

974.90 D343 1941D C.3 REPL.

WATER POLLUTION ABATEMENT IN
DELAWARE RIVER BASIN

NEW JERSEY STATE LIBRARY
NJD 974.90 D343, 1941d
Water pollution abatement in the Delaware River Basin c. 3

3 3009 00454 0490

Water Pollution Abatement

IN

THE DELAWARE RIVER BASIN

with special reference to
THE CITY OF PHILADELPHIA

A SYMPOSIUM
including remarks by Turner,
Neeson, Vaughan, and Wolman,
as presented at a conference
held in Philadelphia on
October 24, 1941.

Published by
The Interstate Commission on the Delaware River Basin
BROAD STREET STATION BUILDING
Philadelphia, Pennsylvania

THE INTERSTATE COMMISSION ON THE DELAWARE RIVER BASIN

BROAD STREET STATION BUILDING
PHILADELPHIA, PENNSYLVANIA

HON. ELLWOOD J. TURNER, *Chairman*
SENATOR ROBERT C. HENDRICKSON, *Vice Chairman*

MEMBERS OF COMMISSION

DELAWARE

MR. R. C. BECKETT
*Director, Division of Sanitary
Engineering*

HON. JOHN M. CONWAY
*Member, House of Representa-
tives*

MR. CHARLES H. GANT
*Secretary, Wilmington Board of
Harbor Commissioners*

SENATOR BURTON S. HEAL

NEW YORK

HON. MARIO J. CARIELLO
Member of Assembly

DR. M. P. CATHERWOOD
*Commissioner, Division of Com-
merce*

SENATOR EARLE S. WARNER

GEN. JOHN S. THOMPSON
Member of Assembly

NEW JERSEY

SENATOR ROBERT C. HENDRICK-
SON

DR. CHARLES P. MESSICK
Chairman, State Planning Board

MR. JOSEPH C. PAUL
*Member, Commission on Inter-
state Cooperation*

MRS. MARY G. ROEBLING
*Member, Commission on Inter-
state Cooperation*

PENNSYLVANIA

SENATOR WELDON B. HEYBURN

MR. F. A. PITKIN
Director, State Planning Board

HON. ELLWOOD J. TURNER
Member, General Assembly

COUNCIL OF STATE GOVERNMENTS

MR. WAYNE D. HEYDECKER
Regional Representative

STAFF

DAVID W. ROBINSON
Executive Secretary

JAMES H. ALLEN
Chief Engineer

HENRY A. ROWAN
Assistant Engineer

JESSE MERRILL
Chief Draftsman

WILLIAM A. WALKER
Assistant Draftsman

Water Pollution Abatement

IN

THE DELAWARE RIVER BASIN

with special reference to
THE CITY OF PHILADELPHIA

A SYMPOSIUM
including remarks by Turner,
Neeson, Vaughan, and Wolman,
as presented at a conference
held in Philadelphia on
October 24, 1941.

Published by
The Interstate Commission on the Delaware River Basin
BROAD STREET STATION BUILDING
Philadelphia, Pennsylvania

944.90
D343
1941d
C.3 Repl.

P R E F A C E

On Friday, October 24, 1941, more than two hundred representatives of public and private agencies, along with interested citizens, gathered at the Engineers Club of Philadelphia for a luncheon-forum meeting on water pollution abatement in the Delaware River Basin.

This conference was called for the general and specific reasons outlined on the following page: its success was assured by the remarks of the four program speakers which comprise the body of this publication.

Three organizations pooled their efforts in the planning and management of this meeting: The Interstate Commission on the Delaware River Basin; the American Society of Civil Engineers, Philadelphia Section; and the Engineers Club of Philadelphia.

CONFERENCE OBJECTIVES

I. General

1. To exchange ideas, opinions, and experiences; to present facts and thus encourage public interest in and support of water pollution abatement in the Delaware River Basin.
2. To explain and analyze conflicting points of view and misunderstandings.
3. To inform participants of the general and technical problems involved in the Philadelphia Sewage Disposal Program.
4. To advance the public objectives of the sponsoring agencies.

II. Specific

1. To express a continuing demand for undertaking and completing the interstate water pollution abatement program in the shortest possible time.
2. To indicate the relationship between the Philadelphia sewage disposal program and the interstate program of pollution abatement and control.
3. In view of the rejection, by the courts, of proposals for financing this improvement, to emphasize the importance of continuing the efforts to find a suitable means for undertaking the work.
4. To weigh suggestions that this project be deferred because of possible competition with national defense activities, or for other reasons, against the need to protect the public health.

CONFERENCE PROGRAM
and
TABLE OF CONTENTS

WATER POLLUTION ABATEMENT
IN
THE DELAWARE RIVER BASIN

	Page
I. The Interstate Program	9
Hon. Ellwood J. Turner, Member, Pennsylvania General Assembly, and Chairman, Interstate Commission on the Delaware River Basin.	
II. The Philadelphia Program	17
Director John H. Neeson, Depart- ment of Public Works, City of Phila- delphia.	
III. The Need	27
Lt. Colonel H. B. Vaughan, Jr., District Engineer, U. S. Corps of En- gineers, War Department, Phila- delphia.	
IV. The Implications	33
Dr. Abel Wolman, Past President, American Public Health Association; President-Elect, American Water Works Association; Professor of San- itary Engineering, The Johns Hop- kins University, Baltimore, Mary- land.	
APPENDIX	
Commission Resolutions.....	45
Conference Registration.....	51

I.

THE INTERSTATE PROGRAM

by

Hon. Ellwood J. Turner, Member, Pennsylvania General
Assembly, and Chairman, The Interstate Commission on the
Delaware River Basin.

There has never been a time in the history of this nation when there was a greater need for clear thinking on public issues and public policies than today.

In the course of our preparations for this meeting, during which the sponsoring agencies have received a full measure of cooperation from public and private organizations, as represented partially by your attendance here today, to say nothing of an unprecedented and supernatural "assist" from the watery element which has "elemented" so infrequently during the past ninety days as to place these problems forcibly in the public eye (nose and throat) of Philadelphians,—in the course of our preparations, I had hoped that the gravity of the situation would assure an unbiased consideration of the facts, with a maximum of practical realism and a minimum of political fantasy!

Unfortunately, the jumble and confusion which now surrounds the Philadelphia water pollution and water supply problems does not support this hope.

As a notable *exception*, I must take this opportunity to compliment the Philadelphia INQUIRER for the series of articles by John M. McCullough, just concluded, on "Philadelphia's Rivers."

Until Sunday of this week, the *worst* characterization which the Interstate Commission on the Delaware River Basin had received from the newspapers in this four-state area was passed along from the editor of a North Jersey paper who classified us as: "*That irrepresive organization with the non-stop name.*"

But Sunday, and Monday, of this week we became "glorified." Overnight as it were (and I am sure this will be of interest to the Democratic members of Incodel) we became "spokesmen" for the G.O.P.; "obstructionists" of pure water; "opponents" of the system of getting something for nothing; and "supporters" of inaction . . .

So in the face of these not too upsetting preliminaries, we are here to speak about, and to discuss, a matter of prime importance to the people of Philadelphia, and, as I am sure you will appreciate more and more as this program progresses, a matter of importance and significance also to the three million people in the Delaware River Basin *outside* of Philadelphia.

This problem of water pollution abatement is not, of course, new; it has been studied and talked about for well over a half century in this city. Many luncheon and forum sessions such

DELAWARE BASIN POLLUTION

as this have been responsible for developing a genuine interest and concern in this problem among an ever-greater number of people. And not entirely in vain, if you will but consider that most of the facts that surround this particular situation are now known and that, for at least a substantial part of the program, a comprehensive plan of correction and control has been drafted and officially adopted.

As to its broader aspects, I need spend but a moment to recall to you that the Interstate Commission on the Delaware River Basin was organized and has been maintained by the States of Delaware, New Jersey, New York, and Pennsylvania as a demonstration, or an experiment, if you will, of the capacity of these state governments to work together on the many mutual problems of land and water resources conservation, development, and control in this watershed.

With these states more and more in direct competition with the federal government in meeting their internal and regional land and water resources problems, the states in the Delaware River Basin are attempting to demonstrate, by competent and coordinated performance, the ability to administer their mutual affairs in this watershed with ever-increasing effectiveness.

Incodel's Interest

It has, therefore, been the policy of this Commission, over a period of years, in the pursuit of its primary objective—the abatement and control of pollution in the waters of the interstate Delaware River Basin—to insist that the state governments in this area are equipped, in law, in technical proficiency, and in aptitude, to solve this problem; that with the formulation of the necessary interstate machinery, as represented by Incodel, water pollution abatement and control in this interstate drainage basin can be effectively solved without the necessity of federal laws to centralize and control the administration of this problem by federal agencies.

(Printed records of our activities and accomplishments are available to you and represent, we believe, outlines of constructive progress.)

Therefore, notwithstanding attempts to misinterpret our position, we must view with apprehension the enthusiastic greeting to the suggestion that the federal government extend largess to Philadelphia, which can hardly come without an

TURNER: THE INTERSTATE PROGRAM

equally liberal extension of federal jurisdiction and control. That is not to say that if P.W.A., W.P.A. or any other alphabetical combination of like federal funds were available to Philadelphia, the City should not take advantage of them. It is certainly entitled to its share.

That has been our policy and is our position today. We believe it to be sound. Having put many years of effort into this work, we do not intend to be driven from our point of view either by ridicule or by slander.

Of Interstate Concern

And so to the role of Incodel in relation to the specific problem before us.

From time to time during the past few years this Commission has taken advantage of such opportunities as have arisen to express its interest in, and occasionally its advice as to, Philadelphia's water pollution and water supply difficulties.

There are some who have looked upon those statements as "intrusions." They have questioned our temerity as "outsiders" in connection with what they think of as a purely local problem.

Those who express this view fail to understand both the proper functions of this interstate agency and the full nature and effect of the Philadelphia program.

For the fact is that the City's daily discharge of approximately 350 million gallons of raw sewage into the Delaware and Schuylkill Rivers seriously affects other communities in Pennsylvania and, more than that, the general welfare of communities lying across the boundary water, in New Jersey.

Communities in the Delaware River Basin above Philadelphia have, with relatively few exceptions, constructed and are now maintaining sewage collection and treatment facilities for the ultimate benefit and protection of Philadelphia. Communities in the Delaware River Basin below Philadelphia have constructed and are now maintaining sewage collection and treatment facilities and are rightly demanding that their source of water supply, the Delaware River, be protected from pollution by Philadelphia.

For these reasons we have taken, and must continue to take, a keen interest in what is done in and by this city. While giving every bit of help that we can, we must nevertheless continue to campaign for the completion of Philadelphia's pro-

DELAWARE BASIN POLLUTION

gram, as well as the interstate program of water pollution abatement and control in the Basin as a whole.

We have suggested, and continue to propose, that if the people of Philadelphia, its business and financial interests, and the public press, want a safer and more palatable source of domestic water supply which will not need to be replaced at great expense by a new source of supply from upland sources, at least for many years; if they want to be assured of a water supply more adequately protected for present industrial uses, and which will serve to attract new industries requiring, as a basis for their operations, clean water; if they want to protect and enhance the values of real estate for properties lying along the banks of their streams; if they want to bring to an end the destruction of shipping values which seriously impairs navigation and affects port development; if they want to stimulate important recreational uses of their streams and their waterfronts for boating, bathing, fishing, swimming, highway and park development; I say if they want all of these things, they can get them, but they must pay for them just as the residents of hundreds of other communities have done.

A united demand upon officials to devise a sewer rental system that will be sustained by the courts offers the citizens of this city the opportunity to redeem their rivers for use and not abuse; rivers that will be a source of pride and not of shame.

All of the facts and factors having to do with pollution of the Delaware and Schuylkill Rivers by the City of Philadelphia are known, as I am sure Director Neeson will illustrate: no study, no survey, no research—by the federal government or by *any* governmental agency—is required.

You know “why” this job must be done; you know “how” this job can be financed; the “when” remains for you to answer.

Mine Wastes and Drainage

Unfortunately, those questions are not so easily resolved in connection with the clogging of the Schuylkill River by mine wastes, an increasing menace to all communities in the Schuylkill Valley and of particular concern to Philadelphia.

This problem, too, is of a half-century standing. Fifty years ago the anthracite region of Pennsylvania (the only one of major magnitude in the world) was producing as much coal as it is now. Twenty-five years ago, in 1917, production was

TURNER: THE INTERSTATE PROGRAM

double the present quantity. The situation today, as to the *source* of acid mine drainage and anthracite wastes is not essentially unlike that of 1888, but the results and effects of this half-century of progressive pollution are cumulative.

Obviously, this problem cannot be solved overnight. At the same time, the City of Philadelphia, the Commonwealth of Pennsylvania, and the anthracite industry, cannot remain indifferent.

What is needed is the development of a long-range program of preventive and corrective measures, to be backed with real money.

As a start in this direction, I have been authorized by the members of the Interstate Commission on the Delaware River Basin to offer the services, the staff and facilities of our organization as a coordinating agency for a unified city-state-federal planning and programming effort to correct conditions in the Schuylkill watershed arising from mine operations.

Whereas Incodel has followed the policy of not intruding upon intrastate matters, a discussion of this problem at a business meeting of the Commission held this morning led to the conclusion that because mine drainage and culm *are* of interstate concern at the confluence of the Schuylkill and Lehigh Rivers with the Delaware, and because of the critical nature of the problem and its extreme complexity, some coordinating machinery or medium is required to bring about a solution.

Having been established for such purposes, and having had considerable experience in organizing and developing unified plans of action calling for coordination and cooperation among technicians, as well as public officials, this offer is therefore made to city, state and federal officials.

If accepted, our suggestion would be that an advisory group of qualified technical experts representing the three levels of government, as well as the anthracite industry, be selected:

1. **To review the facts;**
2. **To develop a long-range plan of action; and**
3. **To settle upon a proper allocation of the costs involved.**

Summary

I have, up to this point, touched upon the basic purposes and objectives of the Interstate Commission on the Delaware River Basin; I have attempted to illustrate to you precisely why the Philadelphia pollution problem is of reasonable concern to others, both within and outside of Pennsylvania, and

DELAWARE BASIN POLLUTION

thus to Incodel; I have summarized the importance of completing Philadelphia's comprehensive plan of sewage collection, treatment, and disposal; I have urged upon you what we believe to be the most logical means of getting that job done; and lastly, I have indicated that Incodel would be glad to be of service as a coordinating agency for city, state, and federal authorities in an aggressive attempt to settle upon a plan of action and an allocation of responsibilities for the correction and control of anthracite mine drainage and coal culm waste.

Conclusion

In conclusion, a word of warning—to the City of Philadelphia, the Commonwealth of Pennsylvania, and to the other communities and states in this watershed.

Decisions of the United States Supreme Court in the New River Case, the Oklahoma Power Case, and in kindred litigation, have, in the brief span of five years, directly reversed the positions of the states and the federal government in their respective rights and responsibilities over the water resources of the nation.

The states and their localities are now on the defensive.

If theirs is to be an "enlightened" defense it must be one of action, and not inaction; it must be one of performance rather than promises; it must be alert, constructive, and imaginative in community and regional thinking.

Faced, as we are, with increasing pressures from the federal government involving day-to-day losses to the states and their cities of the privileges and prerogatives of local self-government (to many of us, the inherent strength of our American system) we must, as I stated at the outset of this paper, think clearly on public issues and public policies, we must—more than that—act quickly.

For: "*The future belongs to those who fuse intelligence with faith and who, with courage and determination, grope their way forward, from chance to choice, from blind adaptation to creative evolution.*"

In such a manner, Charles E. Merriam describes this nation's need for the future.

By the application of that set of principles, the cities and states of the Delaware River Basin can preserve their freedoms while performing their highest function in this democracy.

II.

THE PHILADELPHIA PROGRAM

by

John H. Neeson, Director of Public Works, City of Philadelphia.

The beginning of the discharge of wastes into the water-courses within and bordering upon the City of Philadelphia is, as the historian would say, "shrouded in antiquity," but it was given legal status by an Act of Assembly of Pennsylvania, passed February 18, 1769, and signed by John Penn, Lieutenant Governor. This Act authorized the Commissioners of the City of Philadelphia to make provision for "amending and repairing the common sewers of the said City already made; and making, amending and repairing such as shall hereafter be made, for discharging and carrying off the water *into the river.*" Prior to this time, the Honey Run Creek in the vicinity of Germantown and Cheltenham avenues had become so fouled that it was enclosed with masonry side walls and a stone slab top to hide the nuisance. This practice of discharging into the river was continued by the successors of the Commissioners until the amount of waste has become too great for the streams to absorb.

Early Plans

The necessity for protective action was seen by the city authorities as early as 1873 and the work of constructing intercepting sewers along the smaller streams was begun with the systems bordering upon the Schuylkill River and Wissahickon Creek, in 1881. Work upon the system of intercepting sewers has proceeded almost continuously since that time to a length completed of 57 miles.

The Commonwealth of Pennsylvania entered into the picture with the Act of Legislature of April 22, 1905, which created the Department of Health with the stated purpose of preserving the purity of the waters of the state for the protection of the public health. In 1907, the Department of Health issued a mandate that the City of Philadelphia should, on or before January 1, 1912, submit for approval a plan for the collection, treatment and disposal of the sewage of the entire city.

The system of intercepting sewers had been planned but sewage treatment was practically unknown in America. An organization was assembled, research laboratories were established, and representatives sent to Europe for the collection of data. Later, the Pennypack Sewage Treatment Works were constructed and operated as a full scale trial of treatment methods. It was necessary to ask an extension of time beyond 1912, and the report, in very complete detail, was forwarded to the Com-

DELAWARE BASIN POLLUTION

missioner of Health April 1, 1915. Approval was given by permit issued August 31, 1915, and operations began immediately on contract plans.

The Physical Plan

The accepted plan proposed to divide the city into three areas for treatment, with a treatment works established for each area, the Northeast, the Southwest, and the Southeast. The permit of August 31, 1915, required the first operations to be carried on in the Northeast section to remove sewage pollution from direct contact with the water supply. In compliance therewith the intercepting system has been completed along the water front between Lehigh Avenue and Torresdale, although the mechanical intercepting gates are not yet installed between Lehigh Avenue and Castor Avenue. The first section of the Northeast Treatment Works, to a capacity of 60 million gallons per day, was constructed and has been in operation since 1923.

At the present time, the work in the Northeast section has accomplished the removal of sewer discharges into the Delaware River within 4.5 miles of the Torresdale intake of the water supply. The expenditure required by the work completed in this sector has been \$16,723,715.00.

In the Southwest sector, the intercepting system has been completed in the Schuylkill watershed above Fairmount Dam, along Cobbs Creek above Seventy-fifth street and a few sections of the Schuylkill River interceptors below Fairmount Dam. A sewage pumping station has been built at the site of the Southwest Works and a section of the main collector leading to the treatment works has been completed and another section is now under contract. A portion of the outfall conduit from the treatment works to the Delaware River is also completed. The completed work in this sector has removed the sewage discharges into the Schuylkill and Cobbs Creek watersheds above tide water at a cost of \$3,203,384.00.

In the Southeast District, the intercepting system has been provided for the inland streams in the Chestnut Hill section and the outfall conduit from the treatment site to the Delaware River has been completed. The cost in this sector has been \$1,861,286.00.

The completed work, including the purchase of sites for the three treatment works and engineering expense, has resulted in

NEESON: THE PHILADELPHIA PROGRAM

the expenditure to date of \$24,696,459.00. Construction work now proceeding will require an additional payment of \$190,000.00.

Design work has proceeded and contract plans are almost 100 per cent. complete for the intercepting gates along the Delaware River front between Castor Avenue and Lehigh Avenue. The completion of this interception will remove the sewage discharge to a point about 8 miles below the water supply intake at Torresdale and entirely beyond tidal influence.

The intercepting gates have been installed along Frankford Creek but a number of them cannot be placed in operation because of the silting up of the creek bed obstructing the mouth of the sewers. This introduces the question of the restoration of Frankford Creek, itself a major problem beset with costly physical and legal difficulties.

Plans are almost completed for the Schuylkill River interceptors and gates, the Southwest Main Collector, the Cobbs Creek Cut-off, the Central Schuylkill Pumping Station and the force mains connecting the Mill Creek sewer. Preliminary studies have been made on the Schuylkill River Siphon crossing and the intercepting sewer along the Delaware River front from Lehigh Avenue to League Island.

With the exception of the portion of the Northeast Treatment Works now in service, construction operations have been confined to the collecting system. This was done to permit research for a type of sewage treatment applicable to the needs of Philadelphia and at an operating cost within its resources. The magnitude of the project is far beyond the limits required for most cities as capacity must be provided for a daily average flow through the treatment works of seven hundred million gallons and a storm flow of one billion, two hundred million gallons.

Testing Processes

The installation at the Northeast Works was primary treatment by sedimentation and digestion of sewage solids in Imhoff tanks. This was the best and most economical treatment known at the time of adoption but no further planning was done until the operating results could be studied. It can be stated that the city "got by" with the process by very careful operation. The Imhoff tank is a very efficient piece of apparatus for a residential community but the highly industrial

DELAWARE BASIN POLLUTION

City of Philadelphia introduced trade wastes which complicated the situation and interfered with the digestive process.

Tests and observations have been made of the various developments in treatment processes during the twelve years passed and it is felt that the requirements will be best met by an aeration process on which large scale operations were conducted by the city in 1937 and 1938. In this process, the sewage entering the plant is subjected to agitation by blowing low pressure air through it prior to entering the sedimentation tanks. This produces a coagulation of the solid matter which causes a settling out of a greatly increased quantity of material which causes pollution by exhausting the oxygen content of the river water and provides a food supply to maintain life in the bacteria dangerous to life. By this process, the degree of purification can be varied by varying the air contact as required by conditions in the body of water receiving the discharge.

The solids settled out in the sedimentation tanks will be continuously removed to digestion tanks where the organic content will be bacterially converted to stable and inoffensive matter which can be stored in the open, pending disposal, without creating nuisance conditions. This digestion process releases a large quantity of gas which it is proposed to collect and utilize for heating the digestion chambers and substituting for the oil fuel under the boilers at the central heating plant of the treatment works. It can also be used for heating the incinerators should the destruction of the sewage solids by burning be decided upon.

An advantage of the adoption of this process is that the existing installation at the Northeast Works need not be scrapped but can be incorporated by changing the Imhoff tanks over to plain sedimentation tanks. This work can be carried out in sections and without throwing the Northeast Works out of service.

That a refinement of treatment was necessary, particularly in the Northeast section, which had been the view of the city engineers, was concurred in by the Sanitary Water Board of the State of Pennsylvania. That body, by letter of July 17th last, formally notified the city that a refinement of treatment beyond plain sedimentation would be expected at the future Northeast Works and that the Southwest and Southeast Works must be so designed that the degree of purification could be increased when found necessary. The proposed process fulfills

NEESON: THE PHILADELPHIA PROGRAM

these requirements and is possible to a degree approaching Activated Sludge, which is the ultimate refinement of today's practice.

In August of 1940, the services of a consulting engineering organization were retained to advise the city on the proposed sewage treatment program. After an exhaustive study of the conditions to be met and the data developed by the city, they have advised and recommended that the treatment to be adopted should consist of aeration or its equivalent in performance. Accordingly, formal application was made on October 10, 1941, to the Sanitary Water Board, for a permit to adopt an aeration process and allow design work to proceed in accordance therewith. The proposed change of treatment process, in less complete detail, had previously been placed before the Sanitary Water Board on August 4, 1939, but was not acted upon.

Progressive Steps

In carrying out the sewage treatment program, the city proposes to change over the treatment process at the Northeast Works and increase the capacity of the works to 125 million gallons daily as the first step in the work. The full protection of the water supply is the paramount condition to be satisfied. The present capacity of the works will not permit the operation of the gates to be installed between Castor and Lehigh avenues and, without these gates, sewage will be carried on the flood tide to the water supply intake. As soon as sufficient treatment capacity can be made available, the second step will be the installation of these gates along the Somerset Collector. Earlier installation will avail nothing since the machinery will deteriorate so rapidly under sewer conditions, without operation, that entire reconstruction would be necessary. Coincident with this work must come the reclamation of Frankford Creek in order that the existing gates may be operated and the sewage removed from the discharge of Frankford Creek into the Delaware River within tidal influence of the water supply. These steps will complete the urgent work in the Northeast Section.

It is next proposed to construct the intercepting sewer along the west bank of the Schuylkill River from Fairmount Dam to the University Bridge, a sewage pumping station at University Bridge to lift the interceptor discharge, force mains to deliver

DELAWARE BASIN POLLUTION

the pumped sewage to the Mill Creek sewer. This will temporarily move the west side polluting matter discharge point down-stream to 43rd Street. Coincident with this work must be the inverted siphon crossing beneath the Schuylkill River to afford a means of delivering the east side pollution to the pumping station.

Following the provision for the river crossing, work will proceed on the interceptor along the east bank of the Schuylkill River. The completion of these steps will remove the pollution from the Schuylkill River between Fairmount Dam and 43rd Street.

Next proposed is the first unit of the Southwest Works to a capacity of 140 million gallons daily average flow, the completion of the Southwest Main Gravity Collector leading to the treatment works and the extension of the force mains between the Collector and the Mill Creek sewer. The completion of this work will remove the sewage discharge from the river at Forty-third street and open the way for constructing the interceptors along the river banks southward from University Bridge.

This work will be followed by the construction of the Cobbs Creek Cut-Off sewer between Cobbs Creek and the Southwest Collector, through which the sewage from the Cobbs Creek watershed will be delivered to the treatment works, thus removing the sewage pollution from Cobbs Creek.

The interception of sewage discharges from the Delaware River between Lehigh avenue and League Island does not tie in with any other operation and its sequence will be determined by the availability and amount of funds. In point of urgency, it ranks below all of the foregoing program, because the removal of sewage discharges above Lehigh avenue will so lighten the pollution load that the Delaware River can further assimilate the remainder and thus reduce the present condition of odors along the water front. Neither the City water supply nor that of any other municipality will be threatened by its presence and, with the odor condition ended, the correction can await the completion of the more urgent steps if sufficient funds are not provided to carry on simultaneous operations.

It is proposed to install capacity at the Southeast Works to treat 133 million gallons daily average flow. All of this must be lifted and the pumping station capacity must equal that of the works. Work can proceed on all items of the plant and

NEESON: THE PHILADELPHIA PROGRAM

sections of the intercepting sewer at the same time provided sufficient funds are available.

The program given will accomplish the removal of pollution as of present requirements. Additions to the collecting system will be necessary to accommodate increased flows and enlargement of the treatment works will be required from time to time. The total future capacities will be, at the Northeast 300 million gallons daily; at the Southwest, 250 million gallons daily; and at the Southeast, 150 million gallons daily, average flow.

This is the physical program.

The Financial Program

What is there to say about our financial program to carry out this project? It is merely repetition to set forth here why work on sewage treatment in Philadelphia was suspended in 1933, as were expenditures on all other capital improvements. The financial structure of the nation had become impaired, carrying along with it our major political sub-divisions—the states and municipalities. Philadelphia had exceeded its borrowing capacity because of the almost precipitate slump in assessed valuations of real estate. It was not until 1938, after a lapse of close to six years, that Council, by Ordinance approved September 14th of that year, authorized the creation of a Philadelphia Authority under the Act of Assembly of June 25, 1935, and the amendment of May 20, 1937. This body submitted four applications covering work on the Sewage Disposal Program for loans and grants to the Federal Emergency Administration of Public Works on September 26th and 27th, 1938, which were subsequently revised for grants only. These applications were not favorably considered by federal authorities for the given reason that funds authorized by Congress were depleted, or such as were available were committed to other purposes.

However, with the advent of the Lambertson Administration the Mayor immediately made known his intention to find a means of financing the Sewage Disposal Project and resume the work with as little delay as possible. Two attempts have been made to establish a sewer rental charge sufficient in amount to carry a bond issue of \$42,000,000, and to relieve the City's borrowing capacity of outstanding bond issues for Sewage

DELAWARE BASIN POLLUTION

Disposal and the Drainage System. The first Bill, proposed early in 1940, was based on a flat charge of $1\frac{1}{4}$ times the water rent to yield \$7,500,000., to cover all debt charges, including taxes to the Commonwealth, maintenance and operation. It was objected to both by industry and real estate owners, generally, and resulted in a substitute Bill, the basis of which was 4 mills on the dollar of real estate assessment, to yield \$7,800,000. This ordinance was approved, passed by the Lower Court, the decision being reversed by the Pennsylvania Supreme Court in October of that year.

In January of this year a new Bill was prepared—a modification of the water base—with an initial charge of \$8.00 per property plus three-fourths of the water rent, again to yield \$7,500,000. It met with the same protest as the Bill first proposed in 1940, and a sub-committee of Council held public hearings, conferences with groups, and reported out a new formula—a minimum of 3 mills on assessed values of property served plus one-fourth of the water rent. The same return was estimated, i.e., \$7,500,000. This plan was rejected by the Lower Court and the rejection affirmed by the Upper Court last month.

It should be obvious to all clear thinking persons that public officials charged with the responsibility of terminating the pollution of our streams are no more tolerant of existing conditions than is the citizenry of this community. But this is solely and purely a problem of financing and is not otherwise complicated. It does require specialized engineering treatment in design, construction and operation. But, again, Philadelphia's engineering staff, through years of research and laboratory work and intensive studies of the science of sewage treatment, is quite capable of carrying out its assignment, once given the green light.

Philadelphia is alert to its responsibility in this matter and is determined to find a financial way out of the dilemma even if it must depend entirely upon its own resources. A number of plans are under consideration and it is not improbable that among these alternates one may be found not requiring legal sanction.

We are not averse to suggestions of financial formulae. Neither is Philadelphia the least bit reluctant to the acceptance of a free grant should one be offered. TOMORROW WILL NOT BE TOO LATE.

III.

THE NEED

by

Lt. Colonel H. B. Vaughan, Jr., District Engineer, U. S. Corps
of Engineers, War Department, Philadelphia.

The need for abatement of pollution by sewage, industrial wastes and culm of the rivers in the Delaware Basin should be of prime interest to the 5,000,000 people residing in its 12,500 square miles and certainly to the 2,000,000 people living in the City of Philadelphia.

The need can best be portrayed by first, an enumeration of some of the more serious causes of this pollution problem, and second, the results which follow the lack of clean water throughout the Delaware River Basin and most particularly in our great port of Philadelphia.

Causes of Pollution

The water at Trenton, New Jersey, the head of the tidal and navigable portion of the river, is relatively clean. Weekly analyses over a two-year period made by the United States District Engineer Office at this location indicate an average dissolved oxygen saturation of 95 per cent, which is considered satisfactory.

The river waters from Trenton to about Riverton-Palmyra on the Jersey side and above Frankford Creek on the Pennsylvania side are lightly polluted. Five percent of the sewered population of 179,000 in this area discharge raw sewage into the river. Trenton, New Jersey, Bristol, Pennsylvania, and Bordentown, Roebing, Florence, Burlington, Beverly, Delanco and Riverside, New Jersey, as well as other towns comprising 93 percent of the sewered population of this area discharge partially and fully-treated sewage into the Delaware River.

From the points mentioned above, namely Riverton-Palmyra on the Jersey side and above Frankford Creek, on the Pennsylvania side, to Eddystone, Pennsylvania, a distance of over 22 miles, the Delaware River is subject to gross pollution. There is only an average of 8 percent dissolved oxygen saturation in the river waters during warm weather months. In the river off Chestnut Street often during warm weather the oxygen content is zero. The cities of Philadelphia and Camden, as well as Gloucester, New Jersey, representing over 2,000,000 inhabitants, or 95 percent of the population of this area, discharge raw sewage into the Delaware River.

Based on population statistics, the City of Philadelphia discharges 88 percent of the sewage contributed into this grossly polluted stretch of the river.

DELAWARE BASIN POLLUTION

This pollution problem is further aggravated by diversified discharges of industrial waste as the area in question is highly industrialized. In the City of Philadelphia alone over 200 establishments deposit 90,000 tons of solid industrial wastes into the river annually. This consists principally of wastes from distillery, dye, bleaching, tannery, dairy, laundry, oil, pickling, wool scouring, slaughter house and heavy industrial processes. The waste from forty of these establishments reaches the Delaware River directly while over 160 establishments discharge waste amounting to 72,000 tons annually into the city sewers. The total sewage and industrial wastes deposited into the rivers is 200,000 tons annually from the City of Philadelphia.

From Eddystone, Pennsylvania, to New Castle, Delaware, 34 miles below Philadelphia, the river is substantially polluted due largely to industrial waste and municipal sewage discharges as well as the effect of the gross pollution carried downstream from the Philadelphia metropolitan area.

The zone of recovery in the Delaware River starts at Reedy Island near Delaware City, Delaware, about 46 miles below Philadelphia, where the water quality starts to approach that of the clean water inflow at Trenton. Analyses during 1939 made by the U. S. District Engineer Office at this location indicate an average dissolved oxygen saturation of 82 percent.

Contributing to the conditions in the Delaware River gross pollution area—from above Frankford Creek to Eddystone—is the Schuylkill River. This stream is polluted along its entire length with sewage and culm wastes. The latter originates in the silt-laden discharges from the coal-preparation plants and from erosion of culm banks in the upper reaches of the river. With the coal mines working 2 to 3 days a week, breaker discharge of coal-fines and silt into headwater streams was 650,000 tons in 1936 and 1,000,000 tons in 1939. With mines running full time, it is expected that 2,000,000 tons will be deposited in 1941. 24,000,000 tons of culm wastes are in the bed of the Schuylkill River between the headwaters and Fairmount Dam in Philadelphia, which has increased the flood heights by four feet.

The measured movement of culm over Fairmount Dam during 1939 was about 1,000,000 tons; in 1940 there was 2,300,000 tons, all based on weekly samples.

So far I have enumerated the causes of this pollution problem in the Delaware Basin. These may be summarized as (1) sewage

VAUGHAN: THE NEED

discharge; (2) discharge of industrial waste, and (3) the discharge of culm waste in the Schuylkill River.

Results of Pollution

The second factor in this discussion reflects the results which inevitably follow the lack of clean water in the Delaware Basin and particularly Philadelphia, the second largest harbor and the largest fresh water port in the United States.

These results are:

1. Serious damage and corrosion is caused to vessel hulls and paints. The splendid facilities of the port of Philadelphia are impaired due to the fact that vessel owners and shipping companies are aware of the damage caused by the chemical action of the polluted waters of the Delaware on the hulls and paints of vessels coming within this grossly polluted area. Consequently, Philadelphia is often not made a port of call for this reason. The polluted water of the Delaware is useless for boiler water without treatment and undesirable for ballast from health considerations. For the vessels which do ply these black waters, very little comfort is experienced by the crews during warm weather as sleeping is most difficult in the foul atmosphere prevalent along the docks.

2. Nauseating effects from sewage odors are experienced by harbor workers during warm weather. The Philadelphia Navy Yard and many large shipyards are located along the banks of the Delaware. The morale and efficiency of thousands of workers, now engaged in defense efforts, are lessened by these pungent odors.

3. The unsightly appearance as well as odors created by sludge deposits seriously affect waterfront property values.

4. Sources of water supply for waterfront industrial establishments are impaired. Many plants are compelled to make heavy expenditures to treat the river water in order to render it suitable for use.

5. The quality of raw water for the public water supply system is impaired and while the municipal filtration and treatment plants render the water safe for domestic consumption, the palatability and odor leave much to be desired.

6. The normal recreational uses of the rivers are destroyed. Fishing, once an extensive industry in the Delaware, is now practically eliminated. Most of the fish not caught below

DELAWARE BASIN POLLUTION

Philadelphia die when they reach the grossly polluted area due to lack of oxygen in the waters.

7. It is estimated that the costs to the Federal Government and the City of Philadelphia in the year 1939 for pumping sewage, industrial waste and culm from the Schuylkill River alone was \$1,000,000.

I have outlined the causes of pollution in the Delaware Basin and some of the results which follow the lack of clean water. These, I feel, are ample testimony as to the need for the abatement of pollution.

The Army Engineers have given careful study to this problem during the past several years. During recent weeks all of the Philadelphia newspapers have contributed in an effort to present this problem to their reading public. A real honest will to do is necessary to solve this problem, but the initiative must be assumed by those having the largest interests at stake; namely, the cities of Philadelphia and Camden and the State of Pennsylvania. We cannot logically expect or demand the minor contributors to this problem to correct their deficiencies unless those who have a vital and important interest lead the way.

IV.

THE IMPLICATIONS

by

Dr. Abel Wolman, Past President, American Public Health Association; President-Elect, American Water Works Association; Professor of Sanitary Engineering, The Johns Hopkins University, Baltimore.

I am somewhat puzzled as to the particular line of attack which I should take this afternoon, because the problem of Philadelphia in relation to the Delaware, and more important in relation to itself, seems to me to be an almost obvious one.

Director Neeson and Colonel Vaughan have supplied you with as much statistical, technical, and factual information as to what the situation in Philadelphia is, as I should imagine any audience of citizens would want. I hesitate, therefore, to extend that statistical analysis, first, because it would become increasingly boring, and secondly, because it might vitiate an impression which I should like to leave in your minds,—that what you have in Philadelphia is a long-standing, non-statistical “mess.”

The tonnage of discharge, the gallonage of discharge, the scientific terminologies with respect to dissolved oxygen, the B.O.D.'s, the free flowing and non-free flowing bacteria, are all entrancing to those of us who make our livings within the profession. But all lumped together they merely draw from me the “implication,” which is my assigned subject, that Philadelphia discharges a *lot* of sewage. It discharges a *lot* of varied kinds of sewage, which are not as peculiar to Philadelphia as they may seem to be to Philadelphians.

The long inventory of the types of sewage, which are essential for any technological research or review of the problems, such as Director Neeson must necessarily confront himself and his staff with, merely means a confirmation of the fact that Philadelphia sewage, domestic and industrial, is a common kind of material throughout the United States. It is the same old stuff! It performs in the same old way!

Director Neeson has referred to a fact which I think is one of the emphatic conclusions I would like to draw this afternoon. The technological knowledge of your problem is many, many years ahead of what I might call the moral philosophy of Philadelphia, because although he has gone only into recent history to trace the steps with respect to this problem, I think all of you in Philadelphia should remember that this is not a matter of recent history.

Municipal Housekeeping

Not so many years ago I had the pleasure of appearing before an audience of Philadelphia citizens in celebration of Benjamin Franklin's arrival to a stature of recognition through-

DELAWARE BASIN POLLUTION

out the country. I took the privilege at that time of pointing out that to me Benjamin Franklin, a resident of Philadelphia, was a pioneer in this country in municipal housekeeping.

It was a phase which attracted me as an engineer and which I wanted to point out to other groups who were discussing him from other points of view: from the point of view of political philosophy, from the point of view of international affairs, and a variety of other things which that remarkable man exemplified.

But to me it was important to recognize that he was an expert in municipal housekeeping. He was an expert in what we now more grandiosely call, social organization. He was, you will remember, one of the first individuals to discover that you couldn't do things in Philadelphia that had to be done (even at that early time) without social organization. He was perhaps the inventor of the first public fire department in the United States; the first individual to force public policing of the streets, because it became dangerous for him to walk about at night; one of the first people who demanded public measures for keeping the streets clean, because he fell into things which you now throw into the Delaware, but which you formerly threw into the streets.

I would like to recall, furthermore, in relation to Benjamin Franklin, that he had a concept which we ought to revive today, particularly since I listened to my friend, Ellwood Turner, so passionately and vehemently defend local autonomy. Franklin passionately defended local autonomy all his life, but he had a corollary which Mr. Turner referred to, namely, local responsibility.

There is no magic about the fact that people begin to worry about the local autonomy of Philadelphia when, throughout a history of almost two hundred years, it has neglected a fundamental, basic, and historic feature of its obligations. It is then that people outside begin to inquire, "Has it the capacity to solve its local obligations?"

I think the adjacent states of New Jersey and of Delaware, the adjacent communities, even the Commonwealth of Pennsylvania, might take stock as to whether the local autonomy of Philadelphia, or any other municipality in the country, means anything more than a literary *cliché*, until it produces the goods.

Can it pour out, day in and day out, these vast tonnages, these vast liquid volumes, of a known material for which known

WOLMAN: THE IMPLICATIONS

processes of treatment have been available for years and for which technical information today is ready and ample to show the road out? Can it continue to do that under the excuse, at every crisis in our history, of not being able to meet the issue?

I have my doubts about it, and later on I hope to offend at least three-quarters of the people in the room by suggesting some of the things that might have been done and perhaps some of the things that still ought to be done with respect to this problem. I do it not with courage, but with a kind of intuitive feeling as an outsider, a non-resident of Philadelphia, but one very familiar with your sewage problem for a long time, not only since Incodel started, but long before.

A Balance Sheet

I had the great experience many, many years before Incodel came into being of riding through your sea of sewage, to my great annoyance, a number of days, a number of months, because we were studying the river at that time for special purposes. I didn't need a statistical table to indicate to me that the sewage pollution of the Delaware was then already terrible. I could use more exact terminology. I could use more quantitative terms. I could give you a balance between the tonnage that you turn out and the tonnage that the Delaware brings down to you, relatively clean, and prove to your satisfaction that on a bank account of assets versus debits, you have ruined the river.

I see no point in an extension of that terminology excepting that you might be able to absorb those relationships and carry them around with you, but we have a much more serious and a much more complex task, it seems to me, this afternoon. And in order to bring you to that task as rapidly as I can, with apologies for the perhaps insulting remarks as we go along at various levels of agencies—not political but public agencies—because as I assess the history of this period, you can't escape the fact that there have been delinquencies, financial, moral, ethical and political, all along the line for a long time. Of course, it is up to your people to determine how long you want those delinquencies to carry on. I am speaking today not as a sanitary agent, but as a public welfare agent who has been imported from a sufficiently safe distance, to escape at about four o'clock this afternoon.

DELAWARE BASIN POLLUTION

What are the implications, first as to the Delaware River Basin itself? I won't rehearse them because you are familiar with them. We have gone through all of the steps with which sanitary engineers are familiar. First, we have canvassed the river with a fine-tooth comb; then we determined what the zonal separations should be; then what the standards of water quality within those zones ought to be, four of them. The first one, upstream, is good; the second one, a little less good; the third, in which you happen to have your existence, is worse; and the fourth shows a recovery zone.

We have an interstate agreement, at least some of us do, in the Delaware River Basin. One of our distinguished Commonwealths still isn't a party to that since the Delaware River, or its corrective features, remain outside of the interstate agreement.

A lot of money has been spent in the last ten years but, strangely enough, not by the people who have it, not by the bulk of the people. You have a very fine accomplishment to which Mr. Turner referred. You have spent about ten million dollars from 1936 to date. You have covered some 289,000 people. That would be a grand accomplishment, if you didn't know the river; if you weren't aware of the fact that that's only a drop in the bucket, literally and figuratively; if you weren't aware of the fact that the bulk concentration of population literally has done nothing; if you weren't aware of the fact that over a long period of time, from 1769 to be exact, the harbor of Philadelphia has "smelt" badly.

I referred to that here once before, some three or four years ago, to the annoyance of some distinguished citizens of Philadelphia, but I had a record and looked it up yesterday: Mr. Isaac Weld, Jr., a young Englishman who visited Philadelphia, in 1769, refers to the *mess* in your harbor. At that time you had forty thousand people. I suppose the reason nothing was done about it was that the city was too poor. It has remained too poor until it has risen to a population of two million people within the political boundaries and two and a half to three, or three and a half million people, in the metropolitan area. I don't think it's that poor, myself.

No Alibis

With respect to the Basin also, one other thought ought to be borne in mind, without the figures again. This is one river basin in the United States—I have been over all of them and I

WOLMAN: THE IMPLICATIONS

have worked in most of them—this is one river basin in which the largest metropolitan area hasn't got an alibi. It is the major contributor to the mess. On every other river we spend days and weeks, and have spent years, in arguing whether or not John Jones upstream, shouldn't be the one to begin first, while John Smith, downstream, should be the one to do it last—or second. Here you haven't got that complication, thank Heaven. The major responsibility, quantitatively, is Philadelphia's. I don't think it can hedge. I don't know that it does any good if it can. But it can't hedge on the basis of the facts. On the Ohio, on the Hudson, on the Columbia, on every river where we have worked, there is always that complication: "You clean up first and I'll clean up second"—or preferably third, or fourth, or fifth, or still more preferably, twentieth. You haven't that alibi.

Some Questions

You have another alibi, however. You are in a strategic position with respect to the nation, not with respect to the basin. You are the *only* city of the seven largest cities in the United States that has done relatively nothing. "Why?" is a natural question.

I was interested in Director Neeson's reporting the fact that Philadelphia, when its Authority was created, asked the P.W.A., in 1938, for grants or loans. A natural question in my mind, as a P.W.A. Director at that time, was, "Why 1938?" Almost everybody was finished the program by 1938, and my memory is strong because we were dishing out federal grants-in-aid beginning with 1933 and continuing through 1934-35-36.

Why did Philadelphia arrive in Washington when, like Mother Hubbard's, the cupboard was bare? It is a question which I don't know much about and I merely raise it as evidence of a later question that I want to ask as to whether the city has exercised, what the Courts call, reasonable diligence in correctives. I have something to say about that a little later on.

This progress in correctives in Philadelphia, as I say, shows a tremendous lag in social organization—in which I include fiscal policy and so on—a lag of social organization behind the technological correctives, which you have had for a long time. I won't rehearse the dates. I do want to rehearse certain

DELAWARE BASIN POLLUTION

of the conditions that you have created by virtue of that lag. The intangible cost, for example, in the stream conditions which you have created, some of which Colonel Vaughan has made tangible, are tremendous; they are losses to Philadelphia. The fact that you don't measure them in dollars and cents doesn't mean that they don't cost dollars and cents. I imagine if they were convertible into tangible costs, they would add up to a figure far greater than your annual proposed cost for correctives. I won't labor that point, but I am quite convinced about it.

As to your water effects, I tread very lightly because I am perfectly well aware that friends of mine in Philadelphia who have run the Philadelphia Water Works for years, unknown to most of you, have performed a diligent, competent and fine task with a generally messy source of water. The only point about that is that they are confronted, and probably are in no position to state, that it becomes increasingly difficult, not only to protect you against disease, but to protect you against that other modern characteristic of water supply, the ability to drink it, which is a measure by no means as unimportant as its bacterial content because it drives you to a variety of other sources, some of them worse than this source, all of them obviously more expensive, even though they may be more exciting and more attractive.

In this connection, I want to point out that you have one of the lowest water rates in the United States. You do have financial resources there which might be expanded, provided, of course, you can hurdle the question as to whether water revenues should be raised sufficiently to do the collateral job. That, I know from all local municipal battles, is a difficult bar to hurdle, but it is one by which you could accomplish this task, particularly since you start at a low level of water charges in comparison with the ten largest cities of the United States.

Financing

Then I come to what I consider to be perhaps the crux of the problem here, the administrative, legal, and fiscal issues with which you are involved. Here, too, I have watched the Philadelphia situation for years.

I have been interested, and even amused, by your efforts in the last two years to get Court sanction of a device of financing the system in which you try to call a sewer rental something

WOLMAN: THE IMPLICATIONS

which it is not. I have wondered, before it was appealed to the Courts, whether the people who were making the request really believed their brief, because the Courts have since decided twice, and it should have been apparent, that a general property tax is not a sewer rental and it seemed evident at long distance, with any kind of telescope that we might use, that perhaps you yourselves suspected a general property tax was not a sewer rental. There we are. We've got the decisions back of it. It does clarify the atmosphere to realize that some of those devices are not good; that some of them are apparently hopeless.

Your situation, again, is very much like that of every other large city in the country. I have never gone into a city in which they are propagandizing for sewage treatment's sake, in which the first excuse for delay or for non-compliance with laws, isn't poverty. There appears to be money for new highways, for new tunnels, for new bridges, for new structures of one kind or another, all useful or necessary for community life. They have one characteristic which sewage treatment does not, unfortunately, have. They are all visible. They are all apparent to the aesthetic eye of the citizen. They all run into him every day. He knows what it means to get caught in a traffic jam. He knows what it means to get a through route, a freeway, a parkway, a super-highway, so that he can jump into his Ford or Lincoln and get down town quickly.

The one unfortunate attribute of sewage treatment is that nobody sees it and thus nobody cares. The only time I imagine this city, like every other, begins to care about it is when it begins to flow back into your water system, or when it begins to become apparent to the nose, or to the eye, or to the tongue, and that time arrived in Philadelphia a long time before this afternoon, so that there is still hope that an increase in public interest will occur. .

Now, what about the devices? The first question, which I will leave unanswered, is "Has the city exercised reasonable diligence in trying to find a solution?" I leave it unanswered. You might tell by my expression that I don't think it has. But I will leave it unanswered. The reason I don't think it has is that its per capita expenditure in capital costs, so far, for sewerage and sewage treatment is about fifteen cents a year, as against, say, in an adjacent city, half the size, of a dollar and sixty cents a year. It spent one-tenth of the amount put

DELAWARE BASIN POLLUTION

up by an adjacent city having similar issues and a similar depression in 1933 (which I want to remind some of our previous speakers occurred everywhere in the United States: it didn't occur only in the City of Philadelphia). And strangely enough—I want to emphasize this fact—it was during the period from 1933 to 1940 that we made the greatest advances in our history in the installation of municipal sewage treatment plants in the United States, all during that pathetic time in which Philadelphia was unable to turn a spade. Now, of course, again I am not enough of an Ellery Queen or enough of a Sherlock Holmes to determine why that is. That's your problem.

Some Alternatives

Now, what are the possibilities? We have heard a great deal about the possibility of meeting your fiscal situation by an outright sewer rental. That possibility still remains. It's good today; it could be used probably tomorrow with a minimum of legal necessity. Whether or not it is the best device I am not prepared to say on anything like the superficial examination which I have been afforded the opportunity to give it.

There is, secondly, the pay-as-you-go principle, which has been confronting us in every municipality in the country. I hold no great hopes for it unless you want to continue this race of diligence between corrective and nuisance. If you call this a race, the expenditure of a million or two million dollars a year for the next half a century, I don't hold out much hope for it unless, as I say, you want the race to be won by lowered dissolved oxygen in the Delaware. It has an edge on you in the race; it has what we call a handicap on you. The pay-as-you-go technique will preserve that handicap for many years to come.

Sanitary District Authority

I refer, thirdly, to a device which is on the books of the State of Pennsylvania and which I think you have embodied in the use of a sanitary district authority, not solely for the City of Philadelphia and its political boundaries, but to encompass, for both water and sewer purposes, the metropolitan area of Philadelphia, if for no other reason than that it affords machinery which can ultimately devise a financial scheme and an administrative structure which could and should handle

WOLMAN: THE IMPLICATIONS

this complex issue on the basis upon which it should be handled. It is certainly not a device which should be discarded too promptly, without exploring its possibilities. I am well aware of what it would do to the local jealousies of various administrative officials; those have always confronted us elsewhere when any authority or metropolitan district is created, but it should not be an insurmountable barrier if it is a good business-like device to meet some of your issues.

State Responsibility

And here I come to local autonomy again. I want to remind this group that Philadelphia is a creature of the Commonwealth of Pennsylvania. It has, actually, no legal status. It owes its existence to the State, not to the Federal Government. I wonder whether it has ever occurred to the Commonwealth of Pennsylvania and to the City of Philadelphia that if there are constitutional restrictions, if there are financial disabilities, both the state and the municipality are culpable. I want to recall to this group that there are such things as state grants-in-aid, if you want to keep clear of the centralist political philosophies and the federal grants-in-aid. There are, more important than that, major central responsibilities of the Commonwealth of Pennsylvania.

The only reason I emphasize that is this: I want to take you back 13 years to a United States Supreme Court decision in the case of the Chicago Sanitary District, in which a number of states sought to enjoin the District from doing certain things which were objectionable to those states. It is interesting to recall that in that injunction it included the State of Illinois and its creature, the Sanitary District of Chicago. I want to read you one section of that Supreme Court decision because it is pertinent to the Philadelphia situation. I want to recall, also, that the plea of the Chicago Sanitary District at that time was that it was bankrupt. Many of us remember, perhaps, why it was bankrupt. Many of us know that there may have been sound reasons for their difficulty in financing the situation. And the Court said this: "The defendants are doing a wrong to the complainants and they must stop it. They must find a way out, at their peril. We have only to consider what is possible if the State of Illinois devotes all of its powers to dealing with an exigency to the magnitude of

DELAWARE BASIN POLLUTION

which it seems not yet to have fully awakened. It can base no defenses upon difficulties that it, itself, has created. If its constitution stands in the way of prompt action, it must amend it or yield to an authority that is paramount to the state." Now, if you please, will you substitute, when you leave here today, for the State of Illinois, the State of Pennsylvania; and for the Chicago Sanitary District, the City of Philadelphia, and you might have an inkling that these eternal, constitutional, fiscal, administrative obstacles which we have heard about for 20 years can be wiped off of the scene if you have the will to do it.

Federal Financing

Then we come, of course, to federal financing, in part or in whole. I merely recall to you that you have open to you even today, much after 1938, that possibility, through the Lanham Act. There is a provision in that Act which permits the procedure of leasing a system to a community, thus avoiding the difficulties of indebtedness limitations.

You may be, and perhaps should be, too proud of your local autonomy and your local irresponsibility to take advantage of it, but if you do fail to take advantage of it or any other device, I say you should fall back upon the local autonomy and the local responsibility of your community and your state, because I need hardly point out that in the list of states in the United States I would hardly put the Commonwealth of Pennsylvania among the poverty-stricken. I would hardly couple it with unnamed states which are truly poverty-stricken because of the absence of resources, of materials, of men and of equipment.

I have left until last a suggestion which I know would cause Incodel to have a special meeting this afternoon, if for no other reason than to impeach your last speaker. It would be interesting to see what would happen if the State of New Jersey and the State of Delaware were to enter a suit in the United States Supreme Court tomorrow against the Commonwealth of Pennsylvania and the City of Philadelphia for *ruining* an interstate stream. I suspect that they would win, and I suspect you would find the money to correct it.

APPENDIX I.

COMMISSION RESOLUTIONS

The following two formal resolutions were drafted and approved by the Interstate Commission on the Delaware River Basin on Friday, October 24, 1941: they were based, at least in part, upon the conference discussion.

THE INTERSTATE COMMISSION ON THE DELAWARE RIVER BASIN

I.
A RESOLUTION

on
DOMESTIC WATER POLLUTION
IN THE DELAWARE RIVER BASIN

1. WHEREAS, the discharge of untreated sewage into the waters of the Commonwealth of Pennsylvania has been prohibited by the General Assembly under the Act of April 22, 1905, followed later by the Act of June 14, 1923, and most stringently demanded by the Anti-Pollution Act of June 22, 1937, currently in effect, and,
2. WHEREAS, the City of Philadelphia, under the terms of the 1905 Purity of Waters Act, was directed to prepare a comprehensive plan for the collection, treatment, and disposal of the City's domestic wastes, which plan was presented to and accepted by the State Department of Health in 1915 with the requirement that the City embark upon an immediate construction program to carry out the detailed specifications of its comprehensive plan, and,
3. WHEREAS, the execution of this plan was delayed by the first World War and its aftermath, with the result that a supplemental agreement was made between the Commonwealth and the City, in 1922, under the terms of which the City obligated itself to spend a minimum of three million dollars annually on sewage works construction until the completion of its program, and,
4. WHEREAS, the City complied with the terms of this agreement for a period of only six years, during which less than twenty million dollars was appropriated for sewage collection, treatment, and disposal, and,
5. WHEREAS, since 1929, no substantial appropriations have been made by the City, leaving it in excess of 38 million dollars in arrears on its sewage construction program, with the result that the Sanitary Water Board has refused to issue permits for the City to continue its discharge of untreated sewage into the Delaware and Schuylkill Rivers and has demanded that the City proceed forthwith to comply with the law, and,
6. WHEREAS, various methods for the financing of this urgently needed public improvement are available to the City, including (1) the Act of May 28, 1937, authorizing

- municipalities engaged in the construction of sewage disposal projects to issue non-debt revenue bonds, to be secured by sewer rentals, or (2) the Act of July 18, 1935, as amended May 14, 1937, conferring upon municipalities broad powers to construct sewage treatment works by contracting with a Public Authority for the furnishing of sewage treatment services and to impose an annual rental or charge for the use of sewer systems, or (3) the Act of June 27, 1937, which similarly confers upon municipalities the power to issue and sell non-debt revenue bonds and secure the same by the pledge of sewer rentals, and,
7. WHEREAS, communities in the Delaware River Basin above Philadelphia have, with relatively few exceptions, constructed at considerable expense, and are now maintaining, sewage collection and treatment facilities, and,
 8. WHEREAS, communities in the Delaware River Basin below Philadelphia have constructed at considerable expense, and are now maintaining, sewage collection and treatment facilities and are rightly demanding that their source of water supply, the Delaware River, be protected from pollution by the daily discharge of 350 million gallons of raw sewage by the City of Philadelphia, and,
 9. WHEREAS, the Cities of Camden, Gloucester, and Beverly and the Boroughs of Riverton, Palmyra, and Swedesboro, in the South Jersey section of the Delaware River Basin have been served with legal orders to cease their present discharge of untreated wastes into the waters of the Delaware River Basin as issued under the authority of the New Jersey Department of Health; now, therefore,

BE IT RESOLVED, by the Interstate Commission on the Delaware River Basin:

That the Sanitary Water Board of the Commonwealth of Pennsylvania be urged to make use of the powers granted to it for such purposes by the General Assembly of the Commonwealth under the Act of June 22, 1937, and proceed in the name of the Commonwealth upon relation of the Attorney General to institute suit in equity or at law, in the manner prescribed in the Act of the General Assembly, to prevent the continued and unlawful discharge of untreated domestic sewage into the waters of the Delaware and Schuylkill Rivers by the City of Philadelphia.

THE INTERSTATE COMMISSION ON THE DELAWARE RIVER BASIN

II.
A RESOLUTION
on
INDUSTRIAL WATER POLLUTION
IN THE DELAWARE RIVER BASIN

1. WHEREAS, municipal sewage treatment and disposal problems are of primary importance in the Philadelphia-Camden zone of the Delaware River Basin where the sewage volume is directly proportional to the dense concentration of population; and,
2. WHEREAS, the industrial trade waste treatment and disposal problems in the Delaware River Basin, as elsewhere, vary much in difficulty and in the degree to which the industries may be expected to meet the cost of correction, so that it is impossible to devise any standardized form of treatment that could satisfactorily and economically produce the desired result for all industries; and,
3. WHEREAS, by the construction, maintenance, and operation of municipal sewage collection, treatment, and disposal systems, a substantial part of industrial trade wastes, now discharged into municipal systems, would receive treatment; and,
4. WHEREAS, this Commission, as a public agency, has held and maintained the view that adequate municipal sewage collection and treatment facilities must be secured before the industrial waste problem can be vigorously attacked; now, therefore,

BE IT RESOLVED, by the Interstate Commission on the Delaware River Basin:

That the water pollution problem of first priority in this watershed is the construction, maintenance, and operation of adequate municipal sewage collection, treatment, and disposal systems, and further, that immediate resumption of work in carrying forward to speedy completion the City of Philadelphia's plan of domestic waste disposal is by far the most important project in the entire Delaware River Basin.

APPENDIX II.
CONFERENCE REGISTRATION

CONFERENCE REGISTRATION

Aaron, E. George	Department of Public Affairs	Camden, New Jersey
Aller, Mrs. Elliott	Civic Club of Philadelphia	Philadelphia
Armstrong, Paul S.	Bureau of Water	Easton, Pa.
Armstrong, Roger W.	Board of Water Supply	New York City, N. Y.
Atkins, Captain Frank	U. S. Army Engineers Corps	Philadelphia
Bache, Miss Emily	Civic Club of Philadelphia	Philadelphia
Bache, Miss M. H.	Civic Club of Philadelphia	Philadelphia
Bachman, Fred	Darby Creek Joint Authority	Yeadon, Pa.
Bean, George L.	Consulting Engineer	Philadelphia
Becker, C. H.	R. D. Wood Co.	Philadelphia
Beckett, R. C.	Incodel	Dover, Delaware
Beltz, John H.	Chemist	Philadelphia
Beyer, William C.	Bureau of Municipal Research	Philadelphia
Biddle, H. McIlvain	Mayor of Riverton	Riverton, New Jersey
Birkinbine, Carl P.	Consulting Engineer	Philadelphia
Boies, Mr. David M.	Member of General Assembly Commission on Interstate Cooperation	Clairton, Pa.
Borkland, Gustav A.	Muckinapates Joint Authority	Glenolden, Pa.
Brown, Mrs. E. H.	League of Women Voters	Philadelphia
Brownback, Henry L.	Engineer	Norristown, Pa.
Buckley, Thomas	Bureau of Engineering, Surveys, and Zoning	Philadelphia
Butcher, Harry K.	Committee of Seventy	Philadelphia
Calder, John W.	Central Delaware County Sewer Authority	Springfield, Pa.
Campbell, Mrs. C.	Civic Club of Philadelphia	Philadelphia
Clayton, Mrs. J. L.	Civic Club of Philadelphia	Philadelphia
Connelly, Joseph	Township Commissioner	Upper Darby, Pa.
Costello, James W.	Board of Commerce & Naviga- tion	Newark, New Jersey
Courtney, P. F.	Port of Philadelphia Maritime Society	Philadelphia, Pa.
Cramer, C. G.	Texas Company	Claymont, Delaware
Crawford, Mrs. Alan	Council for Preservation of Na- tural Beauty	Devon, Pa.
Critchlow, H. T.	State Water Policy Commission	Trenton, New Jersey
Crothers, J. Alex	South Jersey Port Commission	Camden, New Jersey
Daly, Thomas	City Engineer	Camden, New Jersey
Damon, A. F., Jr.	Bureau of Public Works	Upper Darby, Pa.
Danton, Mrs. J. P.	League of Women Voters	Philadelphia
Davis, Miss E. B.	Civic Club of Philadelphia	Philadelphia
Delehanty, W. F.	Delaware County Chamber of Commerce	Chester, Pa.
Dodd, Rennie	Chester Municipal Authority	Chester, Pa.
Elias, George A.	State Department of Health	Philadelphia
Emerson, C. A.	Consulting Engineer	New York City, N. Y.
Emhardt, William H.	Germantown & Chestnut Hill Improvement Association	Philadelphia
Feehey, P. J.	Water Department	Wilmington, Del.

You Are Viewing an Archived Copy from the New Jersey State Library
CONFERENCE REGISTRATION

Follett, D. G.	Board of Water Supply	New York City, N. Y.
Forbes, R. D.	Allegheny Forest Experiment Station	Philadelphia
Franey, J. M.	U. S. Engineers Office	Philadelphia
Freeburn, Harry M.	Philadelphia Suburban Water Company	Bryn Mawr, Pa.
Freehafer, Carl	Engineers Club	Philadelphia
Freil, Frank S.	Consulting Engineer	Philadelphia
Fritschman, H. A.	State Assoc. of Township Commissioners	Upper Darby, Pa.
Gant, Charles H.	Incodel	Wilmington, Del.
Gibbs, W. M.	Consulting Engineer	Mt. Holly, N. J.
Gilbert, Francis P.	U. S. Department of Agriculture	Upper Darby, Pa.
Gill, Joseph E.	Bureau of Water	Philadelphia
Glace, I. M.	Consulting Engineer	Harrisburg, Pa.
Gorman, Edwin, J.	Department of Public Affairs	Camden, New Jersey
Gould, D. R.	Councilman	Riverton, New Jersey
Graves, Dr. W. B.	Temple University	Philadelphia
Haney, J. D.	Cities Service Oil Company	Philadelphia
Hart, W. B.	Atlantic Refining Company	Philadelphia
Hartwell, O. W.	U. S. Geological Survey	Trenton, New Jersey
Haydock, Charles	Consulting Engineer	Philadelphia
Hayes, Morgan D.	Water Bureau	Philadelphia
Haywood, Robert	Chester Water Company	Chester, Pa.
Heal, Senator B. S.	Incodel	Holly Oak, Delaware
Hendrickson, Sen. R.	Incodel	Woodbury, N. J.
Hess, Seth G.	Interstate Sanitation Commission	New York City, N. Y.
Hewish, Edgar	Darby Creek Joint Authority	Sharon Hill, Pa.
Heyburn, Sen. W. B.	Incodel	
Heydecker, Wayne D.	Council of State Governments	New York City, N. Y.
Hibbs, E. D.	Radio Station WTEL	Philadelphia
Hiestand, Joseph D.	Schuylkill River Valley Restoration Association	Philadelphia
Hill, Francis J.	Camden County Chamber of Commerce	Camden, N. J.
Hitchens, Col. A. P.	University of Pennsylvania	Philadelphia
Hoffert, J. R.	State Department of Health	Harrisburg, Pa.
Holmes, Mrs. L. R.	New Century Club	Philadelphia
Howland, Charles	Philadelphia Section, A.S.C.E.	Philadelphia
Hudson, Robert V.	Engineers Club	Philadelphia
Irwin, William F.	Philadelphia County Medical Society	Philadelphia
Irwin, Mrs. W. T.	Philadelphia County Federation of Womens Clubs	Philadelphia
Jacobs, Nathan B.	Consulting Engineer	Philadelphia
Jacobs, Maurice S.	College of Physicians	Philadelphia
Jenne, Lyle L.	Bureau of Water	Philadelphia
Johnson, Meredith E.	Department of Conservation and Development	Trenton, New Jersey

CONFERENCE REGISTRATION

Kauffmann, I. E.	Philadelphia Chapter, Izaak Walton League of America	Philadelphia
Keely, E. M.	Cities Service Oil Company	Philadelphia
Kelly, F. W.	U. S. Army Engineers Corps	Philadelphia
Ketterer, Mrs. Gustav	General Federation of Womens Clubs	Philadelphia
Kilimnik, J. J.	United Business Mens Assoc.	Philadelphia
King, York A., Jr.	Junior Board of Commerce	Philadelphia
Kittrell, F. W.	Interstate Commission on the Potomac River Basin	Washington, D. C.
Klockner, L. W., Jr.	State Department of Health	Trenton, New Jersey
Koester, E. F.	Traffic Engineer	Wilmington, Del.
Kowalchik, S. A.	State Department of Health	Trenton, New Jersey
Kulp, Dr. D. R.	Federation of Sportsmens Clubs	Reading, Pa.
Lafore, Mrs. John A.	New Century Club	Narberth, Pa.
Laird, Dr. John L.	Department of Public Health	Philadelphia
Lasche, T. D.	United Business Men's Assoc.	Philadelphia
Laughlin, Milton	Radio Station WHAT	Philadelphia
Leeds, Morris E.	Committee of Seventy	Philadelphia
Levy, Mrs. Lionel F.	League of Women Voters	Philadelphia
Lovett, James E.	Pennsylvania General Assembly Commission on Interstate Co- operation	Trafford, Pa.
McAfee, Miss C. B.	Civic Club of Philadelphia	Philadelphia
McNeal, Mrs. Hector	Philadelphia Federation of Womens Clubs	Philadelphia
Mack, Edward R.	Superintendent of Parks	Wilmington, Del.
Malin, Hollan G.	Manufacturers Association of Delaware County	Chester, Pa.
Mears, J. E.	Hotel Walt Whitman	Camden, New Jersey
Miller, Major H. S.	U. S. Engineers Office	Philadelphia
Mollenhauer, Wm., Jr.	Allegheny Forest Experiment Station	Philadelphia
Montgomery, Miss N.	Civic Club of Philadelphia	Philadelphia
Moore, Dr. Wm. H.	Schuylkill River Valley Restoration Association	Philadelphia
Morrill, L. M.	State Department of Health	Trenton, New Jersey
Moses, H. E.	State Department of Health	Harrisburg, Pa.
Neeson, John H.	Department of Public Works	Philadelphia
Nunner, W. S.	Izaak Walton League of America	Philadelphia
Ogden, Mrs. Nelson	Civic Club of Philadelphia	Philadelphia
Pardoe, William S.	University of Pennsylvania	Philadelphia
Paul, Joseph C.	Incodel	Newark, N. J.
Peoples, Clifford H.	Mayor of Chester	Chester, Pa.
Peterson, Henry W.	South Jersey Port Commission President, City Council	Woodbury, N. J.
Pietsch, W. H.	Sun Oil Company	Marcus Hook, Pa.
Pitkin, F. A.	Incodel	Harrisburg, Pa.
Price, Mrs. Wm. F.	Pennsylvania Roadside Council	Hatboro, Pa.
Reustle, Elmer Y.		Philadelphia

CONFERENCE REGISTRATION

Roebing, Mrs. M. G.	Incodel	Trenton, New Jersey
Roeder, Charles B.	Philadelphia Bourse	Philadelphia
Rosengarten, W. E.	Township Engineer	Lower Merion, Pa.
Rubright, Frank E.	Izaak Walton League of America	Philadelphia
Rudolfs, Dr. Willem	New Jersey Agricultural Experiment Station	New Brunswick, N. J.
Ryder, Charles E.	Pennsylvania Water and Power Resources Board	Harrisburg, Pa.
Saville, Dean T. S.	New York University	New York City, N. Y.
Schall, Lynn	State Department of Health	Trenton, New Jersey
Schwalm, F. M.	Property Owners Committee of Delaware County	Chester, Pa.
Sheble, Miss A. A.	Civic Club of Philadelphia	Philadelphia
Sheble, Miss S. E.	Civic Club of Philadelphia	Philadelphia
Sheen, Robert T.	Consulting Engineer	Philadelphia
Shils, Dr. Edward	Pennsylvania Economy League	Philadelphia
Shoemaker, E. L.	Philadelphia Section, A.S.C.E.	Philadelphia
Siebert, Christian	State Department of Health	Harrisburg, Pa.
Smedley, Samuel L.	Delaware County Park and Recreation Board	Newtown Square, Pa.
Spainhour, C. M.	U. S. Engineers Office	Philadelphia
Steele, William, 3rd		Philadelphia
Stone, Dr. A. L.	Bureau of Health	Camden, New Jersey
Straub, Conrad P.	U. S. Public Health Service	Camden, New Jersey
Swaab, Solomon M.	Consulting Engineer	Philadelphia
Teaf, H. Morris	Izaak Walton League of America	Philadelphia
Thomas, Frank	Izaak Walton League of America	Philadelphia
Thompson, C. R.	Department of Wharves, Docks, and Ferries	Philadelphia
Thompson, Gen. J. S.	Incodel	Medina, New York
Tofani, B. Joseph	U. S. Department of Agriculture	Upper Darby, Pa.
Tompkins, D. N.	Philadelphia & Norfolk Steamship Company	Philadelphia
Tracy, Dr. Martha	Department of Health	Philadelphia
Turner, Ellwood J.	Incodel	Chester, Pa.
Van Loan, S. M.	Bureau of Water	Philadelphia
Vaughn, Lt. Col. H. B.	U. S. Army Engineers Office	Philadelphia
Velz, C. J.	Manhattan College	New York City, N. Y.
Von Nieda, Frederick	Delaware River Yachtsmens League	Camden, New Jersey
Wachs, Theodore	Radio Corporation of America	Camden, New Jersey
Wallerstein, M. L.	National Resources Planning Board	Richmond, Virginia
Ward, John	Mayor of Palmyra	Palmyra, New Jersey
Warner, Sen. E. S.	Incodel	Phelps, N. Y.
Weaver, Dr. R. H.	Civic Club of Philadelphia	Philadelphia
Walker, Mrs. Robert	Civic Club of Philadelphia	Philadelphia
Warner, Charles	Warner Company	Philadelphia
Weber, Harry E.	Board of Fish Commissioners	Philipsburg, Pa.

CONFERENCE REGISTRATION

Wescott, Ralph W.	Camden County Chamber of Commerce	Camden, New Jersey
Wetherill, S. P.	Regional Planning Federation	Philadelphia
Williamson, L. H.	R. D. Wood Co.	Philadelphia
Wills, Henry W.	Philadelphia Board of Trade	Philadelphia
Wilson, Alexander, 3rd	Darby Creek Joint Authority	Philadelphia
Wilson, Frank T.	Northeast Phila. Chamber of Commerce	Philadelphia
Wilson, P. S.	Engineer	Glen Ridge, N. J.
Wolman, Dr. Abel	Johns Hopkins University	Baltimore, Maryland
Woodward, Sen. G.	Pennsylvania Senate Commission on Interstate Cooperation	Philadelphia
Wooley, Mrs. Martha	Bucks County Protective Association	Lahaska, Pa.
Yerkes, Mrs. Bayard	Frankford Womans Club	Philadelphia
Zimmerman, Fred L.	New York Joint Legislative Committee on Interstate Cooperation	New York City, N. Y.

INCODEL PRINTED PUBLICATIONS

on

WATER POLLUTION PROBLEMS

TOWARD UNITY. A series of addresses on regional planning with particular reference to federal legislation as embodied in the federal planning and stream pollution bills introduced in the seventy-fourth Congress. Includes remarks by Wolman, Aiken, Morgan, Toll, Hendrickson, Minard, Lonergan, and others, as delivered at the Second Annual Regional Conference of the Interstate Commission on the Delaware River Basin: 71 pp.; January, 1938. **Series A No. 7**

WATER POLLUTION. First printing of the Interstate Reciprocal Agreement for the correction and control of pollution in the waters of the interstate Delaware River as drafted and negotiated by the Interstate Commission on the Delaware River Basin, with subsequent formal ratification by the State Departments of Health of Delaware, New Jersey, New York, and Pennsylvania. Contains introductory sections devoted to general problems of land and water use: 19 pp.; tables, maps, charts; November, 1938. **Series B No. 1**

MUNICIPAL AUTHORITIES. A supplement to the first brochure in this series. Reprints the Commission's legal-economic brief in support of the Pennsylvania Municipal Authorities Act and includes the Pennsylvania Supreme Court's decision upholding the validity of that Act: 22 pp.; January, 1939. **Series B No. 1 (Supplement)**

PLANNED PROGRESS IN POLLUTION CONTROL. Covers three years of planned progress, 1936-1939, toward the restoration and maintenance of the quality of water of the Delaware River and its tributaries. Emphasizes two major trends in the coordinate direction of progress in planning and progress in construction: 20 pp.; illustrated, maps, tables, charts; January, 1940. **Series B. No. 3**

PHYSICAL FACTS. A graphic compendium depicting some of the major physical facts with which the state governments are concerned in approaching a solution to the problems of land and water use and control in this drainage area: loose-leaf format; maps, charts, graphs, tables; running commentary; a cumulative publication. **Series A No. 29**

THE INTERSTATE COMMISSION ON THE DELAWARE RIVER BASIN

ADVISORY COMMITTEES

COMMITTEE ON PLANNING

NEW JERSEY

DR. CHARLES P. MESSICK
Chairman of State Planning Board

MR. RUSSELL VAN NEST BLACK
Director of State Planning Board

NEW YORK

DR. M. P. CATHERWOOD
Commissioner, Division of Commerce

MR. MAURICE NEUFELD
Deputy Commissioner, Division of Commerce

PENNSYLVANIA

MR. F. A. PITKIN
Director of State Planning Board

NATIONAL RESOURCES PLANNING BOARD

MORTON L. WALLERSTEIN
Chairman, Region No. 2

COMMITTEE ON QUALITY OF WATER

DELAWARE

MR. R. C. BECKETT
Director, Division of Sanitary Engineering

NEW JERSEY

MR. H. P. CROFT
Chief Engineer of Department of Health

NEW YORK

MR. C. A. HOLMQUIST
Chief Engineer of Department of Health

PENNSYLVANIA

MR. H. E. MOSES
Chief Engineer of Department of Health

COMMITTEE ON QUANTITY OF WATER

NEW JERSEY

MR. HOWARD T. CRITCHLOW
*Engineer in Charge
State Water Policy Commission*

NEW YORK

MR. RUSSELL SUTER
*Executive Engineer
Division of Water Power and Control*

PENNSYLVANIA

MR. CHARLES E. RYDER
*Chief Engineer
Water and Power Resources Board*

COMMITTEE ON INFORMATION AND RESEARCH

MR. R. D. FORBES,
Senior Forester, Allegheny Forest Experiment Station

DR. W. BROOKE GRAVES,
Professor of Political Science, Temple University

DR. FRANK A. HEACOCK,
School of Engineering, Princeton University

DR. FRANK B. HOWE,
Professor of Soil Technology, Cornell University

DR. WILLIAM S. PARDOE,
School of Engineering, University of Pennsylvania

DR. WILLEM RUDOLFS,
New Jersey Agricultural Experiment Station

DEAN THORNDIKE SAVILLE,
College of Engineering, New York University

MR. WAYNE D. HEYDECKER,
Regional Representative, Council of State Governments