Pioneering New Frontiers

Forty-six years ago a young man, thirty-two years old, already professor of history at Wisconsin, read a paper at the World's Columbian Exposition in Chicago, and became almost overnight the founder of a new school of historical interpretation. The author of the paper was Frederick J. Turner; its title, "The Significance of the Frontier in American History."

Practicing my own preachment to our Social Relations freshmen, I have consulted the dictionary and find that Mr. Webster defines "frontier" as the border or advance region of settlement and civilization, and as an advance or not fully explored region, as of thought, sentiment, etc. The word, "frontier," takes on special significance in association with the companion word, "pioneer," which is defined as one who goes before, preparing the way for others; also, an early settler, a colonist. It will be noted that these words are rich in figurative as well as in literal meaning; the things which they connote from both points of view have greatly influenced American history.

The span of Andrew Carnegie's life, 1835-1919, covered a period in which with overwhelming speed treasures that lay beyond successive frontiers of space, frontiers of knowledge, and frontiers of man's power to control and direct the forces of nature were severally made available for human use. The Carnegie family in Scotland was itself victim of a new frontier in manufacture incident to the English Industrial Revolution. The calamitous decline of hand weaving left Andrew's father without work and that was the impelling force which brought the family to America in 1848.
As we all know, Andrew, himself, became a major participant in transforming the achievements of scientific and technological pioneering into industrial expansion. His first pioneering enterprise while still in his early twenties laid the foundation of the fabulous fortune of which he later became master. The young Carnegie, on a short trip into Ohio, was sought out by Theodore Woodruff, an inventor, who had recognized him as an employee of the railroad. Woodruff proceeded to display sketches of a marvelous contrivance which he claimed would make it possible to travel comfortably at night. (We who have had experience with the later embodiments of the device may question the claim.) Characteristically Carnegie grasped at once its limitless possibilities and, losing no time, he induced his employer, the Pennsylvania Railroad, to penetrate this new frontier of transportation. Accordingly, sleeping cars were soon rolling over the line. In appreciation of Carnegie's efforts, Woodruff invited him to become one of the original promoters of the enterprise. His continued association with it had profound influence on the development of the business.

Biographers relate a later episode which reveals Mr. Carnegie's part in organizing the Pullman Company. With intense rivalry the Woodruff and the Pullman interests were both trying to land the contract for sleeping cars on the new Union Pacific Railroad. Pullman and Carnegie were ascending the staircase of the St. Nicholas Hotel in New York. After breaking the ice in his cheeriest manner Mr. Carnegie said, "Don't you think we are making a nice pair of fools of ourselves?" "What do you mean?" said Pullman. Carnegie explained that they were letting competition for the Union Pacific business injure both companies. "What do you suggest?" asked Pullman. "Let's make a joint proposition! Why not organize a new company to do it?" To which Pullman responded, "What would you call it?" "The Pullman Palace Car Company" said Carnegie, and the fight was over. So over the years did Mr. Carnegie's first excursion across technological and industrial frontiers unfold.
The sleeping car stories bear eloquent testimony to the quality of Mr. Carnegie's genius and at the same time to the close interrelation of technological, industrial and geographical frontiers. It will help to clarify the part which all of these frontiers have played in American life if we envision at the outset the theory of the geographical frontier as expounded by Turner with a few of the historical facts concerning it.

Turner developed at the Chicago Fair what he conceived to be a crucial circumstance, that here in America for the first time in modern history if not in all history, a people with an advanced culture found itself living next to an unlimited area of unowned or slightly valued land, from which the common man could satisfy his needs and upon which he could build, free from most of the restrictions of congested society, the personal life of which he was capable and the social structure he desired.

In the first half of the nineteenth century, study of history was focussed upon political events, but about the time of our Civil War the English historian, Buckle, and others, were directing emphasis to the economic interpretation of history. In the years after the war these teachings gained currency and accordingly the still dominant political note in American history was gradually modified. As a phase of the economic approach, Turner's conclusions, resting upon painstaking study continued during his distinguished career at Wisconsin and Harvard, had a strong appeal for both historians and laymen. Like relativity, Freudian psychology, and other modern doctrines which won popular acclaim, the theory of the frontier became oversimplified in the public mind, and its applications were unduly extended. It is significant that the imprint of the Turner school of thought was made at a time when settlement of the West had ceased to be a current problem and had become an historical fact.

The geographical frontier was undoubtedly a potent factor in shaping American history, but like other material factors which have helped to make America,
Pioneering New Frontiers

it derived its significance from the quality and the equipment of the people who developed it. If we go back into colonial history, we find that it was not a foregone conclusion that the vast area of unoccupied land would make America immune to the aristocratic systems of Europe. The Dutch patroons in the Hudson and Mohawk valleys were essentially feudal lords. English royal grants, notable among them the princely domain of the canny Quaker who founded Pennsylvania, not to mention Lord Baltimore and other cavaliers, seemed to point to reproduction here of the social stratification of Old World Society.

But opposing forces were at work. Barring temporary Dutch occupancy of New York, Swedes on the Delaware, and French colonization of Quebec, settlement of the Atlantic seaboard was essentially an English enterprise. During the seventeenth and eighteenth centuries, England encouraged the discontented to emigrate and permitted them to take along their rights as Englishmen. Temptation to spectacular exploitation of resources as practiced by the Spaniards was minimized by absence of precious metals in areas taken over by England. English settlers had to build their society largely around cultivation of the soil.

No one was quicker than William Penn to catch the pioneering spirit. After making his first settlement, he began immediately to stimulate immigration, and in the modern realtor manner he advertised throughout Europe, featuring the great benefits of political and religious freedom to be enjoyed under his rule. His paid agents in the Rhine Valley were so successful that within twenty years half the population of Pennsylvania was German. Taking the colonies together, it is clear that English policy in respect to settlement, and the type of people who came to America—two obviously human factors—were quite as effective as was the material fact of vast territories in giving shape to colonial America.

Passing to the national period, the influence of the geographical frontier on American life was interwoven with these same two factors, character of people
and public policy. National policy concerning the frontier began to evolve soon after we achieved our independence. Through a chain of circumstance which could not have been anticipated, the states were induced to cede their public domains to the Federal Government, an event which was closely tied in with the adoption of the Constitution. Out of these two crucial decisions emerged the policies under which our ever receding frontiers were settled.

In 1803, Thomas Jefferson paid Napoleon Bonaparte fifteen million dollars for the Louisiana Territory. Strategically this acquisition gave the United States control of the Mississippi; its value in opening up new areas to settlement was not the main consideration. However, by that time settlement in the territory west of the mountains had made substantial progress. Kentucky and Tennessee had been admitted to the Union and Ohio was just coming in. In Tennessee, a frontiersman from the Carolinas, named Andrew Jackson, was already laying the foundations of a political career which landed him in the White House and made the frontier a potent fact in national politics.

From the very start, the policy of giving all possible encouragement to settlement was adopted. In the forties we fought the Mexican War and we risked a war with England in extending the authority and protection of the Federal Government over settlers in distant and even foreign areas. Annexation of Texas, the Mexican War, and settlement of the Oregon dispute with England extended our territory to the Pacific on a fifteen-hundred-mile front. A later significant event in the conquest of the frontier was the passage of the great Homestead Act of 1862 under which substantially the settlement of the Far West was completed.

The scope of this paper does not embrace the ramifications of policy nor the story of successive tides of migration through which settlement was pushed forward to the Pacific. But it is obvious that the influence of the frontier upon American history must be interpreted in the light of the public policies concerning migration
and settlement during both the colonial and the national periods. These policies in turn were fashioned with reference to the people to whom they applied—the pioneers who went out to possess the land.

However varied the motives and from whatever walks of life people migrated to the New World, most of them had this in common. They were leaving behind limitations and restraints of a settled society to face uncertainty, hardship, and danger in pioneering beyond distant horizons. Whether we emphasize what they came to escape or what they came to achieve, the fact that they came at all set them apart. The same thought applied to the settlers who migrated westward from the Atlantic seaboard and for their followers and offspring who in succeeding generations left old homes for new. From the Mayflower to the covered wagon, those who journeyed toward the west constituted a natural selection from the communities they left behind.

We may well question whether it is the influence of land on people or of people on land that should be stressed. Successive recruits of pioneers brought with them imprints of European civilizations, the human stocks from which they sprang, and their individual characters, abilities, and aptitudes. Above all they brought to their new homes either the exhilaration of adventure or the necessity to forge ahead which was their only alternative to disaster once they had broken their ties with the past. In the colonies and on through the nineteenth century, immigration added many new elements of strength to a population whose virility was high at the start. Nothing could better illustrate this fact than the life of Andrew Carnegie.

To summarize the situation on our geographical frontiers, selection from a rich European background and the disciplines of rugged colonial experience, matured in the war for independence and in the struggle for union, developed in the American people a restless energy and an aptitude for new undertakings which in large measure
Pioneering New Frontiers

explain both the adoption and the success of settlement policies.

But the speed with which settlement advanced was conditioned by the changing technology of successive periods. During the nineteenth century, the advance posts of American development were gradually carried over from our geographical to our technological frontiers. In 1803, when Jefferson purchased Louisiana, he prophesied that it would take a thousand years for settlement to advance to the Mississippi. In 1840, at a time when the policy of giving away lands to settlers was before Congress, Henry Clay could only cut Jefferson's estimate in half, notwithstanding progress westward during the interim. Jefferson, a political philosopher, was keenly aware of the human forces released by the American Revolution and by the French Revolution which followed; but, although the equally significant Industrial Revolution in England was under way during his generation, it had not advanced far enough in 1803 to reveal its momentous portent for the nineteenth century. Jefferson had to view the scene in terms of the ox team and the stagecoach; in Clay's time, river navigation was advancing, and there were canals and toll roads to spur his imagination, but the real Machine Age was still in the future.

The westward movement of the frontier during the twenty-two years between 1840 and the passage of the Homestead Act in 1862 could not have occurred except for the growth of industry and trade. In this brief period, settlement was extended well beyond the Mississippi, and two remote empires, Texas and California, came into the Union from the vast lands formerly held by Mexico. Development of a diversified economic and social life in states like Indiana, Illinois, Michigan, and Wisconsin during the middle third of the nineteenth century was in direct relation to the expansion of industry and transportation the country over.

Discovery of gold in California in 1849 directed world attention to the Far West. After the Civil War, it became our national task not only to rehabilitate a devastated South but to bind together with an industrial East and an agricultural
mid-continent, a vast, arid empire of mountains and plains which, as raw land, was chiefly suited to grazing and the exploitation of mineral wealth. In this western area, agriculture, industry, and organized community life were dependent not only upon transportation but likewise upon extensive engineering enterprises to provide water for irrigation, and for industrial and domestic uses. Whatever the relative importance of geographical and technological frontiers in the antebellum days, technology and its offsprings, industry and commerce, were obviously the crucial factors in making the Far West an integral part of the nation.

The public domain to which the Homestead Act of 1862 applied consisted of one billion, nine hundred million acres. Of this, nine hundred million acres had come into private hands by 1890. In other words, science and invention, their influence filtered through industry and trade, made it possible in this brief span of twenty-eight years to extend civilization over a larger area than that which had been settled during the previous two hundred fifty years. In their earlier, less intense manifestations, these same forces had caused Jefferson's millenium allotted for settlement to the Mississippi to shrink to a mere half-century and Clay's five hundred years to less than a puny twenty-five. Before the end of the nineteenth century the whole continent was settled, and the frontier in the sense in which Turner used the word in his Chicago address was a thing of the past.

Looking back to the year, 1848, when the Carnegie family came to America, it would appear that the chief focal points of opportunity for exceptional talent, then as now, were in centers of population rather than in the sparsely settled areas of the West. Gold and position on the Pacific made California perhaps an exception to the general rule. However, in spite of its admission to the Union in 1850, California remained for many years essentially a separate empire, and its place in the national industrial picture was small. In any case, Horace Greeley's admonition, "Go West, young man, and grow up with the country!" was not addressed to genius, and it seems to have originated, not in New York City but in the Middle West. Greeley
apparently borrowed the idea from a phrase of the same import published in the Terre Haute, Indiana Express in 1851, some three years before Greeley gave it national circulation. Wherever it originated, we may well imagine that its economic appeal was highly charged with romance.

Even the Carnegie family back in Scotland, caught in the throes of technological unemployment found romance mingled with the economic urge that beckoned to America. In his autobiography, Mr. Carnegie concludes a reference to the situation which made the family leave Scotland, with these words: "The decision was taken to sell the looms and furniture by auction. And my father's sweet voice sang often to mother, brother, and me:

"To the West, to the West, to the land of the free,  
Where the mighty Missouri rolls down to the sea;  
Where a man is a man even though he must toil  
And the poorest may gather the fruits of the soil."

From the vantage point of Dunfermline, Pittsburgh in 1848 was indeed a distant frontier, but historically the actual frontier had advanced westward. To borrow a phrase from art, Pittsburgh was rather "in the middle distance" between the settled East and the wide spaces to the west. Its significance at the time Andrew Carnegie appeared on the scene lay chiefly in its emerging function as a national workshop. In the second half of the nineteenth century when Mr. Carnegie was making his imprint upon American industry, settlement of the West still bulked large in public policy. But the crucial problems of American society were gradually shifting from geographical to industrial and technological frontiers.

Settlement after 1850, as previously indicated, was accomplished primarily through the expansion of industry and of domestic trade and commerce. Foremost among the instruments of settlement was the railroad. In order to build and equip railroads and to make better agricultural implements available for cultivating the lands of the West, the steel industry had to be improved and expanded. While this was happening, the great food-producing industries, meat packing and milling, and the lumbering in-
Industry were developing and were providing new market outlets for the products of forests and of newly settled areas.

In the period toward the end of the century when the western frontier was passing into history, Chicago as a focus for transportation, the Atlantic and Gulf ports as centers of foreign and coastwise trade, New York, Philadelphia, Boston, and even London as sources of investible capital and numerous other centers of industry and commerce, all bound together by an expanding network of steel rails, played significant roles in settling the territory beyond the Mississippi and in making the Far West an integral part of the nation. In this final phase of subduing the frontier, Pittsburgh naturally played a major role, and Andrew Carnegie, while pursuing his triumphs on the industrial frontier, became at the same time *ipso facto* an important participant in the final conquest of the geographical frontier.

The reason why men of insight could not imagine anything approaching the speed with which the continent was actually settled lay less in their inability to imagine the vast regions of science and technology revealed in the nineteenth century. Jefferson and Clay surely did not shine as prophets when they undertook to predict the time factor in the settlement of the West, but they were no wiser of the mark than men who at different periods have assumed to set limits upon the expansion of technology. Milton Wright, in his book on inventions, first published in 1927, refers humorously to an oft-repeated story of a Patent Office employee who, years before (1843, in fact) resigned his post because there remained nothing more to invent. Forty years later, in 1883, a prominent economist, David A. Wells, published a work entitled *Recent Economic Changes*, and the scene of the eighties looked about the same to him as that of the forties had looked to the Patent Office clerk. Illumination by gas, he observed, by replacing the kerosene lamp and the earlier tallow candle had made man supreme over darkness. Steam power applied with many refinements had built up a factory system of incredible
efficiency and volume. Applied in the field of transportation it had facilitated the rapid exchange of goods and ideas without regard to distance and had made it possible for man to go quickly by land or sea from one end of the world to the other. The miracle-working telegraph, he noted, had met all conceivable requirements for rapid communication. With such appointments for carrying on a complex and a comfortable civilization, he found it impossible to conceive of any further significant advances in technology.

At the time when David A. Wells saw society in static equilibrium on the basis of 1883 technology, Mr. Carnegie was setting a dynamic course not only as regards industry, but equally with respect to public affairs and social responsibility. Industrially this was the epic period of the Carnegie Associates, the period when H. C. Frick came into the group high up in the ranks and Charles M. Schwab started at the bottom. During the last two decades of the century, the several Carnegie units were showering the nation with iron and steel. Mr. Carnegie had long since initiated the use of trained chemists and had brought the Bessemer Process to Pittsburgh. In these years world leadership in steel output passed from Great Britain to the United States. Development of the open hearth process marked another new epoch in steel technology. As demand for steel rails tapered off with completion of the railroad, structural steel took its place, and foundations were laid for the enormous expansion which came with the skyscraper. Mr. Carnegie tried to concentrate his business efforts more and more on steel. The adage attributed to him, "Put your eggs in one basket and watch the basket," was an expression of this principle; but the basket was so large that watching it made him a dominant figure in the business life of the nation.

The story of the western frontier is our great American saga. We like to dwell upon the enterprise, the heroism and the toil which our fathers from diverse lands poured forth upon it, but in the end, we still think of it as the land of opportunity.
And so it was to those who had the gifts and access to the tools needed to conquer it. But the opportunity latent in the frontier did not mean a chance for the ordinary settler to get something for nothing. Notwithstanding land grabs and other abuses, mostly corporate, growing up with the country was a laborious task. What transformed the three and one-half cents an acre which Jefferson paid for Louisiana into the billions upon billions of wealth in the same territory today was intelligence, enterprise, heroism, gruelling effort and saving. The final step in the process was the continuing investment in productive enterprises of savings which were greatly augmented by eastern and foreign capital.

Obviously there was a potent lure for ambitious, restless and enterprising people in the idea of free land beyond the horizon, but the land was free only in the sense that pioneers could have it if they would forego the comforts and safeguards of a settled community and invest their time, their energies, their varied abilities and their capital to subdue it. These investments through which the frontier was opened and frontier settlements brought to maturity far exceeded any value which could have been ascribed to the raw land. The frontier thus became an instrument of discipline and of selection, and these were the chief factors in making Americans the kind of people they had come to be by the end of the nineteenth century. Inference that opportunity for that kind of people became circumscribed with the disappearance of the frontier would have slight basis in fact or theory.

The western tide of empire started its great surge across the American continent with the Louisiana Purchase in 1803. A century later, when Andrew Carnegie retired from business, the task of settlement in which his domain of steel had played such a vital part was complete and the twentieth-century industrial revolution was just getting its stride. In 1903, a writer from Germany, Ludwig Goldberger, who had paid a brief visit to America did what casual visitors sometimes do; he forthwith wrote a book about it. The book, though widely discussed, cannot claim place with Bryce's American Commonwealth or de Toqueville's Democracy in America a hundred
years ago, nor even perhaps with the work of such current commentators as André Siegfried, André Marois, and H. G. Wells, but Goldberger gave his book a most illuminating title, Das Land der Unbegrenzten Möglichkeiten (The Land of Unbounded Possibilities), and that was some dozen years after the geographical frontier had vanished. Burns' thought was far from frontiers when he wrote the famous lines,

"O wad some Power the giftie gie us
To see ourselv as ither see us!"

but an outsider's view of the American scene in the early years of the century helped our perspective. However much lack of free land may have changed the channels into which American energy and capital have been directed in these later years, it has obviously neither arrested economic progress nor done away with opportunity. Were mention of the automobile, the radio, the airplane, and motion pictures is enough to show that disappearance of geographical frontiers has not brought stagnation nor choked initiative. While private industry has been supplying us with every conceivable convenience, governments have built networks of hard roads into every corner of the land, and with imposing structures in which, in the typical case, engineering and art are happily blended, these superhighways have been carried boldly over and under our waterways and our mountains. Government, private enterprise, and voluntary groups devoted to every conceivable end, have collaborated in utilizing technical facilities to stimulate commerce and social intercourse, and to tie the remote sections of the country together in an entirely new pattern of American life.

Invention of new facilities for living and for social intercourse does not necessarily mean that their benefits have been well distributed among all the people, but it can scarcely be denied that average wages have advanced, hours of labor declined, and standards of mass comfort steadily risen. Notwithstanding stubborn
persistence of grievous inequalities which it remains the task of a new generation to ameliorate, history reveals no parallel to the wide dissemination of the fruits of scientific and technological advances in our time. The people whose lot has been improved even include millions from the least favored social strata of the least favored nations of Europe, for from these came the bulk of our immigration in the years following disappearance of the western frontier.

It required centuries for the cultural and scientific ferment which started with the Renaissance to gain momentum. During the long period of slow progress social effects of the more important inventions were of course great, but viewed in historical perspective, changes ushered in by the English Industrial Revolution, as augmented and intensified in nineteenth-century America, could scarcely fail to assume an aspect of finality to the onlookers. And even when the century was drawing to a close it was no more possible for the generation of the Columbian Exposition to imagine the world of the "Century of Progress" or to contemplate a vision of the "World of Tomorrow" than it was for Thomas Jefferson to imagine himself travelling to Pittsburgh in a Pullman sleeper.

The twentieth century, however, has brought a change of outlook. Thoughtful people of our day look forward to even greater scientific and technical achievements than those which the past few generations have produced. The August 1938 issue of SCIENCE contains a symposium of the views of prominent scientists upon which we have drawn extensively for the introductory section of our Social Relations Program. Arthur Compton, of the University of Chicago, in a contribution to the symposium predicts that within a century our limited petroleum supply will be greatly supplemented by artificial liquid fuel and he expresses the view that one of the major problems of physics in the future will be to investigate all sources of energy, including the inexhaustible flow of energy in the form of radiant heat from the sun and stars.
Similar views about their respective fields are advanced by other scientists. Professor Urey of Columbia University predicts that chemistry will supply men with better clothing from better fibres of the textiles with which we are familiar today and will produce many textiles as yet unknown. New fertilizers, he believes, will enable the arable areas of the earth to support greatly increased populations and he might have noted the progress already made in growing plants without soil. Houses, he thinks, will be made of materials not yet discovered and will be more durable, more beautiful, and more easily constructed. Not only is chemistry in process of transforming our daily lives, but the chemist and his colleagues in the biological sciences have opened possibilities for standards of physical and mental health on levels which have never been approached. But it would be "carrying coals to Newcastle" to remind this audience of the hundreds of promising projects under way in scientific and technical laboratories from which we may expect new machines, new processes, new products, and new modes of life.

Naturally we cannot assume that because scientific discovery and invention have advanced at an accelerated pace during the past few decades that they will continue to do so in all years ahead. But even if there should be a tapering off of these developments, there is ample scope for creative achievement and limitless opportunity for better living in discovering ways and means of making available scientific and technical knowledge within the orbit of enlightened social policy and purpose. Dr. Compton concludes the article to which reference was just made with this significant comment: "It has become clear to all who have their eyes open that the great power given to man by his new knowledge of the world may be used either to his good or to his harm. Without cooperation, we have seen that this knowledge can not be made fully effective. If men divide into antagonistic groups it may become terribly destructive. When it becomes sufficiently evident that the welfare of the more powerful communities depends upon cooperation rather than upon strife with others, we may expect such cooperation to be not far distant. The growth of physics,
through its great advances in communication, its highly specialized and interdependent industries, and the great power given to industrially organized communities, is rapidly bringing about just this condition, where strife endangers every one and cooperation gives rich rewards to all. Thus, not only does physics need well-organized civilization for its own development, but it is in itself a powerful factor in stabilizing such a cooperative society."

Carnegie Day is an appropriate occasion on which to consider the problem which Professor Compton has stated. Business was not the most important aspect of Andrew Carnegie's contribution to human progress despite his business genius. In the early eighties, building upon his European background, he undertook to exert an influence upon British politics through journalism and British Tories looked with apprehension to a time when he might sit in Parliament and direct the influence of his great wealth toward upsetting their cherished institutions. These fears were soon dissipated when he disposed of his papers and in 1886 published under the title, Triumphant Democracy, a book which was a peon of praise for things American and which won for him the sobriquet, "The Star-spangled Scotsman." As the story is told in the Burton Hendrick biography, the brilliant George William Curtis chaffed Carnegie about his extravagant presentation. It reminded him, he said, of Californians and their climate. "It's all sunshine." "Where are the shadows?" To which Carnegie replied, "The book was written at high noon when the sun casts no shadows."

Reference to George William Curtis suggests another side of Mr. Carnegie's activity. One of the most fascinating parts of the Hendrick biography is the record
of Carnegie's associations and correspondence with the great of many lands. He utilized to the full his exceptional opportunities for drawing personally upon the intellectual and spiritual resources of mankind. This gave him first-hand knowledge of many types of endeavor for human betterment and is in part responsible for the discrimination with which his own program of service was developed and carried out. The story of his contacts with educators like Andrew D. White, Daniel Coit Gilman and others throws much light upon the reasons which led him to do the things he did do and to omit some of the things which he was urged to do. Notable among the latter was his decision not to endow a national university for reasons which now appear unanswerable.

Already in December, 1868, a year after Mr. Carnegie had moved from Pittsburgh to New York, he wrote a monograph which contained the germ of his Gospel of Wealth. At that time his income was over $30,000 a year and he expressed concern lest he become unduly rich. When he published his ideas in the North American Review in 1889 they had been ripened under influences of the kind just outlined and Carnegie had come to possess one of the world's greatest fortunes. It would be gratuitous, even presumptuous, for me to attempt in this hall to appraise accurately the portion of Andrew Carnegie's adventures in service to the issues which confront our times, but in both the conception and execution of his Gospel of Wealth he became a hardy pioneer on an important frontier of achievement.

Philanthropy is an ancient institution but Andrew Carnegie rejected the idea that giving is merely a voluntary expression of benevolence and made it definitely a public obligation. From this premise it follows that the obligation should be discharged with informed regard to public needs and this became the keynote of the great research and service foundations which constitute a unique American contribution to social advance. The forms in which Carnegie concentrated benefactions upon culture, teaching and research, revealed remarkable insight. Carnegie show-
Funds have had profound influence on patterns of twentieth-century philanthropy. The size of Mr. Carnegie's fortune gave a range to his endowments which only the Rockefeller fortune could parallel. But when we consider what private foundations, notable among them our own Falk and Buhl Foundations, are contributing not only to understanding of human problems but also to competence in handling them, we realize what splendid pioneering Mr. Carnegie did on this new frontier.

Social research is not confined to foundations which concentrate on the social sciences. Our engineering freshmen were greatly thrilled a fortnight ago when our neighbor, Doctor Meidlein, laid before them some of the products of the Mellon Institute Laboratories and pointed their import for daily living. Research of the kind done by the Mellon Institute and its affiliate, the Air Hygiene Foundation, and even much of the research in laboratories of industry is related at many points to social problems. Several of the important foundations like the Brookings Institution, to cite a single example, apply themselves almost exclusively to the Social Sciences. But activities in that field are by no means confined to research in a narrow sense as the teaching side of our own Falk endowment so well attests. Among the countless variety of agencies which approach human problems from the angle of science, universities and professional schools occupy a high place. Work of great distinction is also performed by many divisions of local, state, and national governments, and be it noted, by the League of Nations secretariat.

The aim of social science is to approach its problems with methods as scientific and as free from the bias of unproved assumption, of misdirected emotion, of provincialism and of unenlightened selfishness as those which dominate physics and chemistry. Progress along successive frontiers has been substantial. Obstacles in the way of controlled experiment, the inevitably high degree of contingency in
analytical procedures, the fact that units of study consist of variable human beings, that environmental conditions are never in equilibrium, and that results are not easily demonstrable—all these present difficulties and mean that conclusions are frequently couched in terms of varying degrees of probability rather than in definitive laws. A further difficulty has to do with techniques for observing and appraising data. Keen discrimination is of course always required in handling data but today, press, radio and a wide variety of agencies disseminate information which is frequently pertinent to scientific study, and some of them also disseminate misinformation, much of it in subtle forms. The wary scientist is better able than the layman to evaluate these barrages of argument and suggestion but, even though he escape personal contamination, the influence of misleading propaganda on the general public is one of the serious handicaps in appraising social situations.

Momentarily progress may not depend as much on cloistered research as on experience in utilizing knowledge already at our disposal. Social science is not unique in this regard. The principle of learning by doing is universal and many experiments in social affairs, even some which scholars do not sanction, prove to have value either positive or negative. Be that as it may, civic zeal and effective machinery for utilizing to the full, knowledge which we now possess are clearly essential.

Municipal government is not a hodgepodge of inefficiency, waste and corruption because we lack knowledge of public administration, but rather because of formidable vested interests in the status quo and also, it must be acknowledged, because of personal preoccupations and gross indolence on the part of many intelligent and well-meaning citizens. The same obstacles retard taxation reform, and they affect numerous items of state and federal government. In large measure, lack of an intelligent world
order which forms the background of present hostilities abroad springs from similar causes. Some of these difficulties are possibly one price we pay for our liberties and for our freedom to muddle through—but further study and experience may show them in part as growing pains of a democracy which did not keep pace with its technical environment.

Fatuous optimism about the current scene is as little helpful as counsel of despair. But I wonder how the Western World looked to the few men who saw and were competent to appraise events when Turks were at the gates of Vienna. How did civilization look to the larger group who could comprehend what they saw when a Corsican general drenched Europe in blood? How narrowly we escaped losing our own feebly-held independence in the accompanying upheaval! Some twenty-three years ago we set out with high enthusiasm to help save the world for democracy but we did not follow through. As we deplore the low estate of the League of Nations which Woodrow Wilson founded, do we perhaps forget how the old Articles of Confederation must have looked from the vantage point of Valley Forge, or by what a narrow margin the Constitution was adopted, or how it took a civil war to cement our union?

The glories of the past were not always so glorious to the bystanders. To our many of their contemporaries, heroes were men of quite inferior clay. Every age and every endeavor has its skeptics. Some three or four years ago in Chicago, we were entertained at dinner in the family of an engineer who amused us by reading a sour-rilious tirade which we readily attributed to a current newspaper. After we became sated with these imaginings, our host revealed the date line, November, 1857! If he had been an historian instead of an engineer he would probably have selected a diatribe about George Washington or Abraham Lincoln.

Just as we deplore present leaders and yearn for the good old days, so too we sometimes view the current scene and wonder whether we the people are what we used
be. Lincoln said the Lord must have loved the common people because he made so many of them and when he was trying to win the war with grafters and incompetent generals, he may well have added under his breath "and He made them so common!"

Even Washington did not have a high regard for the deserters and the politicians of the Continental Congress. Still it may be true that we are not as well equipped as our fathers to solve their problems but I submit that we are vastly better equipped to solve our own. When I say equipped, I mean ourselves, not our tools. But we also have the tools and when we compare social with physical science let us not forget that it was a long, weary and obscure road from a Galileo to a Compton.

Technology has given us command over goods vastly greater than man has ever known or contemplated. We learned how to make them; is it too much to hope that with all the means at our disposal we can learn how to divide them and at the same time to build and conserve in our civilization everything essential to the destiny and the dignity of free men?

American society has now carried its advance guards from a geographical frontier on an epic journey across frontiers of industry, commerce and finance, frontiers of science, frontiers of technology, to these final frontiers of human relations and world order. Well we may pay tribute to the wisdom with which Andrew Carnegie dedicated his fortune and helped pioneer the way.