Some Factors in Municipal Engineering*

The Role of Engineer in the Development of Municipalities

By Morris Llewellyn Cooke

THE role which the engineer is to play in the development of our municipalities will depend primarily upon the attitude taken by the profession as a whole toward what appears to be a wonderful present opportunity and also upon the ability with which the work of the engineer is brought to the attention of the public. There is no real reason why municipal engineering should not be made to comprise most municipal undertakings.

The test by which the role of the engineer is to be determined will be the development in our profession of a genuine spirit of public service. The community is apparently ready to accord the engineer a leading, perhaps a controlling part, if the engineer will consider that in every decision and act there shall be the clearest possible recognition of the public interest. We should remember that democracy can use the engineer without giving him either a leading or controlling hand in affairs. This use of engineers has been conclusively demonstrated by public utilities companies, especially during the last thirty years. In most of our larger cities during this period there have been operating one or more so-called "big business" men who have built large fortunes and a certain kind of fame in the development of enterprises in which engineering was an important factor and in which it should have been the paramount and controlling factor.

In these enterprises engineers have necessarily been used, but not in a leading or controlling capacity. As a profession we may as well face this problem and decide whether in the further upbuilding of our cities, we are to serve democracy as to be warranted in demanding and to be entitled to receive a position comparable to the real importance of our work.

Difficult as it is for some to realize it, democracy will not ultimately be deceived. In the long run democracy's sense of values is unerring and that profession which considers only its own and its clients' interests without a proper regard for those of the general public will be accorded the same position which history has always given those who are led by no higher star than self interest, however enlightened that self interest may be.

These suggestions out of my personal experience are offered in a spirit of the fullest optimism. I firmly believe that the engineering profession is rising to meet its broader responsibilities with perhaps an even more quickened pace than that which during recent years has wrought such sweeping changes in the medical profession and that of architecture. As with everything that is worth doing, however, our course is fraught with dangers.

There are certain kinds of engineering in which financial and almost all other kinds of preferment depend on an attitude of mind which, while not necessarily anti-social, does not provide sufficient opportunity for entertaining a virile public point of view. As a representative of public, rather than private interest, it is my duty in choosing the advisers of the city which I have the honor of serving to satisfy myself not only as to the ability of those we employ, but also as to their disinterestedness—yes, their public point of view.

No matter how able a man may be, how broad his experience nor how high his standing, his service to those who employ him must at all times be consistent with the public interest if, from my point of view, he is to be available for public employment.

Judged by this standard, there are in certain fields of engineering almost no engineers who are at present available for the service of the public and who at the same time have had sufficient experience for large undertakings. In the past few years we have had unusual opportunities for seeing at close range the professional attitude of those equipped with the technical knowledge required in advisers to cities on utility matters. It has been practically impossible to secure the services of those with reputations already made in the electrical field. Some of our experiences could be considered on the whole rather amusing were it not for the fact that we are left under the obvious conclusion that for the average city official to get good advice on these matters, is well-nigh impossible. What is more objectionable is that this condition is one quite generally recognized as true by city officials. We hear a good deal of complaint on the part of engineers that as a profession we are not chosen more frequently to serve on public service commissions and for similar technical work.

Perhaps in our experience may be found at least part of the reason for this condition. Of course, when a city wants advice on a subject such as this the matter is usually one of considerable importance, often involving large sums of money, and in reaching conclusions the city official should not be dependent for advice on junior members of the profession.

I must be careful to emphasize the fact that no criticism of any individual is embraced in these remarks and that I am simply pointing out a danger almost necessarily confronting the engineering of an industry dominated by financiers having no knowledge and little appreciation of such professional standards as engineers are supposed to have.

The same tendency is to be noted in other branches of our profession. An eminent authority on concrete, who is in intimate touch with the men who are practicing in this line, was recently asked for the name of an engineer who was not in any way affiliated with the large manufacturers of this material, and after considerable study was able to think of only one man. There is nothing necessarily improper in this situation—it may simply mean that all the competent men in this line receive retainers from manufacturers. Some months ago I wanted to retain an engineer fully posted on the details of a certain sub-division of railroad operation. It was extremely difficult to find a man without recognized affiliations which would preclude his retention. Again I am informed that there are no asphalt experts who do not receive retainers from the manufacturers. It is a condition which should be provocative of thought by engineers.

The conditions reflected in these statements are undoubtedly improving and as we recognize the dangers with which the very existence of certain branches of our profession have been threatened, necessary and remedial steps will be taken. But in any consideration of the opportunities afforded by the municipal field for engineers we cannot ignore such basic considerations.

I would not have you think that I do not fully appreciate that our present situation is the natural outgrowth of the fact that all of the foremost engineers have become prominent through the service of private interests. Public employers up to the present have been almost a negligible factor in furnishing opportunity for employment or for the making of a reputation. It is perfectly natural, and it is in accord with former ideals that engineers should feel their first duty to be to these private employers. But in this time of broader and deeper social consciousness, it seems to me that this standard must change.

The point I wish to make is that engineering has now reached the stage of development where it has become a profession in the highest sense of the word. The engineer being a scientist, his responsibility should be for the development of facts, regardless of whose advantage they may serve. I have in mind that the service of an engineer should be as the service of a judge and as opposed to the service of a lawyer who confessedly seeks out and represents the interests of his client, and often "makes the worse appear the better cause." This is justified by the fact that lawyers are not scientists, and by the assumption that there shall always be opposing counsel.

In the medical profession during the last generation, largely owing to the enlightened leadership of the American Medical Association, there has been inaugurated a great forward movement with the slogan of "preventive medicine." The medical profession in a way seemed to launch a campaign to wipe out its opportunity for a livelihood. There were, and I suppose still are, doctors who held that in advocating "preventive medicine" the profession was standing in its own light. The profession, however, is held in higher esteem than ever before. Under the new conditions there is a broader field for the activity of practitioners, both medical and surgical, than had ever before been available.

On the contrary, in inviting the attention of our profession to the municipal field, we are apparently opening the door of opportunity to tens of millions of dollars worth of work which is not now either considered engineering nor carried on by engineers. The municipal field is almost virgin soil so far as engineering is concerned. As recently as ten years ago the problem of snow removal which is being discussed as a part of this day's programme, was so absolutely in the hands of thumb rule, and in many instances even of inexperienced men, that it is probably true that in no city in

this country was it being attacked either by engineering methods or by engineers. Yet it will not be denied that on work of this kind, in which one city spent nearly \$3,000,000 in six weeks last year, there is in reality an engineering problem of considerable magnitude.

If this municipal field is to be one in which engineers of ability, sincerity of purpose and high ideals are to find a permanent and satisfactory outlet for their energies, our profession acting as a profession will be one of the main agencies bringing about certain fundamental changes in the attitude of the public. In the minds of too many engineers, participating collectively in matters pertaining to municipal engineering means "getting into politics." Architectural work being a part of the business of the Department of Public Works in Philadelphia, we have had the co-operation of the American Institute of Architects and of its Philadelphia chapter from the beginning. We have made many demands on them and in every case have met with generous and enthusiastic response. This assistance has been entirely apart from the help rendered us by individual architects. We have had the constant, indefatigable and valuable support of the secretary of the American Society of Mechanical Engineers in our efforts to maintain the highest professional standards in the work of the department. But engineering bodies as such have given us no assistance and as far as I know have taken no part in the discussion of federal, state and municipal engineering, except in the matter of conservation, which for some reason is considered as innocuous from an engineering standpoint as a prayer-meeting.

Many municipal engineers in this country are beginning to adopt the European system of employing non-residents for certain highly specialized positions. Whenever this is practised it excites criticism and abuse. As yet no technical organization, so far as I know, has recognized the opening thus made for technical merit and given moral support to the movement. Again, I have tried to get support from organized engineers in the obviously necessary procedure of employing experts outside our regular staff, but without results.

From an engineering standpoint any scheme of highway construction which does not include an ample repair programme, is futile. In our community this is not at all understood because the plan has never been followed. It would seem a proper function of an engineering body to educate the community to this point of view. But, as a matter of fact, engineers as such have taken so small a part in public discussions that the layman with us settles more engineering questions than the engineers themselves and the taxpayer foots the bills.

The public to-day is undoubtedly impatient for "results." It has an unmistakable liking for the men who "do things." It has little patience for experimental work. There was introduced in our Philadelphia City Councils, an appropriation of \$50,000, for an experimental test roadway and the bill was defeated on the ground that I had stated that the man who was to spend the money was one of the best experts on bituminous road-work in the country. It was held that this statement and the appropriation were inconsistent—that either the engineer was less expert than I had claimed or that we did not need an experimental test roadway. The title of the road in the appropriation bill was changed to read "service test roadway" and the bill was passed by a good majority.

The public must be taught that public service is not different from private service in that forward steps come frequently, even usually, as the result of a large amount of preliminary investigation. Again, the public, of which please remember we are a part, must be educated to place more responsibility on individuals, thus making it possible to do away with the great inefficiencies which inevitably accompany board and committee management. As long as we have boards and committees they will vote—and they will insist on voting—on matters that are not questions of personal opinion, but questions of fact which ought to be determined by the facts. It is one of our duties as technical men to carry on a propaganda which will show to the public the difference between these problems of policy and public interest, that are properly settled by public opinion and those scientific problems which are improperly settled unless they are settled according to the facts. Mr. Frederick W. Taylor, past-president of the society, in recent lectures has very forcibly and lucidly

* Presented at the Annual Meeting of The American Society of Mechanical Engineers.

suggested this fundamental difference. For instance, my opinion may be as good as that of any other citizen's as to how fast an automobile should be allowed to operate in different sections of a large city. The opinion of any member of this society is as good as that of any other citizen as to the penalty which should be inflicted for false registration. On the other hand, the designs for a bridge; or the specifications for a sewer; or the plans for the laying out of a public park; or the organization of the police department; or the fighting of fires; or the elimination of mosquitoes are necessarily the work of experts. Such work will always be indifferently done if done by voting; whether the voting is by the people at large or by a committee or board acting for the people. Notwithstanding all the boards and commissions that are created in the generally approved laws of to-day, there should be no uncertainty as to what questions they may vote upon. It is, therefore, one of the duties of the educated to carry this message to the people, and in doing so I do not think there will be any more powerful method than to give the great mass of the people a larger and larger knowledge of expert work.

Lord Kelvin is the authority for the statement that the physicist who has discovered some great principle or invented some new process in physics should be able to explain it to the first man he meets on the street—both what the discovery is and why it is useful; or failing in this he should go back to his laboratory and put in some more time. If Lord Kelvin could say this about discoveries in physics, surely our city officials and the public service engineers with whom they co-operate should take the position that their work is capable of being fully explained to those who are footing the bills.

Another difficulty confronting the engineer in public office is the restriction placed upon him in making proper expenditures. I have been given practically no money for purposes not contemplated by the City Councils at the time the appropriation was made. The result has been that whenever any emergency has come up it either had to be paid for out of private funds or we had to wait until the legislative machinery could be put to work to make the necessary appropriation. Every administrative officer occupying a position of wide range and responsibility, whether an engineer or not, should have a certain amount of money placed at his own disposal and guarded only by the necessity for ultimately explaining its expenditure. In requesting an appropriation of \$10,000 for such unforeseen purposes, I agreed with our City Councils that if money were granted I would write a one-hundred word description of the purpose for which the money was used, such explanation to accompany each warrant drawn against the item. Even this does not go quite far enough, as my experience has shown. There are certain legitimate and necessary expenditures for expert services which should not be divulged for months after the expenditures are made. So that unless city officials are to be placed at a serious disadvantage in their negotiations with private concerns, certain moneys (representing, of course, a very small, almost negligible, percentage of the total appropriation) must be placed at their disposal for a more or less free disposition.

Experience has shown that in our department, spending as we usually do over \$10,000,000 in a single year, for instance, we could profitably spend \$25,000 a year for research and investigation work and for the employment of experts. Ninety per cent of the expenditures drawn against this amount could be explained on the vouchers as drawn. It would probably be wise to allow the remaining 10 per cent to be explained or not in the judgment of the administrative officer. This would only be following the practice followed in practically every city of the country in the expenditure of funds for the detection of crime.

Especially in engineering work almost the entire absence of what may be called a financial programme is the great handicap. Private institutions can go along for years on a straight operating basis and without the necessity for undertaking any extensive construction work. But a growing city—and all our cities are growing cities—must necessarily have to spend a considerable part of its income on construction. This can be done with intelligence only by taking a long look ahead. For instance, at the present time in Philadelphia we are facing expenditures of from \$20,000,000 to \$25,000,000 on a sewage disposal installation; perhaps \$40,000,000 for rapid transit; with extensive additions to our water supply system, not to mention other millions which could profitably be spent on sewers, bridges, grade crossing removals and a much needed programme of modern highway construction. There is probably no city in the country that is even attacking this obvious business problem in an intelligent or energetic way. Reform will not be brought about until the community, and especially the business part of the community, is educated as to its necessity.

I am not one of those who feel that all our short-

comings are "the fault of the people." I would rather assume my share of the responsibility for conditions as they are and then join with my professional associates and the community at large in bettering them. If we engineers are to have any prominent part in this there are fundamental changes which we shall have to make in our own equipment for the work. In the first place, we have to get rid of the now old-fashioned idea that advertising is a crime. I admit that as a part of my work as a public official I put in a great deal of thought on what may be quite properly called advertising. By that I mean that I pay less attention in my reports to dignity of form and diction than to making them sufficiently interesting to be read. It is only as we engineers who are public officials learn to make the public, sometimes against its will, understand our work, that we are to get that degree of popular support for it which will make it possible for it to be done in an efficient manner.

In my opinion it is going to become more and more a necessity, not only in public but in private work, for engineers to be able to popularize what they are doing. It is true to-day that a man who wants to do really good and efficient work can do so only after an aroused public opinion. You cannot drive people in a democracy. So I admit that in offering employment to an engineer, other things being equal, I want what might be called a good advertiser. You can secure appropriations for work more easily when it is well advertised. The Panama Canal is a good example of this principle. Again, advertising is the best possible check against ill-advised expenditures. In building our Byberry and Bensalem Service Test Roadway we erected sign-boards on each of the twenty-six sections giving to the layman the exact method of its construction in non-technical language. If the public knows how a street is supposed to be constructed or cleaned, you do not require as many paid inspectors on the job.

The development of some varieties of municipal engineering is absolutely dependent upon the development of public opinion and must proceed with it. The matter of street cleaning is largely a question of an improved public taste in the matter of street paving. Unless streets are well paved they cannot be well cleaned except at a prohibitive cost. To jump from one degree of cleanliness in this respect, to another, without a supporting public opinion, may be enough to wreck an administration and to set the tide of civic improvement running in the opposite direction.

The newspaper is the great educator in these matters to-day. But we are already using in Philadelphia moving pictures, parades, and exhibitions. The possibilities of these and other means of publicity are not yet fully understood.

Again, more effort must be put into humanizing public administration. The engineer shares with those who have had the opportunity for education, the mistaken idea that the man at the top is in a position to tell the man at the bottom what is good for him. The fact that our country was founded and has been perpetuated on the contrary idea has not seemed to affect the situation very much.

Take, for instance, the movement which has led to the formation of large numbers of business men's associations and improvement associations. This affords one of the very best examples of the present vitality of American public life. Our leading men should accept them as something that has come to stay and co-operate with them in such a way as to direct their activities into profitable channels. It seems to me they afford the most promising agency through which, in the first place, the thought of the public on civic questions can be crystallized, and secondly, through which that thought can be given expression in definite public procedure. I have found these associations ready and anxious to hear from men who had definite knowledge on matters of public interest. It should be the attitude of any engineer who wants to play his part in the community, to affiliate with one of these organizations and to help to make it an influence. You can rest assured that the man who is in public life for his own personal advancement is bending every energy to defile and degrade these institutions and to divert them from the high mission which they have it in their power to carry out, so they need our help.

In such a discussion as this, one cannot ignore the civil service. It is always a pleasure to say that personally I could not hold public office if it were not for the safeguards and reliefs that our Civil Service Act affords. At the same time, without repeating what I have said in other public papers on this subject, I want to call attention to one fundamental misconception under which the entire civil service question in this country apparently rests. Civil service appears to be founded on the theory that the best man for the position will apply for it. I think it is the experience of every employer of men—and this is especially true in filling the higher positions—that the best man will not

apply. On the contrary, you will usually have to go out on the scriptural highways and hedges to find the best man, and then having found him, fall on your knees and beg him to accept the positions offering such opportunities for public service and professional independence as are most likely to secure him.

This is the way to get good public servants. It is almost impossible to find men who have many of the qualifications for our work combined with a willingness to enter the public employ. Even if public employment should come to be considered more desirable than it is at the present moment, I think that this difficulty in finding the best man would still be encountered. Therefore, if we are to have the highest class of men in important engineering positions we must develop some merit system by which the appointing officer is given a greater opportunity than he now has of finding the man for the job. In this work it is possible for our engineering societies to take an important part.

I believe, for instance, that if the secretaries of the four national engineering societies could be authorized by their several councils to associate themselves as a civil service board to act in an advisory capacity to federal, State and municipal service commissions, it would be a decided step in the right direction. Suppose the president of the Borough of Manhattan should want to secure a competent engineer to put in charge of the highway department. Through the New York City Civil Service Commission he would state the problem to this suggested advisory board, which in turn would appoint, say, three engineers to act as his counselors in finding the man. The appointing officer would keep these counselors in touch with the search, and when he was ready to make a choice, secure their approval before entering into a contract. In this way the merit system would act as a check against favoritism, but would allow the appointing officer the widest possible opportunity to search for the best man available. It would probably not be found desirable to have all of the counselors from the engineering profession and one of the engineers should probably be an expert in the particular branch of engineering to which the position to be filled belongs.

This procedure is a radical departure from the present idea of civil service, which is based on the assumption that it is impossible to allow the appointing officer to have anything to do with the selection of his men. Even under the most advanced forms of civil service the appointing officer is confined to a full statement of the qualifications he is trying to secure. One never exactly fills a position with just the kind of man in mind when the search started. It is a question of compromise and the appointing officer is the one who is in the best position to know where concessions can be made and which among the several requirements are the most indispensable. There would be no objection to a check on this action of the appointing officer through some kind of a written test. But to choose men for positions paying from \$5,000 to \$25,000 a year on the results of a written examination is absolute folly. So far as I know, engineers have never taken a hand in the discussion of methods under which engineers shall be chosen for positions in the public service, and it seems to me high time they should do so.

Now a word of warning about the growing complexity of municipal operations and administration. Gladstone, fifty years ago, described the then complexities of governmental administration in these words:

"A protracted experience of public affairs not unattended with a high estimate of the general diligence, devotion and ability of the Parliamentary as well as the civil servants of the Crown has long convinced me that of the more difficult descriptions of the public business, apart from the simple routine, it is only a small part that is transacted with the requisite knowledge, care and thoroughness. We have undertaken in the matter of government far more than ever in the history of the world has been attempted by the children of men."

If he had sounded this alarm in the year 1914 he would have made it very much more emphatic. Take, for instance, any city's inspection service. In industrial establishments it has come to be recognized as desirable not only to inaugurate a full system of inspection from the inception of the work, but to gather together under the direction of a single head as many as possible of those engaged on inspection work. In our cities at the present time we have a minimum of inspection and yet we already have in good-sized communities at least ten or twelve different officials who periodically inspect individual houses and places of business. For instance, we have building inspectors, fire marshals, police, meter inspectors, of several different kinds, water waste inspectors, health inspectors, elevator inspectors, truant inspectors, garbage and street cleaning inspectors. These men, for the most part, work so independently of one another that if, on a given date, representatives of each of these types

should call at the same house they might do so without any knowledge that the others had been there. In the Federal service it frequently happens that the Post Office Department, Treasury Department, War Department (and perhaps other departments), each starts a representative from Washington to a town on the Pacific coast on relatively minor commissions, simply because the business of the Government has become so complicated that it has become impossible for us to utilize our men and resources efficiently even though we desire to do so.

As compared with what has become good practice in the industries our record keeping in the cities falls far short of what it should be. Even with this meager quantity of records those that we have are practically unavailable except to those who make them. Unless some radical reorganization can take place and some sound system of record keeping can be evolved for governmental units, one is appalled at the chaos that will come within the next generation, as memory and public opinion give way further to the reign of records and facts.¹

One distinct contribution which the group of engineering societies housed in this building can make to the solution of this question would be to establish in the Engineering Societies' Library a section devoted to a Municipal Reference Library. As a beginning a single alcove could be set aside under proper supervision and provided with the necessary index. There is every reason to believe that it would grow as rapidly as any other section of the library. At the present time there is no possible way for a city official to be sure that manuscript reports on engineering matters will be available twelve months after they are made. I have, for instance, a digest on American street cleaning methods prepared for our education by Day & Zimmerman, consulting engineers. It is an exceptionally valuable document. I know where it is to-day, but there is no possible machinery provided in Philadelphia or in any other city whereby officials can be sure that they can find such a report a few months after its preparation. This manuscript would be of very great value to any city official charged with the problem of extensive street cleaning. We would be glad to deposit this report in any library properly organized to receive it.

The same is true of literally dozens of reports on gas, lighting, electricity, garbage disposal, city planning, police discipline and others prepared under the present administration in Philadelphia. I know that, if this suggestion is adopted and such a library is started, city officials all over the country will be glad to have extra copies made of every report which should properly belong to such a library. In this way the results of the trouble and expense taken to study any one subject in one city would be made available for engineers interested in similar subjects all over the country. This agency could be started here at such minor expense compared with the value of the service rendered that I believe it is an obligation which our society can hardly afford to overlook, even though it should have to do it alone.

The more rapid promotion of municipal engineers due to moving from city to city, the development in our colleges and engineering schools of courses especially designed for those who want to follow this branch of engineering, the gradual but incessant cleaning up of city governments is going more and more to make municipal engineering a desirable calling. But nothing will go so far to remove the objections to municipal engineering as a career as the standardization of all engineering specifications. Prior to this, of course, a tremendous amount of research work must be done. Much of this can be done by the cities themselves, but a large part of it should preferably be done by research laboratories. These latter may be connected either with existing technical schools or preferably be operated in municipal colleges founded sometimes in conjunction with existing colleges and universities as an aid in the great municipal movement.

Even a casual survey will show the municipal field not only to be a big one, but one in which relatively little work has thus far been done. I hope that these random notes of mine may be at least suggestive. The fact that we are holding this public service meeting to-day is proof positive that we are working in the right direction and that the engineers of the country are determined to play their part in the further upbuilding of this great republic.

The Coal-Tar Chemical Industry in Germany and America

THE coal-tar chemical industry includes not only the manufacture of dyestuffs, but of a number of valuable medicinal preparations, and of various high explosives. It is based upon the use of crude compounds present to

a small extent in the tar obtained in the destructive distillation of coal in gas works and coke ovens. These 10 crude compounds—benzol, carbolic acid, anthracene, etc.—are separated from some 145 other substances present in tar, by fractional distillation. This is the work of the tar distiller. From the 10 crudes, nearly 300 more complex compounds, none of them dyes, are produced by highly refined and complicated chemical and mechanical processes, involving in most cases a number of complete chemical transformations. These serve as the materials for the manufacture of about 920 dyestuffs now in current use.

In the case of Germany, the domestic supply of "crudes" is amply sufficient. The color factories make all of the 300 intermediates required for Germany's own industry and a large share of those used in the very restricted production of other lands.

The industry has been chiefly developed by the inventive power of German chemists, combined with a wealth of technical skill and keen business management scarcely equaled in the history of any other branch of manufacture. The 21 German companies engaged in the dyestuff manufacture have a nominal capital of over \$36,700,000, on which dividends average 22 per cent. Actual profits often reach 50 per cent. The great excesses have been devoted to new construction. It is the most remunerative industry in the empire, the one most solidly and formidably entrenched.

In the United States the supply of coal-tar is ample, sufficient to provide in abundance all of the crudes required for the manufacture of the dyestuffs consumed in the country. The amount of valuable by-products not yet recovered in our present coking plants amounts to \$75,000,000 annually. With adequate provision to save all the benzol and tar liberated in American coke-ovens, enough of the 10 crudes could be secured to more than cover the world's consumption in making artificial dyestuffs.

If a commercial demand is present, American tar works can quickly provide all of the crudes needed, practically as cheaply as in Europe. In the manufacture of intermediates the production is restricted to four or five compounds, and these cover about one-quarter of the needs of American color works.

Our manufacture of heavy chemicals is well developed, able to expand rapidly, and supply all needed chemicals for the production of intermediates and their transformation into finished dyes.

The four establishments devoted to the production of dyes supply nearly 100 different colors, largely, however, as already stated, by "assembling" nearly finished products of foreign origin. These American firms are bold and enterprising, commanding about \$3,000,000 capital, evidently doing the best they can under existing conditions to build up a national industry.

Investigation shows that their advance, beyond certain limits, in the manufacture of either intermediate or finished dyes is persistently checked and prevented by the united action of German producers in underselling. The entire German color industry is so completely organized and accustomed to act as a unit in furthering the general interests, at home and abroad, that little success in facing their determined opposition has been obtained.

The present crisis has evoked deep interest on the part of all concerned—tar distillers, manufacturers of chemicals, manufacturers of dyestuffs, the many users of the same, and American economists in general—as to how the problem can be settled. There is no question but that our coke interests are ready to multiply their recovery plants for the production of benzol and tar, if a permanent market is assured. There is no question of the readiness of tar distillers to enlarge their plants for the production of an ample supply of the needed crudes if a continued demand is certain. American chemical works and American manufacturers of dyestuffs are ready to embark capital and experience in building up a distinctly American coal-tar chemical industry, using entirely American crudes and intermediates, provided there is adequate legislative prohibition against both "dumping" or unfair restraint of American trade by the arbitrary action of foreign monopoly permitted by foreign law and not as yet forbidden by our own. Domestic makers assert their ability to make at once over 90 per cent of the dyes now consumed in the United States, which are now patent-free, and state that the remaining tenth will soon be freed from patent restriction.

There seems to be a consensus of opinion that any rapid development and evolution of the dyestuff branch, on a scale commensurate with the nation's needs, present and prospective, can be assured only on the basis of an effective law preventing that action toward control of our markets by a foreign monopoly which is now prohibited to a domestic monopoly. Some of the largest manufacturers have personally informed the department that what is needed is not a tariff change, but laws placing a foreign monopoly on the same basis as an American one.

American economists feel that the present crisis offers the most favorable moment to decide upon a policy with regard to this one important industry, whether it is to be firmly rooted in American soil or whether the dependence upon a foreign source is to continue indefinitely. It is pointed out that each year elapsing increases in geometrical ratio the difficulties attendant upon any attempt to create a self-contained American dyestuff industry. Further, it is claimed that it is the only highly organized industry not yet brought on a broad and generous scale within the cycle of American economic activity.—*Report of Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.*

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¹ See Graham Wallis's "The Great Society," The MacMillan Company, New York, 1914.