designated for the purposes of collective bargaining separately from any other group composed of persons not capable of being so designated, shall be that of only those who, excepting employers or those to whom employers have delegated managerial responsibility with respect to employment conditions, possessing an intimate knowledge of mathematics and the physical sciences gained by technological and scientific education, training and experience, and in a position of trust and responsibility, apply their knowledge in controlling and converting forces and materials to use in structures, machines, and products, and whose work requires the exercise of discretion and judgment, is creative and original and of such character that the output cannot be standardized; and those who, without the experience set forth, but having been graduated from an approved educational institution and having received the degree of Bachelor of Science or its equivalent, in Engineering, are engaged in engineering work."

The American Society of Civil Engineers has committed itself to this program with substantial support. It will maintain a "field representative" in each of four geographical areas. They are to advise, counsel, assist and provide correlation for the local bargaining group.

Whether the other major engineering societies will deem it necessary to take comparable steps of the radical nature taken by the American Society of Civil Engineers will probably depend upon the extent to which their members are affected by encroachment and possibly upon the results following the action taken by the Civil Engineers. However, a courageous effort has been made to preserve the professional viewpoint with which most young engineers approach their careers.

The Engineer in the Labor Picture

BY ROBERT D. GRAY[1]

THE painting of the labor picture to show the place of the engineer in it would require a giant canvas. On such a canvas would appear the hundreds of large employers and the thousands of small employers in this country. In addition, this canvas would show the millions of employees working or desiring to work for wages. In other places in this painting would appear the unions or organized labor. In drawing this picture it is especially important that a distinction be made between labor with a small "l" meaning all workers, and Labor with a capital "L," meaning organized groups. The government would also have to be represented, and the dual role of government must be indicated. On the one hand the government itself is a large employer of labor, and, on the other hand, government regulates many of the employer-employee relationships. It is important to realize that the government as an employer and government as a regulator of other employers follows very different policies and practices. To some it may appear that the government has two separate entities, and to others it may appear that the government is merely suffering from a split personality. Finally, this labor picture must include the public which not only is affected by labor problems but which in the long run determines the solution of labor problems.

In making such a sketch it would become apparent that many individuals would appear in more than one location. Thus, the employers and employees constitute a large part of the general public, and the general public should stand in the background of government for the eventual determination of sound policies.

But if we took the time required to make this complete picture, we would not understand how the present situation developed and the picture would be obsolete by the time it was completed. We should, therefore, use the technique of motion pictures rather than painting in order to present the dynamic character of our labor problems.

It must be recognized that the labor problem includes a large number of somewhat independent but largely interdependent specific problems such as employment, training, wages, security, safety, grievances, and labor organization. The complete discussion of these various problems would require volumes. It is necessary, therefore, to limit discussion in this paper to a small part of the labor problem, but the part which affects engineers most directly: a consideration of the general problems of organization of employees and the background of the present efforts for organization of engineers.

ADAM SMITH'S VIEW OF UNIONS

Organization of employees is not a new, or "New Deal," phenomenon. The problem of employer-employee relationship began in the distant past when one person started to work for another. The need for organization of employees became apparent quickly although at the beginning such organizations were illegal. For what may be considered one of the best statements of the need for labor organization, let us begin our motion picture with the employer-employee relationship described in that classic of classics in economics—"The Wealth of Nations," by Adam Smith. In discussing relationships between employers and employees Adam Smith recognized the mutual dependence of employer and employee. The employer needed the employee in order to facilitate

(*Continued on Page* 15)

[1]Paper delivered before the January 26, 1944, meeting of the Alumni Association, California Institute of Technology.

The Engineer in the Labor Picture

(*Coninued from Page* 4)

the manufacture of goods and services in the anticipation that eventually the employer would make a profit from the business. The employee was dependent upon the employer for employment from which the employee would receive wages and with which the employee would purchase the necessities of life. It was, therefore, apparent to Adam Smith that the employer and employee were both interested in the success of an enterprise.

But Adam Smith did not limit his picture by merely pointing out that the employer needed his employee and that the employee needed his employer. Recognizing a fundamental difference in the need of one for the other, Adam Smith pointed out that the need of the employee for his employer was more immediate than the need of the employer for the employee. The employer, according to Adam Smith, usually had some reserves. If the employee would not work on a given day, or even if the employee would not work for a short period of time, the employer was inconvenienced, it was true, but he was not necessarily reduced to the question of how could he survive. Frequently the employer could even wait for several years. On the other hand the employee needed the employer currently. The employee usually had no reserve; if employment was not forthcoming regularly, the employee faced the basic problem of survival. It was, therefore, apparent that the bargaining power of the individual employer was much greater than the bargaining power of the individual employee, and the employees were forced to organize in an attempt to equal the bargaining power of the employer.

Furthermore, according to Adam Smith, the immediacy with which the employee needed his employer was so great that the employees were inclined to use violence to achieve their goal. This drive to use violence was further intensified by existing laws which prohibited the formation of unions and the use of the strike. Being forced to violate the law in engaging in any strike, the employees had little compunction in violating other laws at the same time.

Eventually, and only as the result of specific legislation, unions were legalized. But for many years after lawfully organized unions were permitted, it was also lawful for employers to interfere with the organization of their employees and even to prohibit membership in unions as a condition of employment. It was only in 1932 that the so-called "Yellow Dog" contracts were outlawed. Subsequently, the National Industrial Recovery Act and the Wagner or National Labor Relations Act gave employees the right to bargain collectively through representatives of their own choosing, and at the same time specifically forbade employers to interfere with the organization of their employees.

Although the situation has, therefore, changed to some extent since the time of Adam Smith, it is still true that employers and employees are mutually dependent upon each other, and it is likewise still true that the employee has a more immediate need for his employer than the employer has for his employee.

HISTORICAL APPRAISAL OF UNIONS

The history of the growth and development of trade unions in all parts of the world supports the following conclusions. In the first place, membership in trade unions tends to fluctuate in accordance with the fluctuation of the business cycle. Specifically, unions grow in membership during the upswing of the business cycle, and decline in membership during the ensuing depression. At no time, however, does organized labor disappear completely. Secondly, attempts to outlaw unions and attempts to drive the organized labor movement underground merely result in increased violence in labor disputes. Third, because of the human errors on the part of management, unions will play an important role in any system of free enterprise. It is only under some form of totalitarian government that unions can be suppressed. Fourth, the unions exert more influence in the economic system than the number of union members indicates. Most collective agreements cover non-union as well as union employees of a given company. In addition, non-union employers tend to base wages, hours, and other working conditions at or above the level prevailing in the unionized companies. Fifth, no employer can influence his employees to remain unorganized merely by paying higher wages or operating shorter hours than union plants. The urge for organization springs from psychological as well as material causes. In any aggregation of individuals, many minor irritations or frictions will develop. It is most difficult to discover and correct the minor irritations when no organization of employees is present. It should be noted that during the 'Twenties especially, many companies found it desirable to form plans of employee representation or works councils in order to settle the day-to-day grievances.

CURRENT FUNCTIONS OF UNIONS

From this brief statement of the growth of labor organizations, we are led to an examination of the function of unions. Although there have been some organizations of workers formed for the purpose of overthrowing the existing economic system and substituting a different one, and although there may be some members of organized labor who have such views, the major unions existing today, and those which will continue, desire to maintain and strengthen the present economic system. Within this economic system such unions hope to derive for their members the four fundamental goals of higher wages, shorter hours, better working conditions, and the prompt and favorable settlement of specific grievances.

From the employer's point of view, the unions can perform a function which will be of assistance to management. With proper organization and under effective leadership, the unions can provide a return channel of communication between employer and employee. The employer's organization — the hierarchy of foreman, superintendent, general manager, and vice president— operates effectively in transmitting orders from top management to individual workers. This organization may also transmit policies, but frequently the milk of human kindness in the basic policies of top management has curdled by the time it is transmitted from foreman to worker. Such conditions cannot be brought to light by the line-and-staff organization set up by management. It is only through some organization of employees that top management may learn where its policies have soured or where there is a wide variation between policy and practice.

The development of this second channel of communication from employees to management may develop from its original, but somewhat negative, use in settling grievances into a positive instrument of labor-management cooperation, or into what is sometimes referred to as industrial democracy. During the war there have been many attempts to establish within various companies

joint committees of employees and management for the purpose of discovering methods of improving and increasing production. These committees have been called many things, but their most polite names have been War Production Drive Committees, Labor-Management Committees, or Union-Management Committees. It appears that most of these committees have failed to perform to the satisfaction of the company, the union, the government, and the public. In the widespread failure of these plans it is easy to overlook the previous success of labor-management cooperation. These recent failures appear to have resulted largely from the fact that these committees were usually forced upon either the union or the company. It should be apparent that such cooperation cannot be expected to work satisfactorily during the first year, or even during the first few years, after collective bargaining is established in a given plant. Labor-management cooperation should be the logical outgrowth of a somewhat lengthy and comparatively peaceful period of collective bargaining. Such committees can only function effectively when there is mutual respect and confidence between the management of the company and the officers and members of the union. Labor-management cooperation is the eventual and long-time function of unions which will stress the mutual dependence of employer and employee after the difference in immediacy of need has been offset by approximate equalization of bargaining power.

LABOR LEGISLATION

The laws affecting relationships between employers and employees are many and varied. If there is any pattern in our labor legislation it approximates that of a crazy quilt. In order to understand these varied pieces of legislation, it must be understood at the beginning that there is one group of laws affecting industrial relations of railroads and another affecting industrial relations in other industries. The labor legislation affecting railroad managements and employees will not be discussed here. The general legislation mentioned below is of little interest to this special case.

The specific federal legislation which affects industrial relations in most industries except railroads is based on the constitutional authority of Congress to regulate interstate commerce. The administrative agencies set up under these acts have stretched the definition of interstate commerce, but many of these extensions by the administrative bodies have not been confirmed by decisions of the Supreme Court.

National Labor Relations Act: There are two pieces of legislation which have some bearing on the problem of labor organization. The first and more important of these is the Wagner or National Relations Act of 1935 establishing the National Labor Relations Board composed of three members. This Board and its Regional Directors have no jurisdiction over matters such as wages, hours, or working conditions; it is specifically forbidden to arbitrate or conciliate disputes. The only disputes between employers and employees which can be handled through this Board are those over unfair labor practices by employers, the definition of an appropriate bargaining unit, and the choice of bargaining representatives. Frequently this latter activity results in the holding of an election among the employees of a plant to determine which if any union should represent the employees.

In considering the operation of any law, it is not as significant to attempt to interpret the law itself as it is to interpret the decisions made under the law. This means that one cannot say what a law means until the courts have interpreted it. In other cases where a law establishes an administrative group such as the National Labor Relations Board to administer an act, one does not know what the act means until the board has established its own interpretations and the courts have confirmed these interpretations.

There has been a considerable turnover among the three members of the National Labor Relations Board, and turnover of policy has followed closely on turnover of the Board. For a short while, for example, the National Labor Relations Board held that it was proper for management itself to join unions to bargain with itself. The Board held that supervisors were employees and, therefore, entitled to the protection of the Act. In the last year, however, the Board has reversed its policy and has refused to recognize unions of foremen and supervisors. This reversal of policy was influenced largely by the realization on the part of two members of the Board that management can hardly bargain with itself, and that foremen and supervisors are really a part of management.

Most engineers, however, do not hold supervisory positions. This is especially true in a large engineering department. In such cases the engineers are not engaged in the hiring or firing of other employees nor are they part of the management of the company. Only the chief engineer or the head of the engineering department would come in this category. The bulk of the employees in the engineering department are classed as professional employees. As such they are, I believe, entitled to the protection of the National Labor Relations Act although this matter has not been finally adjudicated by the National Labor Relations Board. In most contracts the employees of the engineering department are specifically excluded. However, it must be recognized that there is a growing pressure for unionization of such employees.

Wages and Hours Act: Another Federal Act which should be examined is the Wages and Hours, or Fair Labor Standards Act of 1938. The purposes of this Act are to establish a minimum rate of pay for employees engaged in work affecting interstate commerce and to require the payment of one and one-half times the regular hourly rate for work performed in excess of 40 hours per week.

This Act has an important bearing on compensation of engineers because it excludes from its requirement for overtime compensation, "any employee engaged in a *bona fide* executive, administrative, or professional capacity."

The definition of a professional employee is as follows:* any employee who is—

(A) Engaged in work—

1. Predominantly intellectual and varied in character as opposed to routine mental, manual, mechanical, or physical work, and
2. Requiring the consistent exercise of discretion and judgment in its performance, and
3. Of such a character that the output produced or the result accomplished cannot be standardized in relation to a given period of time, and
4. Whose hours of work of the same nature as that performed by non-exempt employees do not exceed 20 per cent of the hours worked in the work week by the non-exempt employees; provided that where such non-professional work is an essential part of and necessarily incident to work of a professional nature, such essential and incidental work shall not be counted as non-exempt work; and

* United States Department of Labor, Wage and Hour Division, *Regulations Defining and Delimiting the Terms "Any Employee Employed in a Bona Fide Executive, Administrative, Professional, or Local Retailing Capacity, or in the Capacity of Outside Salesman,"* Title 29, Chapter V, Code of Federal Regulations, Part 541, December, 1940.

5. (a) Requiring knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study, as distinguished from a general academic education and from an apprenticeship, and from training in the performance of routine mental, manual, or physical processes; or

(b) Predominantly original and creative in character in a recognized field of artistic endeavor as opposed to work which can be produced by a person endowed with general manual or intellectual ability and training, and the result of which depends primarily on the invention, imagination, or talent of the employee, and

(B) Compensated for his services on a salary or fee basis at a rate of not less than $200 per month (exclusive of board, lodging, or other facilities); provided that this subsection (B) shall not apply in the case of an employee who is the holder of a valid license or certificate permitting the practice of law or medicine or any of their branches and who is actually engaged in the practice thereof.

In interpreting this definition it must be realized that the individual under consideration must meet all of the tests and not one or some of them. There are comparable definitions for executive and administrative employees who also do not receive time and one-half payment for hours worked over 40 in any one week.

It should further be recognized that these standards prescribed by this Act and the Wage and Hour Administrator are minimum standards. As far as this Act is concerned, therefore, employers may pay higher minimum wages, pay overtime for hours worked over a smaller number than 40 in a week, and may even pay overtime to all of its employees. This Act does not forbid such practices, but it does not require them. The Act does not affect the organization of employees or disputes between employers and employees.

State Legislation: Activities of firms engaged in intrastate commerce are subject only to state legislation affecting employment relations and conditions. It must be realized, however, that firms engaged in interstate commerce must also conform with state laws if the state laws set higher minimum conditions than those imposed by federal act. An examination of state legislation, however, must be omitted from this discussion.

Special Wartime Legislation: Employer-employee relations are further complicated by special wartime legislation and agencies. Because of the emergency these special pieces of legislation affect all employers regardless of whether they are engaged in interstate commerce or not. It must further be realized, however, that even these wartime acts do not apply to the railroad industry.

Under this category of special wartime agencies, it is most important to examine the structure and function of the National War Labor Board which was established by Executive Order No. 9017 issued January 12, 1942.

The National War Labor Board consists of 12 members—four representing the public, four representing the employees, and four representing the employers. The function of this Board is to settle labor disputes which cannot be settled in any other manner.

From the outset the National War Labor Board was confronted with the necessity of developing a national wage policy. A temporary solution was found in the formula of the "Little Steel Decision." Subsequently the activities of the National War Labor Board were expanded to include not only the settlement of disputes between employers and employees but to assist in the stabilization of wages by handling requests to increase wages in conformity to the stabilization program of Congress and the President and the "Hold-the-line" Order of the President. The Board has also established Regional War Labor Boards which handle the same functions as the National War Labor Board and are based upon the tripartite panel plan with public, employer, and employee representatives.

It should be noted that usually the National War Labor Board and the Regional War Labor Boards handle practically all disputes between employers and employees except disputes arising over what union should represent what employee. Although in some cases the Board has decided this question too, there has been established recently a definite policy to leave such disputes to the National Labor Relations Board if the company is engaged in interstate commerce. In other cases the National War Labor Board will handle these disputes also.

The salaries of most engineers, however, come under the jurisdiction of the Commissioner of Internal Revenue. In the regulations issued by the Office of Economic Stabilization, which implements the Economic Stabilization Act, the National War Labor Board was given jurisdiction over all wages defined as payment on an hourly, daily, or unit basis, and over all salaries not in excess of $5,000, if employees receiving such salaries are not classed as executive, administrative, or professional, in the meaning of such definitions under the Wages and Hours Act. In addition, the National War Labor Board has jurisdiction over salaries not in excess of $5,000 even for executive, administrative, or professional employees when such employees are represented by a *bona fide* collective bargaining agency. The Commissioner of Internal Revenue was given jurisdiction over all salaries over $5,000 and salaries of less than $5,000 for executive, administrative, and professional employees not included in a collective bargaining agreement. It appears, therefore, that the salaries of most engineers are included in the jurisdiction of the Commissioner of Internal Revenue since they are executive, administrative, or professional employees and not part of a collective bargaining unit.

ORGANIZATION OF ENGINEERS FOR COLLECTIVE BARGAINING

There are several current efforts being made to organize engineering employees. The American Federation of Labor has chartered the International Federation of Technical Engineers, Architects and Draftsmen's Unions, and the Congress of Industrial Organizations has chartered the Federation of Architects, Engineers, Chemists, and Technicians. Both of these groups are relatively small at present. In addition, it is reasonable to expect that other unions will attempt to expand their coverage to include the engineering employees. Thus in the steel industry the United Steel Workers of America might attempt to bargain for the engineers, in the aircraft and automobile industry either the International Association of Machinists (A. F. of L.) or the United Automobile, Aircraft and Agricultural Implement Workers of America (C.I.O.), in the oil industry the Oil Workers' International Union.

This variety of bargaining representatives emphasizes the widespread conflict between the craft and the industrial types of labor organizations. In a craft union, membership is limited to employees performing a given type of work. In an industrial union, membership is limited to employees of a given industry. The craft union type of organization means that management must deal with a large number of unions in a given plant. In the past the craft union type of organization resulted in the

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C. I. T. NEWS

DEATH TAKES JAMES A. B. SCHERER

DR. JAMES A. B. SCHERER, president of Throop College of Technology from 1908 to 1920, died in Santa Monica on February 15, 1944. Death came after a long illness.

Dr. Scherer was born in Salisbury, North Carolina, May 22, 1870. He held degrees from Roanoke College, the University of South Carolina and Pennsylvania College. During his lifetime Dr. Scherer was an historian and a prolific writer, as well as a college administrator. In earlier years he taught school in Japan where he was married in 1897. In World War I, he was active in war work, being a member of both National and State Councils of Defense and a special representative of the United States Shipping Board. After leaving Caltech he was director of the Southwest Museum for a number of years. Thereafter he devoted himself to lecturing at various universities and colleges, to writing, and to travel.

JAMES A. B. SCHERER

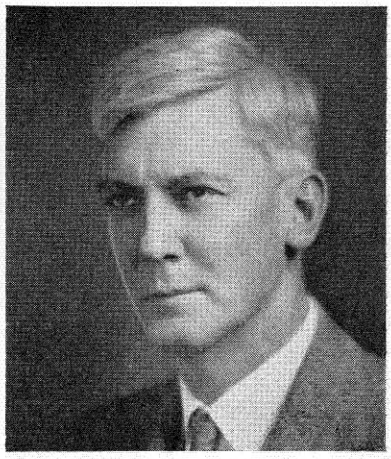
Dr. Scherer is survived by his widow, Mrs. Bessie Brown Scherer, a daughter, Mrs. Isobel Mosher, and a son, Dr. Paul A. Scherer, who is now in Washington as head of the transition office of the National Defense Research Council.

In a tribute to Dr. Scherer, Dr. Robert A. Millikan stated, "Dr. Scherer did a great job in the early days of the development of California Institute of Technology. He was essentially a crusader who shared the vision of the trustees as to possibilities here in the way of serving the interests of this community and this nation, and when there was as yet practically no money in sight needed to do the job, he kept beating the tom-toms as to the opportunities and possibilities that lay ahead. At that stage, it took such a man as he was, a man of great enthusiasm, of great devotion, of great talent as a public speaker and also as a writer, to keep the flame going in this community under discouraging circumstances and with a pathetically small supply of fuel in sight to feed that flame. He did a yeoman's service at the most critical hour which any institution ever goes through, an hour at which the great majority of similar enterprises flicker and die. All honor to one of southern California's pioneers."

California Institute of Technology
ALUMNI SEMINAR
April 16, 1944

DEAN HINRICHS PASSES

LIEUTENANT Colonel Frederic W. Hinrichs, Jr., dean of upper classmen at the California Institute of Technology, passed away February 16, at a Pasadena hospital after a brief illness. Colonel Hinrichs was born in Brooklyn, New York, November 3, 1878. He received the Bachelor of Arts degree from Columbia University as of the class of 1899. In 1898 he was appointed to the United States Military Academy at West Point, and upon his graduation in 1902 was commissioned a second lieutenant of artillery. He later transferred to the ordnance branch of the Army, in which service he remained until his retirement as a captain in 1910.



FREDERIC W. HINRICHS, JR.

From 1910 to 1917 he held the position of associate professor of applied mechanics at the University of Rochester. Upon the entrance of the United States into the last World War, in 1917, he was recalled to active duty in the Army and served until his final retirement in 1919, with the rank of lieutenant colonel.

In 1920 he joined the staff of the California Institute as professor of applied mechanics, and in 1923 was appointed dean of upper classmen, holding both of these positions at the time of his death.

Colonel Hinrichs was a member of the Association of Graduates of the U. S. Military Academy, the Army Ordnance Association, Phi Delta Theta fraternity, the American Legion, the Sons of the American Revolution, and, in Pasadena, the Annandale Golf Club, the Pasadena Town Meeting, the Twilight Club, the Athenaeum, and the Board of the Neighborhood Church.

He is survived by his wife, Marie Honeycutt Hinrichs, his son, Colonel John H. Hinrichs, and by five grandsons, John H., Jr., and Robert, sons of Colonel John H. Hinrichs; and Frederic W., IV, Leslie Witherspoon, and Malcolm Speer, sons of the late Lieutenant Frederic W. Hinrichs, III, U.S.N.R.

The Engineer in the Labor Picture

(*Continued from Page 17*)

organization of skilled trades but made little advance in the semi-skilled and unskilled classifications. The industrial type of labor organization, on the other hand, has secured the bulk of its membership from the un-

skilled and semi-skilled classes and has tended to raise minimum wages, often with no increase in wages for the skilled group. This results in a narrowing of the wage differentials and fails to benefit the skilled workers who have more bargaining power than the semi-skilled and unskilled groups.

It is of special interest to engineers, and to those engineers who are professional employees rather than executive or administrative employees, that the American Society of Civil Engineers has established committees on employment conditions which can become *bona fide* collective bargaining agencies.**

The eventual character of these committees, like the character of any other group of individuals, will depend largely upon the men who join. In addition, the character of the group will be affected by the attitude of management toward it. If the activities of this group are opposed as intensively as organizations of other employees have been fought in some cases, it is likely that the employees will quickly learn how to fight back. It has been observed that unions reflect the managements with whom they deal.

** See editorial by Professor Franklin Thomas, page 3 of this issue, *Engineering and Science Monthly*.

WINS CREDIT FOR ROCKET GUNS

FROM an advanced Allied headquarters in New Guinea came credit for the Californita Institute of Technology in the disclosure that the new secret weapons that blasted invasion paths of Americans in New Britain were "multi-barreled rocket guns."

"Consisting of rocket tubes mounted in banks on 'ducks'—amphibious trucks—and other small craft, their blazing barrages paved the way for successful landings on Arawe and Cape Gloucester in western New Britain," wrote Ralph H. Teatsorth, United Press correspondent.

The newspaper story went on to say that during experiments in 1942 at the California Institute of Technology the idea was conceived of mounting rocket tubes on "ducks" for use in landing operations.

War Correspondent Teatsorth stated that he witnessed the first use of rockets in an amphibious landing when he rode into Arawe Harbor December 15 on a "duck." Two hundred and forty rockets were fired in four minutes, blasting every square foot of landing beaches. There was a great swish and burst of flame as they were fired, but it was not hard on the ears like a naval barrage. Lieutenant W. Donald Beaver who commanded the "duck" said that they were going to prove that the rocket is a great weapon.

BASKETBALL

By HAROLD Z. MUSSELMAN*

AFTER a mid-season slump, the Caltech basketball team rallied to win five of the last six games, and finished the season with a record of seven victories and eight defeats.

Playing a schedule of 15 games with the strongest teams in southern California, the summary is more impressive than it may appear at first glance. The Beavers trounced Redlands twice, split even with U.S.C., U.C.L.A., Occidental, Pepperdine and Camp Santa Anita, dropped two to Los Alamitos Naval Air Base and bowed to March Field Army Air team in the single game played them. Even though the Southern California Conference has been suspended for the duration, the engineers, nevertheless, claim the unofficial Conference championship in winning three out of four games with Conference opponents.

*Acting director of physical education.

The major teams in southern California were very evenly matched this year, and in all Caltech games, the final scores were close, with the victory going to the team that was "hot." In only three games were there more than 10 points between Tech and the opponents, while two games were won by two points.

Coach Carl Shy produced the finest basketball team in the history of the school. All the members of the squad were fine floor men, good ball handlers and excellent shots. Co-Captain Dean Chapman, while a marked man in every contest, retained his high scoring laurels with an average of 15 points per game. But for the first time other men helped carry the scoring load, for diminutive Hugh West averaged 11 points and Co-Captain Paul Nieto seven.

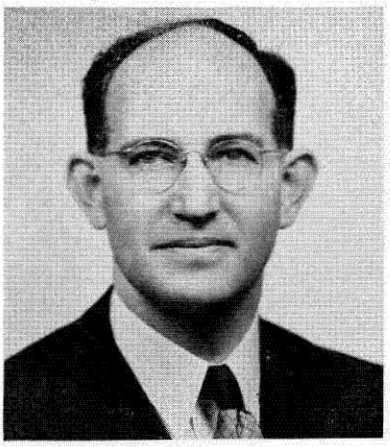
Letters were awarded to 10 men—Co-Captain Dean Chapman and Hal Ball centers; Hugh West, Stuart Bates, Willard Smith and Bernard Wagner forwards; and Co-Captain Paul Nieto, Jerry Lamb, Ross Dana and Jack Cardall guards. All except Chapman are V-12 men. Chapman and Smith graduated in February, while Lamb and Dana will have graduated before another basketball season rolls around.

The results of the games are:

Cal Tech	49	Camp Santa Anita	34
Los Alamitos	62	Cal Tech	56
Cal Tech	43	USC	35
UCLA	58	Cal Tech	41
Camp Santa Anita	51	Cal Tech	41
Occidental	66	Cal Tech	47
Los Alamitos	65	Cal Tech	58
USC	41	Cal Tech	36
Pepperdine	48	Cal Tech	47
Cal Tech	55	Redlands	50
Cal Tech	38	UCLA	36
March Field	66	Cal Tech	56
Cal Tech	48	Occidental	40
Cal Tech	41	Redlands	39
Cal Tech	50	Pepperdine	40

INDUSTRIAL RELATIONS SUPERVISOR

Lee W. Ralston, '27, former supervisor of trade and industrial teacher training for the California State Department of Education, has been named supervisor of industrial relations for the manufacturing and repair department, Westinghouse Electric and Manufacturing Company. In his new post, Mr. Ralston will be responsible for company-employee relations at the headquarters at Emeryville, and also the branches located at Los Angeles, Portland, Seattle and Salt Lake.



LEE W. RALSTON

After receiving his B.S. degree in mechanical engineering from the California Institute of Technology, Mr. Ralston took graduate courses in vocational education at the University of California at Los Angeles and at Berkeley. In 1927 he joined the Standard Oil Company of California, leaving in 1937 to become dean of Coalinga Junior College. He joined the California State Department of Education in 1941, serving there until he joined Westinghouse.