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Trinity College

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**Trinity College**  
HARTFORD CONNECTICUT

VOLUME XXXIII

NEW SERIES

NUMBER 3

# Trinity College Bulletin



Two Commencement Addresses  
1936



Hartford: Connecticut

July 1936

## Trinity College Bulletin

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# Trinity College

## TWO COMMENCEMENT ADDRESSES

TRINITY COLLEGE

JUNE 14, 1936

AN ENGINEER'S LOOK AT THE WORLD OF TODAY

*by*

George Wood Bacon



RENSSELAER POLYTECHNIC INSTITUTE

JUNE 13, 1936

THINKING, QUANTITATIVE AND QUALITATIVE

*by*

Samuel Ferguson



HARTFORD

Printed for the College

1936



Trinity College

THE COMMENCEMENT ADDRESSES

TRINITY COLLEGE

June 14, 1936

At the University Hall at the Trinity of Hartford

by

Charles W. Brown

RECEIVED BY THE POSTAL SERVICE

June 14, 1936

Trinity College, Hartford, Conn.

1936

Printed by the College



1936

Printed by the College

1936

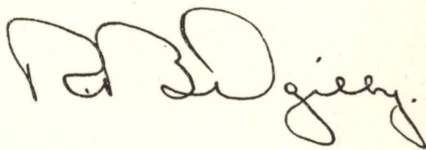
THE CASE, LOCKWOOD & BRAINARD CO.  
HARTFORD [1936] CONNECTICUT

## Foreword

On Saturday, June 13, 1936, Samuel Ferguson, a graduate of Trinity College in the Class of 1896, delivered the Commencement Address at Rensselaer Polytechnic Institute at Troy, New York. On the following day, George Wood Bacon, graduate of Cornell University in the Class of 1892, made an address at Trinity College, Hartford. It was a significant coincidence that a graduate of a small college of liberal arts, Trinity, should give an address at an engineering college at the same time that a graduate engineer should speak at Trinity. Accordingly, Trinity College enjoys the privilege of printing these two addresses together. The title chosen by Mr. Bacon, "An Engineer's Look at the World of Today", might well cover much of what Mr. Ferguson said.

Samuel Ferguson, son of the late Reverend Henry Ferguson, formerly professor at Trinity College, is Chairman of the Board of the Hartford Electric Light Company, formerly President of that Company, and is an authority on public utilities. He is a Trustee of Trinity College and a distinguished citizen of Hartford.

George Wood Bacon, Chairman of the Board of Ford, Bacon, & Davis, Inc., is an engineer of wide experience. His address at Trinity College was to be given at the outdoor service on the College Campus on Sunday, June 14, but on account of rain was delivered in the College Chapel. At the Commencement exercises on June 15 the degree of Doctor of Science, *honoris causa*, was conferred upon Mr. Bacon. At the Commencement exercises on June 13, the degree of Doctor of Engineering was conferred on Mr. Ferguson.

A handwritten signature in dark ink, appearing to read "G. W. Bacon". The signature is fluid and cursive, with the last name "Bacon" being more prominent and written in a larger, more stylized script than the first name "G. W.". The signature is positioned in the lower right quadrant of the page.



## *Citations*

Hic homo, praeses reverende, ex republica Nova Caesarea ortus, diplomate ab Universitate Cornell accepto postquam societatem minus pecuniarum quam ingeniorum et virtutum cum altero iuvene coit, negotii administrandi peritus arbitrium popularis aurae haud quaerens consilium multis et potentissimis negotiatoribus dat. Hunc hominem qui officiis civis bonum publicum amantis et in pace et in bello functus est ad te duco Georgium Wood Bacon.

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As an engineer and an executive he has proved that private industry is compatible with the public good, and that technical skill and administrative ability may be developed effectively under a policy which encourages initiative, promotes co-operation, and eliminates misunderstanding in the community.

In recognition of his achievements and his services, I present Samuel Ferguson to you for the degree of Doctor of Engineering.



AN ENGINEER'S LOOK AT THE WORLD  
OF TODAY

*by*  
George Wood Bacon





# AN ENGINEER'S LOOK AT THE WORLD OF TODAY

by

George Wood Bacon

*President Ogilby, Members of the  
Senior Class, and Fellow Guests:*

It is indeed very pleasant to find myself again on this campus. My last visit was in October, 1890, as the full-back of Cornell's team. Modesty prevents my referring to the score, but I do think it is time I confessed to the grand larceny I then committed in taking home three blue and gold tam-o-shanters from the heads of your team, with which during the game I stuffed my football trousers. I might add that this time I have not come hatless.

Professor James Harvey Robinson once remarked that most persons spend an amazing amount of effort in worrying their way from obscurity to oblivion. He was right about many things. And I cherish, in this moment of emergence which President Ogilby has given me, the hope that perhaps with your help, some directing beacons may be discerned along obscurity's populous highway.

But we've only fifteen minutes for the job, so let us get to this world-look of mine.

As of those about to enter the world of work, you have the right, at the outset, to know what kind of spectacles it is the engineer, for instance, uses when he looks at the world.

Perhaps I should define just what kind of a person the engineer of today is, and just what it is he attempts to do. Engineering may be said to comprise the work of shaping and compelling materials and forces of nature to serve mankind. The engineer strives for a resultant unity of action, where all component parts will function most effectively in the interest of the completed whole.

A large part of his work in this modern day world is to help chart the economic course of business in terms of the capital and of the individuals employed in its operations. He has gradually evolved from the operator of the transit and the level, the civil engineer of four generations ago, to become, as it were, the advance scout of a great industrial army, comprised of workers, management, and investors, who look to him to explore thoroughly and expose the nature of the ground ahead.

He is, as it were, the lookout at the masthead, who is expected to call to the captain on the bridge of danger signs; but it is more than this that he does, for he it is who out of the fairest of weather is charged with the responsibility of reporting upon what is going on or even brewing beyond the horizon. You may think of him as an economic weather man if you like, although I would think of him as one a little less likely to be mistaken. His weather signs, however, to a great extent lie hidden in the breasts of the average man and woman. Their conduct under given conditions constitutes the meteorological chart he endeavors to read.

While natural aptitude and inherited talents score heavily in the engineer's makeup, in the last analysis his effectiveness grows out of the application of an orderly and thorough mind, which finds its way not alone from the theory of the problem but to a major degree from the results of experience.

Many of his problems call for a high order of judicial and reasoning ability, and it may surprise you to know by how few is constituted the group of leaders in the score or more of engineering fields to which a life's work is dedicated. Close reasoning by which the problem is dissected step by step constitutes the right arm of the engineer. You may recall that Daniel Webster in middle age went back to the study of geometry to improve his faculty for close reasoning.

It may interest you to know that into the engineer's laboratory of today come problems from every corner of the business and tech-



COMMENCEMENT ADDRESS BY GEORGE WOOD BACON

nical world, problems dealing with illness or disconcerting symptoms in all kinds of business—quite apart from the work of engineering design and construction—requiring study, dissection, and analysis of a more intricate, involved, and intensive character, because of the absence of rules and standards by which we so largely build; problems of expansion and realignment to meet changing conditions.

The first question which the engineer usually asks is:

What is the status of the product with respect to the market?

Henry Ford's clinging too long to the foot controlled so-called "Tin Lizzy" is said to have cost him over a hundred million dollars; either his engineers failed or he failed.

From this the engineer goes on to ask:

Are the reasonable requirements and interests of the consumer adequately serviced, and can he secure what he wants, when he wants it, and at prices competitive in the particular field?

Are the facilities for producing the product what they should be in the interest of the consumer as well as the owner of the business, its stockholders usually?

Are the relations between the management and its workers harmonious and fair to all concerned, and is each reasonably responsive to the obligations they carry to their customers, to the public at large, and to their stockholders?

Months, and sometimes years, with much experimentation are involved in finding the solutions and in having them incorporated into the day to day operations of the business. You may like to know that more than a hundred different kinds of engineering specialists may be simultaneously engaged in the kind of work I'm talking about; that more than one hundred billion dollars would be required to replace the various kinds of property in the United States which so requires in its counsels the engineer.

And just here let me say that the theory that all production comes from labor is a very false theory. Labor without brains is futile. The principal agents in any productive enterprise are three: brains, labor, and capital. And it might be appropriate to inquire where capital came from? Initially there was no capital in the hands of the individual; it existed in nature's storehouses. Capital in the hands of the individual, has resulted from savings by the individual, as the result of work; as the result of thrift and positive denial on the part of scores of millions of individuals. It is to this storehouse that you and I now have access, and without which the finest laid plans of mice and men would come to naught.

So! When the engineer of today looks at the world, he endeavors to perceive what it is the average human being would like to do, given half a chance; how, under given conditions, he will act; what the economic consequence of such acts will be; how they will affect the mechanism of modern facilities for conducting our life.

Witness, for instance, the advent of the modern motor bus on the principal lines of the Manhattan surface transportation system of New York City, in replacement of the highly applauded street car of only a generation ago. The quiet streets of a former generation had become a tangle of traffic of motor vehicles and pedestrians. In place of occasional horse-drawn vehicles, which could move only at a snail's pace, the streets are choked with speedy motor vehicles. The problem of street capacity had arisen. The inflexible street car was out of step with this condition. It became clear that mass transportation must be conducted by a vehicle measurably as agile as motor cars themselves, a vehicle that required less capital investment and less maintenance cost than a street railway, and one that would, in the interest of safety to the individual and of time, avoid loading and unloading passengers in the middle of a busy street. These signs read by the engineer have necessitated in this instance fifteen millions of new capital and the scrapping of equipment and construction still in good running order costing four times as much.



Most things in this world grow by what they feed on. Jobs are a direct function of what is going on. When I came on the scene, our frontiers were just being reclaimed by the products of industry; but 20 per cent. of the railroads had been built. No herald had predicted the electric industry, the skyscraper, the internal combustion motor, the radio, the modern high carbon and alloy steels, or the thousands of things which these have made possible.

Today we are at least peering beyond the horizon. The internal combustion motor made of Jules Verne a laggard. It and the electric spark have given the world a tempo undreamed by him.

The fifty billion dollars we in this country spend each year in the purchase of food, clothes, and other possessions for mere living compares with some ten billion dollars' worth of things we each year either throw away, lose, or endure as outmoded or obsolete. This loss, call it depreciation, supersession, obsolescence, or what you will, is clearly the fuel that feeds the flame of our mechanistic age. For after all, the whole game of living—for so many far from a game—has grown to its present proportions because of the ambitions and the desires of the average man and woman, not to say the cupidity of some; and mother earth has as yet not failed us.

We labor constantly, due to the shortness of the normal life of things, the products of man's genius. For while the life of most of such things in point of the time for making, exceeds by hundreds of times the life of man in terms of his period of making, nevertheless things are, measured by man's effective life, relatively short lived, and hence it is that the turnover of things gives birth and rebirth to the age of industry in which we live. All very fine until the shoe begins to pinch, as pinch it ultimately will. There's a time coming when mother earth will recoil and call a halt on waste and extravagance.

I have spoken of the engineer's weather signs. Perhaps you would like me to name some of the things he seeks to explore in his appraisals. I will mention but a few:



1. Service to the average man.
2. First cost of the product.
3. Cost of its maintenance.
4. Its life expectancy.
5. Its influence upon health and life.

And when I say health, I mean not only of the physical body but of the mind, our moral and even spiritual makeup. For make no mistake, we can overdo this business of piling things upon things in our daily life.

Much of matter and something of mind seems to be associated with the life of the engineer. And while it is true that he is of necessity, if he is to survive, matter of fact, this characterization does him scant justice unless it credits him with something far more significant. That something is an abiding spirit of service; at times it becomes almost spiritual; it rules the mind and it moulds the matter. It is not too serious; in fact, humor is one of its mainstays, because after all the actors in the drama of the engineer are principally, in the last analysis, not materials but human beings; it is their reaction that spells success or failure. Any engineer can, for instance, design a wall that will keep the smells of the kitchen from the dining room, but it requires thought and understanding to stop the cook's voice.

The cornerstone of this spirit of which I speak is what I have come to think of as thoroughgoing coöperation amongst those engaged in a common task, the ability to put yourself in the other fellow's place; to be frankly honest with yourself without being a fool about it.

Little happens in this world as the result of one man's work. A thousand people may have had a hand in getting Cream of Wheat on your this morning's breakfast table. It is good philosophy to remember that most human beings respond best in an atmosphere where they have a hand in the game, where the venture takes on a coöperative aspect, where credits are awarded with a generous hand. The world respects him who comes with a challenge, as it detests the man who chisels his way.

COMMENCEMENT ADDRESS BY GEORGE WOOD BACON

I have said that so far mother earth has not failed us. But even mother earth has her limitations. As science has made and is making inestimable contributions to human welfare, so is it fostering gigantic inroads upon nature's storehouses of raw materials essential to the pace of life which we have set, and which, as I see it, is just getting well under way. Of such vast proportions is this movement that I venture to assert, at no time in history has the need for informed leadership amongst us, in the matter of rationalization in the handling and the use of the materials and the physical and moral forces at our hand, been of such sustained import as at the very period in which we are now living.

The reason for this is, at least as it seems to me, that the machine has grown faster than man. There's a shortage of informed man power, a deficiency in leadership. In many cases, stability has gotten actually out of hand; witness the unbelievable devastations of the World War. But come closer home, witness the record of so many in whose hands we have placed the power of guiding the machine of government, indeed today a stupendous task; witness the demand throughout industry, for new recruits constantly, to sustain and carry forward the work of servicing this nation. There is literally no limit to the distance you young men may travel, if only you can be really launched.

Out of my experience, I have been obliged to conclude that man as yet isn't a very efficient instrument. You are aware that, generally speaking, one-half of us supports the whole; that we spend as much time getting ready to do our job as we do in performing it. You, for instance, will all be thirty before you are really paying your way, and before you are sixty, you will be through, as the life insurance actuaries will tell you. No sooner do we strike our stride in work than we sign off. Green hands take our places and the cycle is reenacted. This enjoins us as no other single thing could, so to conduct our work that it doesn't die with us. Let me select but one



instance of our inefficiency: our bread and butter, the soil, without which civilization would perish over night.

The product of millions of years of soil building now lies useless at the bottom of the sea, forever lost, due to our failure, as we took over nature's job of conservation, to prevent soil erosion. It is estimated that approximately 10 per cent. of our crop lands have already been ruined, and three times that amount have been largely stripped of top soil by erosion which we have permitted to go unchecked.

Time will not permit us to explore the reasons or the remedies for this deplorable condition, but there is no doubt that it may be laid generally to lack of knowledge and organization on our part in the handling of this greatest of nature's resources.

You young men come upon the troubled scene of this world of today, knowing as well as I do that it is troubled. Do not, however, harbor the notion that this is its first commotion. You come with the beginning of an equipment you have spent the past four years in designing, with which to start to take your places in the ranks. How are you to get to work? That is the question. That is your great problem.

Let me try and indicate to you from the front line trenches, as it were, how that problem lies in my mind, for to do effective work, one must, of course, understand the conditions under which such work is to be done.

One thing is perfectly clear. You will never get anywhere in this world without hard work. And I mean by hard work, concentrated thought and study; a burning determination to understand and to achieve. At the outset, select the field in which you expect to work, the path in it down which you expect to go; then explore that path, the ground on which you tread; don't under-estimate the importance of knowing each square inch of it, of exposing all the soil. It's a full time job to which I am committing you, but its reward is that it will get you places; you will begin to understand what it is all

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about; where half truths have been operating all too long; where you can step in. In the zest of such accomplishment lies perhaps life's greatest compensation.

Each day makes it the more apparent to me, in what we term industry, with all the essentials of man power, organization, the application of the sciences, the production, distribution, and use of goods, that the field for young men such as you is quite without limit, provided you are determined enough to inform yourselves sufficiently really to help lead in its problems.

I have no desire to preach to you, but the fact is, as I see it, there is too little deep thinking in the world today on the part of both old and young. I don't blame the young altogether, for you certainly are up against handicaps that those of my generation never had to face; never knew anything about. This modern world isn't all beer and skittles. It takes grit to pass up a lot of the fast play that is dangled before your eyes; but if you are to take a worth while part in the contest, for it is nothing less, you can't do it with half a mind or half a body. The stream never rises higher than its source, and most of us are made, not born, and the making is in the first instance the individual job of each one of us.

That false gods beckon from time to time when in control of forces none confess wholly to understand, should only spur us to greater effort in a determination to find the truth. Life at best is a matter of trial and error; both will continue in the future as in the past; the percentage of error will be decreased and the stability of the structure upon which contentment rests, will be assured in proportion to the accuracy of the diagnoses we make.

As I look out, therefore, on the world today, I am consumed with the query, did ever opportunity for accomplishment stalk so nakedly as now? Was there ever a day in all the days that have marked the course of the affairs of man, when men endowed as you young men are being endowed, could as today, play so significant or so enriching a part in the work of digesting and directing the



products of our labors? I would say without reservation that there has been no time in my business lifetime, now in its forty-fifth year, when original thinking based upon experience commanded the premium it does today.

But you may well observe that this is all very fine; that you are in principle for it; but that man must live. You may point out that this boat in which I indicate a seat for you is already crowded to the gunwales; that there isn't the room or the opportunity in it there once was, and I shall not undertake to disagree with you as to the brawn in the boat, but I shall vigorously as to the brain.

So we come back to the question which may well be puzzling you. Where is the task with which I am now to enlist, through which I am to pay my way? It's a question that requires a straightforward answer. Of our 123 million people in 1930, 49 million carried the load as workers, 40 per cent. In 1870, the year after I was born, the workers amounted to  $12\frac{1}{2}$  million out of  $38\frac{1}{2}$  million, or  $32\frac{1}{2}$  per cent. The mechanical age seems, therefore, to have stimulated worker opportunities. Of our present population, about  $2\frac{1}{4}$  million men and women are college graduates, about  $1\frac{3}{4}$  per cent. of the total. We college graduates are at best as yet but a small group. Opportunities should seem fairly to stare us in the face, although there are about  $12\frac{1}{4}$  million high school graduates who may be entirely competent for our jobs.

Training in the art of thinking in terms of the problems of living has been steadily advancing, and this without doubt reflects the market demand for the products of thought.

I got my first job by watching a man half again my age brush the foundry sand from brass castings and by selling his foreman on the proposition that I could equally well clean three while he was cleaning two. I subsequently took the foreman's job, as he moved up the line.

Your first job is a selling job and the first person you have to sell is yourself. And don't be too easy a customer. Give yourself

COMMENCEMENT ADDRESS BY GEORGE WOOD BACON

at the very outset a taste of what the average buyer is like. He will take little for granted. Above all, in the process, don't overlook the results of the research workers in the field you enter.

And now as I wish you Godspeed, may I leave this final thought with you: That the home of ideas is the birthplace of accomplishment. Nor will it in my judgment take more than one good idea for each of you to find yourselves hard at work.





# THINKING, QUANTITATIVE AND QUALITATIVE

*by*

Samuel Ferguson



# THINKING, QUANTITATIVE AND QUALITATIVE

*by*

Samuel Ferguson

I feel that a signal honor has been conferred upon me in that I have been asked to join in the Commencement exercises of an educational institution of such standing in the engineering and scientific world as the Rensselaer Polytechnic Institute, and it gives me great pleasure to be permitted to say a few words to the members of the class who today as graduates are closing their course of academic training and starting on that further and prolonged course of education which goes hand in hand with their activities in whatever may be their field of endeavor throughout the full term of their lives. There are those whose education does not progress year by year, whose lives are, therefore, routine and mechanical, but society expects better things of those who have had the educational advantages accorded by this great institution.

These advantages are not so much in giving you the specific knowledge that will make you expert and efficient in your chosen lines of work. In fact you will experience a rather crushing revelation as to how little of your laboriously acquired technical knowledge is directly applicable; but you have two great advantages over those who have not had your opportunities in that you have acquired the knowledge of how to study, where in general to look for specific information, and above all in that you have acquired a reasonable perspective—past, present, and future—of the fields of endeavor to which you may be called.

Please do not think that I belittle the courses you have taken if I seem to consider them as comprising to a considerable extent a form of very necessary and desirable mental gymnastics. The physical



stamina of the recruit is built by setting-up exercises to a point where he can assume the burdens of the soldier, and the mind is similarly expanded for a greater possibility of usefulness by the conquest of subjects which in themselves have values not directly or evidently connected with your probable future work.

Technical skill is, of course, an asset, but unless combined with the ability to think clearly, its value is limited. More and more we see on every hand the need for clear thinking rather than for clever thinking.

Not long ago the President of this Institute, in an address, called attention to two very great differences in the ability of persons to think. He differentiated one ability from the other by the terms "qualitative" thinking and "quantitative" thinking, and it is the very striking differences in results arising from these two types of thought that I propose to stress this afternoon.

When thought is concentrated on specific results to be attained and attendant action is based solely on such thought, it is likely that consequential results in other quite different and far-removed fields will occur—the effect of which will be quite as important and far-reaching as the specific accomplishment. This I look upon as the application of qualitative thought alone. On the other hand, quantitative thought is capable of analyzing the consequences which will follow any given line of action designed to bring about a given result. With qualitative thinking, cause and effect are likely to be confused with one another; while with careful quantitative thinking, such an error would be avoided. For example:—Without question, the objective sought by the National Recovery Act was most desirable, but the means adopted for that end brought confusion and such widespread adverse attendant results that it was rapidly creating a greater damage than that it was designed to cure, when fortunately the Supreme Court brought its career to an abrupt end.

Both types of thinking are desirable; qualitative thinking because unhampered by factual handicaps, it can the more readily visualize

the ideal society toward which our effort should be directed and stimulate the more prosaic quantitative thinking into finding ways and means to accomplish the desired end; but action predicated on qualitative thinking alone leads to disaster in unforeseen places.

Those who are impatient with the world's pace in social progress and seek to legislate us into the happy Utopian state they visualize are guided by qualitative thinking alone. "Do something" is their motto; "and if it does not work, do something else." But such thinkers are mentally incapable of counting the costs to which they shut their eyes. We all applaud the objective of a more abundant life, the uplifting of the downtrodden, the improvement in our economic machinery, and if all of us were to be hampered by the necessity of weighing cause and effect, the notable progress toward these desirable ends made during the last fifty years would have been much less than actually has taken place. A certain amount of prodding toward these ends is desirable and the clear picture of what needs to be accomplished is stimulating. On the other hand, to rush blindly toward these desirable objectives, shutting our eyes to the wreckage caused by such a course, is to endanger all the gain we have made and to slow down rather than promote progress. The danger in our present state of social development lies in the fact that we now have in power too many of these qualitative thinkers who believe that they can reach their objectives without recourse to the sound but slow processes of quantitative thinking, which is so essential to our national existence and to progress.

The qualitative thinker looks on the individual as subordinate to the State. This leads to the regimentation of life and business. Our forefathers held exactly the reverse of this concept, and they created our world-famed Constitution with the avowed object of insuring to the individual his inherent rights and of forever perpetuating the subordination of the State to the individual. It is on this concept that social progress such as the world has never before seen has been accomplished in the last hundred years, and foolish efforts



to effect short-cuts toward the millenium must not be permitted to imperil that which we have thus accomplished.

The belief in the efficacy of state regimentation seems to spring from the fallacious assumption that the employee of a government bureau is automatically endowed with infallible wisdom coincident with the delegation of power to him. How far from the truth this assumption is, most of you are destined to learn from bitter experience.

Unfortunately, qualitative thinkers, capable of painting the rosier picture but incapable of leading us toward it, have been in the ascendancy for the last few years. The need is for the two types of thought to couple-up in coöperative effort instead of each looking upon the other as antagonistic.

Let us not blindly destroy that which we now have in our efforts to reach at once the social perfection which all agree should be our objective as worthy citizens. The advice incorporated hundreds of years ago by Aesop in his fable of the dog who reached for the bigger and better bone which he saw reflected in the water is as pertinent today as it was when it was given in the distant past.

To illustrate the relationship between qualitative and quantitative thinking and the value of both when jointly applied to a problem, I have chosen the field of public relations, for no individual or line of endeavor can be isolated from that contact and influence on a larger or smaller section of the community which constitute public relations. In a more restricted sense, public relations may be defined as the sentiment existing between many individuals collectively and some one agency of business or government that has an influence on their daily lives. On such sentiment careless or careful thinking has a most profound influence, and I know of no undertaking where good Public Relations are of more vital importance than in my own line of endeavor—that of rendering electric service. Yet I know of no industry where a greater degree of unfortunate antagonism has developed; and it has arisen chiefly because of the failure of the

COMMENCEMENT ADDRESS BY SAMUEL FERGUSON

electric industry to supply the necessary quantitative thinking which should have supplemented the qualitative thinking of the public. It is the lack of this coördination which has created what I term the "Great Misunderstanding" between the electric industry and the public.

Just as the cost per volume is high in the case of printing a limited edition of a book, so is the cost of delivering a small amount of electric service similarly high, and for much the same reason. Likewise the cost of additional volumes or kilowatt hours is far less.

The extent of the misunderstanding which has grown from the non-appreciation of this simple fact illustrates the need of clear thinking before actions are taken which, regardless of their good intent, make the desired objectives more difficult of attainment. It was by no means all one-sided, but grew from a mistake on the part of the public which the industry allowed to grow instead of rectifying by explaining the situation from its more complete knowledge. The mistake of the public was in complaining about the wrong thing; the mistake of the industry was taking the complaints at face value instead of seeking and remedying the real grievance.

What the public wanted, was to use electricity liberally and at prices within the reach of the family budget. This was a qualitative thought covering an objective which everyone will agree is most desirable. Unfortunately, in seeking to bring about this desirable objective, the public did not stop to analyze the situation but vigorously attacked the only thing that they could see, which was the top rate maintained to cover the cost of the then existing small average usage. They could not be blamed for attacking the only thing they saw nor for not understanding that the top rate established to provide adequate revenue for small usage had nothing to do with fair prices for liberal usage; it was the duty of the industry years ago to both make this fact plain and to offer lower and practicable prices for liberal use. But generally those in the industry did nothing of the kind. They simply stood pat and told the pub-



lic that it was mistaken in claiming that the rate under attack was high. From this start, it was only to be expected that the politicians seeking votes would take up the battle on behalf of their constituents, and they, knowing even less of the economics of power costs than the public, created a new issue of extortion and robbery. The politicians knew no difference between the high top rate for small usage of which their constituents complained and the low average rate which they saw combined with liberal usage over the border in Canada. What is more natural than the charge of robbery when comparing a local 10-cent top rate with a 2-cent average rate enjoyed in the neighboring country?

The industry, smarting under attacks which it considered unjust, either fought back with charges of misrepresentation for purely political purposes; or else, doing what was even worse, taking the path of least resistance (in hopes of stilling complaints), gave in and reduced both top rates and earnings below proper economic levels. The error on the part of the public was, through ignorance, in complaining about the wrong thing. The course of the politicians in seeking to obtain for their constituents what they requested was only natural—both unfortunate—but not in either case a knowingly wrong act. On the other hand, the industry had not the excuse of ignorance, because in spite of its better knowledge that to lower top rates and earnings would harm the public more than the companies, it went ahead and did both of these things, thereby greatly hampering itself in rendering that greater degree of service which the public has a right to expect. To do wrong by committing an economic sin would appear a far greater offence than, in error, to complain about the wrong thing.

With a higher level of earnings, the industry would of course have today funds available to promote that greater usage which alone can bring electricity abundantly within reach of all, and if it had not yielded and uneconomically reduced the top rate for small usage, those customers who today desire to use liberally would not have to

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bear the burden of making up the deficits created by serving the small user below his true cost.

These wrong and backward steps of the industry are not recognized by the public as such, but are mistakenly looked upon as halting and unwilling steps, taken only under compulsion, though in the right direction. Can any misunderstanding be more complete?

If the rate for small use could be lowered as well as the follow-on rate without interfering in any way with the lowness of the latter, it would of course be psychologically desirable; but every lowering of the top rate below cost reduces the amount by which the follow-on rate can be reduced, and progress is thereby delayed except in cases in which subsidies are available to make good deficits during the developmental period that must elapse until a sufficient average usage has been created to make the business self-sustaining—a method available only to governmental operations.

Progress has also been impeded by the very general practice of carrying the disputes into court. In such cases both parties are too intent on maintaining their rights to have any time to devote to ways and means of coöperative action.

The following is a specific instance:

The domestic rate of a small rural subsidiary of a large holding company was 15 cents per kilowatt hour and consequently the consumers wishing to cook, pump water, etc., were deprived of the privilege. Following this qualitative thought, the consumers brought a rate case before the Commission and retained one of the ablest and most prominent lawyers in the state.

A few days before the hearing, he asked the speaker to go over his outline of the case which, as developed, was a request that the 15-cent rate be reduced because of the high earnings of the company which presumably existed in conjunction with this very high rate. He was told that his outline was in every way standard practice and according to Hoyle, but that the trouble with it was that the com-



pany would have no trouble in defeating his claim because of the fact that with such a high rate the amount of usage was so small as to produce only a very low return. He was advised to scrap his brief and follow a radically different program, to which he agreed.

On the day of the hearing, he opened his case by stating that he realized the earnings of the company were inadequate and that the price for the existing small use was not too high; but none the less, the company was not giving the service of which it was capable, and he asked for a lower rate applicable to such customers as wished to make more liberal use of the service. He was interrupted at this point by the company expert who explained to the Commission that whereas he had been sent to oppose the petition, he was in the peculiar position of having to agree with what counsel for the petitioners had said; and that if the Commission would adjourn till the next day, he would endeavor to meet their views. Adjournment was taken, a rate agreed upon which, while maintaining the high price for small use made a reasonable price for liberal use, and the next day the case was withdrawn. In this case, quantitative thought was applied to the problem of obtaining the objective specified by qualitative thought. As a result the consumers obtained what they really wanted—but not what they had originally asked—and the earnings of the company were subsequently materially improved. Is it any wonder the householder complains of the wrong thing when not even the retention of one of the ablest lawyers in the state served to direct this request toward what really was wanted and away from what erroneously was thought to stand in the way of his desires?

In contrast to this instance of logical analysis of the problem, we see on every hand the same misunderstanding developing which intensifies the public's feeling of injustice and which creates in the industry a feeling that any effort is useless as it will only be misinterpreted and made the basis for further unjust accusation.

How unnecessary is this misunderstanding, resulting from an effort to find a short-cut to a desirable objective without the necessary

amount of quantitative thinking, is indicated by the favorable sentiment accorded the Utilities in those places which have turned away from the temptation of these illusive short-cuts and through maintaining compensatory prices for small use have been able to make those low prices for liberal use that meet the real needs of their communities.

Illustrations of good results from quantitative thinking and of bad results from a lack of it, can be found in the relations between the public and any industry; it is not peculiar to mine. You who have had the benefit of the education afforded by the Institute are especially obligated to supply your fellow men with thinking of this sort which is at this time so badly needed as an adjunct to the qualitative thinking of those who, seeing things in our social economics that need improvement, create a most alluring picture of an improved society and call for something to be done at once. We owe much to such thinkers for clearly painting the objective, but it is up to you to supply the quantitative thinking which must be used in conjunction with theirs if the retarding result of their practice of doing something at once, regardless of what, is to bring sure progress rather than destruction and disintegration.

We all subscribe to the ideal of the more abundant life, and to that end, let each of us assist by contributing what we can of constructive thinking instead of making it more difficult of attainment through such loose thinking as to suppose that it can be brought about by legislative fiat.

Public relations, whether applied to authorities existing in business or in governments, will be the result of what clear thinking or the lack of it shall cause it to become, and I hope that when you leave this campus and take your places in the social and economic life of the nation, you will insist that sound, clear, and comprehensive thinking shall attend each step taken toward the major objective of every citizen, namely, that each generation shall find our country a better place in which to live than did the one preceding.

Do not discourage those who dream dreams, but rather coöperate with them by using what this Institution has given you to see that the nearer and nearer approach to dreamland is built on a sure foundation of economic sanity.