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ON OUR COVER is a portion of the Container Control Center for Norfolk
International Terminals, presented by McGaughy, Marshall and McMillan on
page 32 of this issue. (Photo by Ron Kirby)
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During the deluge of (mostly deserved) brickbats assailing this administration of "good ole boys" — the peanut-grower, his kinfolks and neighbors, and sundry downhome cronies — probably a number of their fellow-statesmen regard with some satisfaction this belated "Revenge For Sherman." Doubtless not too many non-Georgian Southerners, except among politicians, find much satisfaction at the almost grotesquely inept performance of the first president from a former state of the Confederacy and of the original thirteen colonies since before the Civil War. They might experience some relief from hearing gleeful renditions of that callously cruel hymn to pillage, "When We Were Marching Through Georgia." But this would not lead to an impulse to sing a retaliatory paean to "The Rednecks March Through Washington."

For, though a strain of parochialism still runs through the denizens of the South (stronger in some areas than in others), and a sense of a Southern identity exists in most Southerners of middle-age or older (and some younger), the region as a whole is as American as, say California or New York City or the so-called "heartland" of the Midwest. Yet, in the conglomeration of diverse regions, with diverse and often conflicting interests, in which we are daily confronted with the more vocal demands of ethnic groups and the more ruthless ambitions of economic groups, The South (as the dying Calhoun said, "the poor South") seems to be the one entity that all the rest accept as unAmericanly "different."

In a long, lead article in the Saturday Review on "Sunbelt vs Frostbelt," Horace Sutton writes, "117 years after the outbreak of the War Between the States, we remain a nation where part of the country waves and reveres the flag of the Confederate breakaway states and still sings 'Dixie' as if it were 'Onward, Christian Soldiers'...." Now, the antics at Alabama and Mississippi football games might tend to confirm what the author wishes to believe, but in Richmond, Virginia, the capital of the Confederacy which withstood four years of attacks and siege, the Confederate Museum, housed in the former White House of the Confederate States, does not fly a Confederate flag. Nor can I remember when I heard "Dixie" sung. In fact, at the private school which my daughters attended, the students were taught "The Battle Hymn of the Republic." Although my daughters refrained from singing it, I've never heard them sing "Dixie" either.

In Mr. Sutton's perception, he reveals another cult-view of the South by mentioning that the Civil War broke out 117 years ago. Heaven knows that is long enough for it to be forgotten by the victorious invaders who sanctified their power struggle by slogans such as "freeing the slaves." In this delusory moral superiority, they were able to dismiss the devastation that overwhelmed the Southern people, their property and institutions, during four years of invading armies and eleven years more of the despoliation of Reconstruction. It was simpler 75 years after the war in the South, where whole cities were destroyed and a people impoverished, to regard the South as a poverty-stricken appendage composed to ignorance and bigotry.

Then, in 1939, F. D. Roosevelt, the Hudson River Valley patrician, said... "the South presents right now the nation's number one economic problem — the nation's problem, not merely the South's. For we have an economic unbalance in the nation... that can and must be righted for the sake of the South and of the nation."

That year the war started in Europe  (Continued on page 40)
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That engineering creates wealth is probably its most important raison d'être. It creates wealth by innovativeness, experimentation, by decision arrived at after careful deliberation, by strict control of engineering projects. To prove that engineering creates wealth one need only cite as outstanding feats of Charles Steinmetz, Charles Taylor, Herbert Hoover, and Vannevar Bush. And we know, of course, that although these men's accomplishments are now become history, the era of engineering accomplishments is not closed. Future records will document the accomplishments of those engineers who are right now working in their laboratories, in factories, and at their drafting tables to live today's engineering problems.

Engineering can create wealth by opening up new chronological vistas, by pointing to new methods, and by inventing new products. It can also create monetary benefits by saving costs, by reducing the period of completion of a project, or by finding new ways of accomplishing a task.

To do any of this, however, engineering must have the opportunity. So, the equally important consideration is that engineering must be used properly. To derive the full benefit on the engineer's knowledge and experience it is imperative that he be called in as early as possible in the scission stage of a project.

We find quite often that prospective engineering clients are asking too many decisions too early in approaching their projects and not leaving enough latitude for the engineer to make the decisions which can save money, create a better project, or invent a new way of completing to benefits the client. This chains the engineer to certain methods and makes it impossible for him to exercise the full extent of his ability and knowledge for the benefit of his client.

ENGINEERING COSTS

The client may believe that by preparing much work themt the benefit of the engineer's advice he is saving money, but that is not always so. In fact, it is quite likely that the client, attempting to save some of the engineering cost, is instead already lost money by precluding the full application of his engineer's experience and innovativeness.

A client's concern with the costs of engineering is usually redirected. That does not mean that the client should spend money unnecessarily or foolishly on any part of his project. He will naturally be concerned with the economics. However, may well be that in some instances the engineering cost is higher than expected but in turn the higher engineering cost result in a lower total overall cost of the completed project.

The cost to be watched more critically is the overall cost of the completed prototype. Let us say that the engineer, however, after spending the allocated engineering fee decides to go further and spend an additional 50% of the amount originally set aside for engineering, thereby reducing both the cost of the prototype and its construction time. The benefit, of course, will accrue to the client.

THE PROOF IS THERE

It is difficult to prove the cost saving of a project, but it sometimes proves itself almost incidentally. These are cases where the engineer is locked in to a certain method, but the total project bid is too high to suit the client. He prevails upon the engineer now to begin reworking the entire concept. The engineer, being free to use his innovativeness, imagination, and engineering knowledge, arrives at a considerably lower cost for the project by changing specifications, materials, and/or methods of erection. Now the client knows that the additional engineering has saved him money. The engineer's fee will be higher than expected, because the engineer had to do his work twice. But the total cost is reduced through the re-design. It would, of course, have been better had the client called the engineer in sooner. This would have reduced both the engineering fee and the total project cost.

Naturally, what is true of buildings and machines is equally true of other engineering projects. We could just as well be talking of bridges, water filtration, water supply, sewage treatment plants, or any other engineering projects.

Engineering may be based on a fixed fee, percentage of construction cost, cost times a factor, or on a combination of these — depending on the nature and location of the project.

The important thing is that the fee permits the engineer to do his job thoroughly, weighing all possible alternates and costs versus gains, so that the client can look upon a satisfactorily completed project.

There must be the utmost trust and confidence between the engineer and his client. The engineer is greatly concerned with the satisfaction of his client because a galaxy of satisfied clients are the best assurance for the engineer's continued professional progress. The engineer's reputation and economic welfare depend greatly on the esteem in which he is held by his clients. (Reprinted with permission of the Consulting Engineers Council of Oregon.)
Officers and Directors of the CEC/V 1978 - 1979

JAMES A. LIMERICK, JR.
President

  A native of Richmond, Limerick holds a B.S. degree in civil engineering from VPI & SU. A former sanitary engineer for the Virginia Department of Health, he joined R. Stuart Royer & Associates in 1955, and now is a partner in the Richmond, Va., consulting engineering firm. He is a certified professional engineer in Virginia, West Virginia and North Carolina.
  Limerick has been a member of CEC/V and the American Consulting Engineers Council for many years, and has served the state Council as vice president, and as chairman or member of many of its committees. He also belongs to the Virginia and National Societies of Professional Engineers, Virginia Association of Professions, American Waterworks Association, and Water Pollution Control Federation. He has served on several advisory groups and panels to the State Water Control Board.

RICHARD L. WILLIAMS
President Elect

  Williams was graduated in 1959 from Virginia Polytechnic Institute and State University with a B.S. degree in civil engineering. He formed his own firm — Richard L. Williams Consulting Engineer — in 1973 in Roanoke, offering professional services in civil, structural and sanitary engineering.
  He is licensed to practice in Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Ohio, Pennsylvania and Maryland.
Robert D. Sayre was born in Canton, D. He was graduated in 1950 with a S. degree in civil engineering from the South Dakota School of Mines and Technology, and received a Master's degree in civil engineering in 1952 from the University of Virginia.

After working for E.I. duPont de Nemours, the Corps of Engineers and several engineering firms, Sayre opened his own consulting engineering firm in Richmond in 1968. In 1973, he took in a partner and changed the name of the firm to Sayre & Sutherland, Inc., and became its president.

Sayre is registered in Virginia, West Virginia, North Carolina, South Carolina, Maryland, Ohio and the District of Columbia.

In addition to the Consulting Engineers Council of Virginia and the American Consulting Engineers Council, Sayre is a member of the National and Virginia Societies of Professional Engineers. He received the Virginia Society's outstanding service award in 1968 and its distinguished service award in 1973. He also was president of VSPE in 1972-1973, and president of the Engineer's Club in 1970.

Sayre is a Fellow of the American Society of Civil Engineers, and belongs to the International Society of Soil Mechanics and Foundation Engineering, the Virginia Association of Professional Engineers and the American Arbitration Association. He also is a member of the board of directors and is on the executive committee of Terra Insurance, Ltd., Hamilton, Bermuda.

Oliver P. Strawn, Jr., 52, is a partner in the CEC/V member firm of Scott & Scott, Inc.

A native of Martinsville, Virginia, Strawn received his B.S. and M.S. degrees in Mechanical Engineering in 1950 and 1965, respectively, from Virginia Polytechnic Institute.

Before joining his present firm in 1976, Strawn operated his own consulting office in Blacksburg from 1972 to 1975. He was assistant professor of engineering at VPI from 1957 until 1972.

In addition to his many activities in the Consulting Engineers Council of Virginia and The American Consulting Engineers Council, Strawn is a member of the Virginia and National Societies of Professional Engineers; American Society of Mechanical Engineers and the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Strawn belongs to the Southern Baptist Church in Blacksburg where he has served as Deacon and Sunday School Superintendent. He also was chairman of the Montgomery County Republican Party from 1969 until 1976, and has been a member of the Party's state Central Committee since 1976.

Strawn is active in the PTA, the Lions Club and Boy Scout work.
Daniel J. DeYoung

Secretary

- Daniel J. DeYoung received his early education in public schools in different parts of the country, and was graduated from high school in Kaiserslautern, Germany.

He attended Hope College in Holland, Mich., before transferring to VPI & SU in his junior year. He was graduated from VPI & SU in 1961 with a B.S. degree in civil engineering.

DeYoung has worked as bridge design engineer for the Kentucky Department of Highways, in the bridge division of the Virginia Department of Highways and as an estimator/resident engineer with a Maryland general building contractor. He then spent 5 years as a structural engineer with Torrence, Dreelin, Farthing and Buford, followed by a position as chief staff structural engineer for R. Stuart Royer & Associates.

In 1973, DeYoung became a vice-president with Architects and Engineers, Inc. (formerly Woodside Littlepage and DeYoung, Inc.) Williamsburg. He is registered in Virginia, Maryland and Alabama.

DeYoung is a member of the Virginia and American Consulting Engineers councils, the National Society of Professional Engineers, and was 1977-78 president of the Williamsburg chapter of the Virginia Society of Professional Engineers. He also belongs to the Society of Marketing Professional Services, the American Institute, Westgate Lodge #352, AFAM of Richmond, and the Williamsburg Kiwanis Club.

DeYoung is married to the former Jackie Weatherman, of Patrick County, and they have two sons.

Henry P. Sadler

Treasurer

- Henry P. Sadler is a charter member of the Consulting Engineers Council of Virginia, and has served that organization in many capacities over the years. Last year he received the CEC/V Past Presidents' award for outstanding service.

He is president of Henry P. Sadler & Associates, Inc., Consulting Engineers, of Richmond, and is a registered civil engineer in Virginia, North and South Carolina and Florida.

Sadler is a member of the American Society of Civil Engineers, American Arbitration Association, American Public Works Association, American Railway Engineering Association, American Water Works Association, National and Virginia Societies of Professional Engineers.
WILLIAM L. GIBSON  
Director

William L. Gibson, partner in the consulting engineering firm of handler and Gibson, Norfolk, is a director of the Consulting Engineers Council of Virginia (CEC/V) for 1978-79. Before he became a partner in his present firm in 1964, Gibson was a partner in the Norfolk firm of John A. offman & Associates, and a supervising engineer with the U.S. Army Corps of Engineers. A graduate Virginia Polytechnic Institute and State University, Gibson has been a registered professional engineer in Virginia since 1953.

He is a long-time member of CEC/V, and has served that organization as eastern regional vice president and chairman or member of many of its committees. He also belongs to the Virginia and National Societies of Professional Engineers; American Society of Mechanical Engineers; the American Society of Heating, Refrigerating and Air Conditioning Engineers; Virginia Association of Professions; American Waterworks Association; National Fire Protection Association, and many other state and national professional organizations.

Gibson is a member of the alumni associations of Old Dominion University and VPI & SU; the Cosmopolitan Club of America; the Norfolk and Virginia Chambers of Commerce; the Norfolk Yacht and Country Club; the Harbor Club; the Norfolk Chapter, Va. Society of the American Revolution; the Virginia Museum; The Bull & Bear Club of Richmond; and the Virginia Beach Society of the Arts.

He is married to the former Doris Robbins, and they have a daughter, Linda, who is a graduate of Duke University. The family are members of Royster Memorial Presbyterian Church.

HARRY W. KINCAID  
Executive Director

Harry W. Kincaid, 48, has been executive director of CEC/V since May 1976. A native of Morgantown, West Virginia, Kincaid was in the U.S. Navy from 1951 to 1954.

In September 1954, he enrolled at West Virginia University and was graduated in 1957 with a B.S. degree in journalism. While a student at WVU, he worked part time as an announcer/copy writer for a local radio station.

Following graduation, he moved to Richmond and became a reporter for the Richmond News Leader. In 1959, he joined the public relations department of A.H. Robins Co., Inc., an international pharmaceutical manufacturing firm headquartered in Richmond.

In 1964, Kincaid moved to Washington, D.C., and joined the public relations staff of the pharmaceutical Manufacturers Association. Three years later he was named assistant association manager of the Washington-based Institute of Industrial Launderers, the trade association for the rental work uniform and career apparel industry.

Kincaid is a member of the Virginia Society of Association Executives and the American Society of Association Executives.

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Tell the Virginia Story JULY 1978
THE IMPACT OF SURFACE MINING AND CONTROL RECLAMATION ACTION OF 1977 ON VIRGINIA COAL

ON AUGUST 3, 1977, President Carter signed into law the Surface Mining and Control Reclamation Act of 1977, Public Law 95-87. This law covers all coal mining, surface operations as well as surface indentures created by underground mining. The law has a very real effect upon one of Virginia's great natural resources and the position of this resource in the competitive market. Subsequent rules promulgated by the law will obviously affect the economy of virtually every citizen of the Commonwealth. Several of the more important aspects of the law are discussed below.

Complete restoration of the highwalls and depressions are conceded to be the most costly factors. Virginia coal is mined in the Appalachian region, an area where the terrain is naturally composed of steep slopes and narrow valleys. According to Kenneth Englund, US Geological Survey, 95 percent of Virginia's recoverable strippable coal reserves are located on slopes steeper than 20 degrees.

Complete restoration as required by the new law is estimated to increase the price of coal in Virginia from $3.00 to $6.00 per ton. Figure 1 attempts to diagrammatically indicate required restoration under the law at several typical slope variations. Conventional mining equipment such as crawler tractors can safely work on a slope of 2:1 or 27 degrees. Once the slope exceeds 27 degrees, it becomes difficult to cover the highwall, requiring additional equipment such as hydraulic excavators to restore the last 15 feet of material against the highwall.

There appear to be some areas where interpretation of the law can reduce the economic impact of complete restoration in steeper sloped areas and still fulfill the intent. Figure 2 relates one approach which would leave some highwall exposure but would obscure most of it and at the same time offer better control of runoff from above the working area. This method would allow equipment working areas on which to work at some point in the future, if it should become necessary.

Current thinking by the federal enforcement agency (Office of Surface Mining in Washington, D.C.) appears to put an additional penalty for mining in previously surface mined areas. Figure 3 represents an area where mining of this nature was proposed. According to the Office of Surface Mining, complete restoration of the old and new highwall is a requirement. Considerable economic relief could be realized and at the same time an improvement made to the existing situation by allowing the second cut to take place which would also allow partial restoration of the highway. In the example shown, the old highwall could be reduced from 75 feet to 25 feet while at the same time allowing additional coal to be recovered. If complete restoration of the highwall is required, then mining areas as shown by Figure 3 would not be possible and these coal reserves lost.

Another very costly area of the law is requirements for water quality standards and effluent limitations. The mine operator must provide a water monitoring program which gives adequate data to describe the likely...
Figure 2

Figure 3a

Figure 3b

Note: 57% of original overburden removed to the bench. 
52% of original overburden transported to below 30' on steep grade. 
Overburden ratio: 13.4 yd³/ton. 
Standard bench: 20' wide, 10' high, and 12' thick. 
No spoil allowed on the outcrop.

Note: 27% of original overburden returned to the bench. 
33% of original overburden transported to below 30' on steep grade. 
Overburden ratio: 13.4 yd³/ton. 
Standard bench: 20' wide, 10' high, and 12' thick. 
No spoil allowed on the outcrop.
laily and seasonal variations in discharge from the disturbed area in terms of flow, pH, total iron, total manganese, and total suspended solids and if requested by the regulatory authority, any additional parameter characteristics of the discharge. In Virginia it is almost impossible to obtain enough capacity in sediment ponds to allow the suspended solids to settle out. Although effluent limitations which are to average 35 mg/l do not apply to a precipitation event greater than 10-year, 24-hour frequency, this effluent limitation points out the necessity of treating or controlling the discharge from the mining operation as soon as possible, as is observed in the example in Figure 2.

The facilities to accomplish these requirements are akin to sewage treatment plants required to serve many communities across the state of Virginia. Approximately the same quality of discharge must be maintained at the mine site. However, municipal and community sewage facilities are largely financed by federal grants and are depreciated over 30 to 40 years. Similar facilities at a mine site may have an average life of only three to five years.

There are some other areas of the law which simply increase the red tape and do not appear to accomplish much. The operator is required to make public a lasting schedule ten days prior, but not more than 20 days prior to initiating such operation along with the dates and time when explosives are to be used. These schedules are to be published in local newspapers, sent to local governments and public utilities as well as to residents within one-half mile of the site. Maintaining the records and correspondence related to this work will probably require an increase in the labor force at each job site. Signs and markers are also required to distinguish between top soil and other soil. Although not a significant requirement, the necessity of such a regulation is questionable.

According to OSM personnel, haul pads will have to meet federal grade requirements even though they are existing and have been in use for several ears. If roads are brought up to the lower grade requirements, additional areas will be disturbed, thus causing more runoff and subsequently more erosion. After completion of underground mining, surface work areas are to be graded to approximate original contours. It appears that it would be better to seed the bench area of an underground mine than to redistribute material that was initially removed to create the surface area for an underground mine, especially if this material has been stabilized for several years.

Also, PL 95-87 grants the regulatory authority the right to place a lien on orphan land that has not been reclaimed whether or not the surface owner wants this area reclaimed.

It is anticipated that these and other requirements will result in substantially increased cost in operation and affect the total price of coal taken from the mine site. At the same time, the increased complexity of operation, the higher manpower, and initial equipment outlay requirements will no doubt, discourage or even eliminate the smaller operator who has traditionally been a factor in maintaining competitiveness in the open market. There is a provision for small operators, which would exempt them from the law until January 1979, but there are several requirements that many operators will be unable to meet by that time. This exemption is not as advantageous as it sounds once it is considered that initial equipment such as off-the-road haulers cost from $200,000 to $250,000 each.

No doubt, we will see the effect in our monthly power bill, in the increased cost of steel, automobiles and in other goods requiring substantial energy input to bring about the finished product. The extent of the increase will to a large degree be determined by those in the federal and state governments who promulgate the rules, interpret and enforce the laws established by our legislators.
RIVER REROUTING AND URBAN REDEVELOPMENT DREAM NEARING REALITY

By Edwin M. Phillips, P.E.
Project Engineer
Thompson & Litton, Inc.

• THE ST. PAUL Neighborhood Redevelopment Program is a cooperative project involving several federal, state and local agencies. The project is in St. Paul, Virginia, a town of approximately 1000 people, located on the Clinch River in Wise County in Southwest Virginia. The work involves rerouting a portion of the Clinch River, relocating and four-laning Route 58A and leveling a mountain, known as St. Paul Hill. It will provide, in addition to the highway, approximately 80 acres of gently rolling land to be used for establishment of an industrial park, recreation area, residential development and commercial zone.

The project, originally proposed over eight years ago, has moved one step closer to reality with the recent completion of the engineering plans and specifications for the redevelopment work by Thompson & Litton, Inc. Plans for the river relocation were completed in 1974 and the highway plans are nearing completion.

The land necessary for the project was acquired through efforts of the Wise County Redevelopment and Housing Authority (project agent for the Town of St. Paul) and the Virginia Department of Highways and Transportation, in accordance with guidelines set forth in the Federal Uniform Relocation Act of 1971. This acquisition was substantially complete in 1977. Funding for the redevelopment portion of the project is being made available through the U.S. Department of Housing and Urban Development. The acquired land lies adjacent to the Clinch River and on the mountain bounded by a horseshoe-shaped portion of the river. One major problem in land acquisition was that a large part of the property lies in Russell County with the remainder in Wise County. This problem was solved in 1972 when Russell County allowed the Town of St. Paul to annex the area.

The total project involves moving approximately 2.2 million cubic yards of earth and rock. First order of the construction phase will be the river relocation. The relocation will serve a two-fold purpose: first, a new channel will be cut through the hill at the base of the horseshoe, thereby creating approximately 1500 feet of dry river bed which will be filled to provide usable land. Second, the new channel will improve the hydraulics of the river, thus lowering the 100-year flood stage in the town. Thompson & Litton's hydraulic studies associated with the design of the proposed channel change were coordinated with the Tennessee Valley Authority, who in turn will provide financial assistance for the channel change construction. To meet requirements of the Virginia Water Control Board, certain modifications to the existing Town of St. Paul sewage treatment plant will need to be made. These include rerouting a force main presently located in the area of the proposed channel and constructing an effluent outfall line from the present effluent discharge point to the relocated river.

The next portion of construction centers around the removal of the mountain and relocation of Route 58A. This work, and the channel change will be accomplished by a contractor for the Virginia Department of Highways and Transportation. During this phase monies from TVA, HUD and the Highway Department will be used. Funding from the various agencies will be proportioned according to the percent of work done for each agency's segment of the project. The highway portion of the project will complete one of the three remaining sections of Route 58A between Abingdon and Norton that have not been four-laned.

Most of the material removed from the mountain will be used to fill the old river bed and its adjacent flood plain. The remainder will be used for highway construction extending eastward from the project area. The old river bed and the adjacent area will be raised with fill material to a level higher than the 100-year flood stage of the relocated river. This, along with the proximity of a four lane arterial highway and two railroad will enhance the value of the land within the project area.

The third portion of the project consists of the construction of the streets, storm drainage system and utilities within the area. This phase will be funded by HUD through the Wise County Redevelopment and Housing Authority. At present, three of four areas within the project limits have
en designated for specific land uses, approximately 27 acres are designated for single family residential units, consisting of 41 lots of at least 10,000 square feet each. Residential lots will be platted from Route 58A by a noise suppressing earth berm and from the railroad by a "green" area which will also be used as a linear park. All utilities in this area will be underground thus maintaining desirable aesthetic qualities.

The commercial area, which adjoins the residential area, and through which Wise Street Extension will pass, contains an area for small shops and an area for a larger enterprise such as a shopping center or automobile dealership. The commercial area occupies approximately 15 acres.

The 20-acre industrial park area is served by a wide street suitable for large truck traffic, and has provisions for three rail sidings, making it ideal for rail-truck oriented industry.

At present, an area containing approximately 14 acres has been left undesignated. This parcel is situated so that it can be developed for multi-unit dwellings; industrial or institutional use.

The probable construction cost for the redevelopment portion of the project is estimated at 4.97 million dollars.
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THE DEVELOPMENT of a new reservoir supply for the city of Newport News, has not been without its problems. The project, being built by the Department of Public Utilities of the City of Newport News, will increase the safe yield of its system to 60 mgd, adequate to meet projected demands through the year 2000. The site is in a remote area of James City County, approximately 35 miles from downtown Newport News. The project includes a homogeneous earthfill dam, about 1700 ft. long, with a crest height of 67 ft., a raw water pumping station, which will ultimately have a firm pumping capacity of 60 mgd, 5200 ft of 54-in reinforced concrete raw water main, and the reconstruction of about 3 miles of Virginia State Highway.

The reservoir created will impound water pumped from behind a tidal exclusion dam on the Chickahominy River during the high flow periods for use during dry periods. Storage capacity is approximately 6700 mil. gal. at a normal waterline of Elev. 60. When full, the impoundment will have a surface area of about 860 acres, an average depth of about 25 ft., and a shoreline length of about 39 miles.

Little Creek Dam and Reservoir Under Construction
The project is subdivided into six separate contracts (see accompanying Table 1); Clearing and Grading Roadways
Earthfill Dam
54-in. Pipeline and Access Road
Raw Water Pumping Station
Reservoir Clearing
Paving Roadways

The project was first considered in 1956, but was not died in detail until late 1968 when Malcolm Pirnie, Inc. prepared a memorandum on the subject of additional water supply and pipeline capacity for Newport News. At that time the average daily water demand of the Newport News system was approaching 29 mgd. With the possibility that the city would reach the system’s safe yield of 35 mgd by the year 1976, the need for increased supply was obvious.

Investigations were made of runoff, evaporation, pumping and pipeline capacity, and system demands to determine the volume of storage required to develop various system yields. Several sites were investigated with the Little Creek site proving to be the most advantageous based on its location relative to the existing raw water mains, topography, and its relatively undeveloped nature. In 1970, the capacity of the Chickahominy Pumping Station was increased to 40 mgd as recommended in the study.

Little was done about Little Creek itself until late in 1970 when the city authorized MPI to prepare a report on the project, including preliminary designs and cost estimates. Topographic maps of the site were prepared from aerial photography and soil borings taken at the proposed dam site. Based on this data, the dam was relocated about 1000 ft. upstream from its original location in order to reduce its length from 2400 ft. to 1700 ft. That move would also reduce from 1200 to 400 in ft. the length of dam that would be founded on the dewatered sands of recent geological origin and the silty sands of the Calvert formation, Miocene Age. The relocation resulted in a reduction of unsuitable materials requiring excavation. The report recommended

<table>
<thead>
<tr>
<th>Contract</th>
<th>Contractor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing &amp; Roadway Grading</td>
<td>Dal-Ray Contractors, Williamsburg</td>
<td>$ 77,650</td>
</tr>
<tr>
<td>Dam</td>
<td>Excavation-Construction Inc., Bladensburg, Md.</td>
<td>3,487,600</td>
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<tr>
<td>Pipeline &amp; Access Road</td>
<td>A. Stanley Mundy &amp; Co. Woodbridge, N.J.</td>
<td>626,640</td>
</tr>
<tr>
<td>Pumping Station</td>
<td>Norcarva Construction Clarksville</td>
<td>2,105,200</td>
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<tr>
<td>Reservoir Clearing</td>
<td>To Be Bid</td>
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<tr>
<td>Roadway Paving</td>
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that the project be in service by mid-1974 in order to ensure that the system would be adequate for projected demands.

In September 1971, the city authorized design to begin on all phases of the project. Copies of the design report were submitted to various state and federal agencies for review and comment and the Corps of Engineers informed the city that Little Creek had been determined to be a navigable waterway and hence construction of the dam required both approval of the Secretary of the Army and preparation, by the Corps, of an environmental impact statement in accordance with the provisions of NEPA, PI 91-190. The application and supporting documentation were filed on February 29, 1972.

To make a long story short, it was many months before the city would be able to proceed with the project. A detailed environmental assessment was prepared which formed the basis for the EIS developed by the Corps of Engineers.

Questions and comments on the EIS were received during the review period from the following agencies:
- U.S. Department of Commerce
- U.S. Environmental Protection Agency
- U.S. Department of Interior
- Virginia Institute of Marine Science
- Virginia State Water Control Board
- Virginia Marine Resources Commission
- State Department of Health
- State Commission of Game and Inland Fisheries
- State Air Pollution Control Board
- Department of Conservation and Economic Development
- Commission of Outdoor Recreation
- Governor’s Council on the Environment.

The Corps permit was finally issued December 5, 1973, three years, nine months and five days after the application was filed. The approval of the governor and that of the state attorney general, both required by state statute, were granted twelve and fourteen days later, respectively.

Among the conditions of the permit were three stipulations by the Department of the Interior and the Virginia Commission of Game and Inland Fisheries:

1. Withdrawal of water from the Chickahominy to Little Creek Reservoir will cease when the reading on the Chickahominy Reservoir gauge is at 3.0 ft.; (cre of tidal exclusion dam).
2. A minimum of 10 cfs flow downstream from Chickahominy Reservoir must be provided at all times.
3. A plan of intensive wildlife management for the Little Creek Area must be implemented for the approximately 1200 acres of inundation.

The city had earlier agreed to monitor the dissolved oxygen and temperature of the estuary prior to construction in order to establish base data for future water releases from Little Creek Reservoir. This information would make it possible for the City to release water from one or more of the three sluice gates provided to approximate the ambient temperature downstream of the dam and thus lessen the impact on anadromous fish during the spawning period.

And so, by 1979, the City of Newport News will have a water supply that it contemplated and began work toward nine years previously. Truly, today, environment engineering projects have become involved in environmental more than in engineering.
As man evolved from caves he built shelter, then the rains came and the shelter leaked. He has been building more and more sophisticated shelters since, but he is still trying to stop leaks with varying degrees of success. The last 20 years have seen a dramatic change in construction materials and methods used throughout the world; one notable example has been the use of curtain wall construction which was made possible by the development of a whole new family of high performance sealing compounds and caulking. The success of the curtain wall requires understanding of the materials used both for the panels and the sealant as well as the movement of all the related component parts that can be expected when the building is finished. Once the designer has selected the materials, the details of all the joints and connections must be meticulously shown and followed in order for the system to work.

In January 1977 our firm was employed by the owners of 3800 Oceanfront, Virginia Beach, to design a remedial scheme to stop the wall leaks of their building. Inspection revealed a 14-story building of curtain wall construction; the walls being Cement Asbestos Board (C.A.B.) panels fastened to weather resistant gypsum board which was attached to steel studs framed between the concrete structural slabs. Waterproofing was accomplished by sealant applied in the joints and around the aluminum window frames which penetrated the walls at each level. The cement asbestos panels were sealed to a concrete beam at the bottom, no expansion joints or weep holes were provided. Water had penetrated the wall causing the interior sheet rock to be damaged throughout the wall face.

The worst damage was observed on the first and second floors which had become uninhabitable. The sheet rock and the insulation were removed in order to observe the interior of the "skin" of the building, this revealed evidence of water penetration over the entire wall of the building without any particular concentration. Observations were made of the exterior wall with infra-red optical equipment to ascertain if any "hot spots" were present that would indicate a local failure or break in the wall, but none were found.

Design of a scheme to remedy the problem had to consider: protection from the weather for the inside of the building at all times since the building was occupied; and the location of the building, which was on the oceanfront and subjected to almost continual wind. Before a design scheme was attempted, a search was made to determine if other buildings had been constructed of similar materials and methods. This search was confined to oceanfront areas because we felt this location created special conditions. The research also was aided by reports obtained from American Society for Testing and Materials and from the National Research Council Building Research Advisory Board. Buildings of similar construction were located in Florida and Maryland. We visited several of these buildings and in talking to people who were involved discovered that similar problems existed. Remedial work that had been done had not completely solved the wall leaking problems and work was continuing. Our research revealed that extensive study had been done in England and Norway on curtain wall systems. The Norway studies had concluded that the "skin" of high rise buildings required three elements to be successful, these being: an air seal on the inside of the panel; a rain deflector on the outside; and an air chamber vented to the
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Our final design attempted to accomplish a method which took into account all the essentials and would still be practical. The existing C.A. panels were removed in order to reveal deterioration of the underlying gypsum board in order that heavily damaged sections could be replaced.

Furring strips of galvanized metal were then applied over the membrane and screwed through the gypsum to the existing studs. A wide furring strip was used because the studs did not always line up exactly. A rubber strip with adhesive backing was then applied to the furring strips to act as a gasket for the joints and provide backing for the sealant. The depth of the furring strip provided the necessary "air-chamber" for the completed wall. We divided the wall into sections with flashing which extended behind the membrane, and this provided the vent necessary to equalize the pressure and provided a trough for the exterior face. Cement asbestos board panels were then attached to the furring strips, care being taken to see that all joints occurred over the gaskets. The joints were made having widths of not less than 1/4" or more than 3/4". The minimum width was assured by the use of dowel aluminum sub-frames were applied in order to extend the window frame through the new wall and provide "lip" around the opening where the sealant would be applied. This insured the caulking would be stress to prevent cohesive failure that occurs when the sealant is applied as a "fillet." Two sealants were selected having the required elasticity, one sealant to be used for the panel joints and the other for the windows. This was done to assure proper adhesion. The joint sealant completed the design.

Our experience with 3800 Oceanfront has created the opinion that man must yet stop his cave from leaking if proper attention is given to all the details.
The Town of Farmville located in Prince Edward County has experienced rapid growth. Longwood College and several large industries which have expanded in recent years have contributed to increased water usage. The water plant supplying the town with water was built in the early 1930s. This plant had a capacity of one million gallons per day (MGD) and drew its raw water from Buffalo Creek.

In 1970 the engineering firm of Stuart Royer & Associates submitted a report concerning proposed water stem improvements for the Town of Farmville. In this report it was recommended that a new water treatment plant be built to replace the thirty year old existing plant. It was proposed that the new plant have a capacity of 3 MGD to satisfy the future needs of this growing community. The selected site for the facility was on the Appomattox River. This change in source was necessary to obtain the 3 GPD of raw water during periods of prolonged drought.

In June of 1972, the Buffalo River rose to flood stage. Water production was curtailed while the old water plant was inundated.


A site high on a ridge overlooking the Appomattox River was selected and acquired by the Town of Farmville. Preliminary financial arrangements were made with Farmers Home Administration for a loan and a grant. Site surveys and soil investigations were accomplished and detailed design began.

It was decided to design the proposed plant to treat 3 MGD. A conventional raw water treatment process consisting of a raw water pump station, flash mixing (chemical addition), flocculation (assembling of coagulated particles in preparation for settling), sedimentation (settling out of settleable solids), sand filtration, disinfection and pumping of finished water. A raw water pump station and a diversion structure (low water dam) was placed in the Appomattox River which would...
channel all flow on the river to a point where it could be withdrawn even during periods of extremely low flow.

The raw water pump station contains three raw water pumps which will raise the water from the river to the plant site. This station also contains a traveling screen which will remove larger solids from the raw water.

The new plant itself is attached to the settling basins, flash mix and flocculation basin which makes for a more centralized operation. The building contains an operator's office with instrumentation which allows him to monitor all systems within the plant as well as three water storage tanks serving the Town of Farmville at scattered locations. A modern well equipped laboratory capable of performing all tests needed to maintain water of good quality is adjacent to the operator's office. It will not be necessary for the operator to leave the plant unattended since showers and kitchen facilities have been provided. A chlorinator room with hydraulic scales and power hoist houses two one-ton cylinders which provide the chlorine for disinfection. The chemicals which are fed to the water for coagulation, pH adjustment, taste and odor control, fluoride addition, and iron and manganese removal include hydrated lime, soda ash, activated carbon, liquid alum, hydrofluosilicic acid, and potassium permanganate.

The hydrated lime is stored in a circular silo with a capacity of 30 tons. This silo is loaded by a truck which uses air pressure to "blow" the lime up into the bin. The lime is stored in the bin until needed and then blown into the chemical feeders inside the plant by compressed air. By purchasing lime in this form, the Town of Farmville can save greatly over the cost of bagged lime, air pollution is reduced, the problem of disposing of old bags eliminated and a much cleaner facility can be maintained. The alum and hydrofluosilicic acid is stored in a tank and pumped into the water as needed. Other chemicals are fed by the chemical feeders.

Bagged chemicals such as soda ash and activated carbon are conveyed to the chemical storage floor by means of a conveyor system. A modern well designed laboratory allows the operator to carry his heaviest individual piece of mechanical equipment in the plant.

In conjunction with the new water treatment plant, approximately 1 mile of road and an 18" water transmission line was designed to convey the finished water to an existing 1 MGD storage tank.

The design allows expansion of the plant to a 6 MGD by changing the filter media, addition of instrumentation and the addition of two 6 MGD pumps. One mile of 16" water line has been laid to further aid the transmission of water to the town.

The total cost of the new water treatment plant with related road and 18" water transmission line was approximately $2.5 million dollars.

When this plant goes into operation, the water needs for the people of the Town of Farmville, Virginia will be fulfilled for many years to come.

Andrews Large & Whidden, Inc. was general contractor for the plant.

Subcontractors & Suppliers: Frank S. Black, Staunton, piping mechanical; Rogers Masonry, Orange, masonry; Carlett-Johnson Corp., Richmond, HVAC; Waugh Contractors, Inc., Keysville, grading and seeding; Chapman & Martin, Inc., Richmond, floor covering; L. Wingfield, Roofing & Metal Corp., Kenbridge, roofing; The Floor Shop, Farmville, floor covering; Brinkley Ward Electric, Inc., Farmville, electrical; and W. C. Newnam Co., Farmville, concrete.

Also, Rexnord, sludge collection equipment; Car Day, lime handling - CEA; Kahn & Sons Co., Inc., windows & doors; The Co., doors; Wallace & Tiernan, Wheaton, Md., chlorination; Black Chemical Feeders, instrumentation, flow controls; Economy Cast Stone Co., Richmond, cast stone; Bethlehem Steel Corp., Bethlehem, steel; and All Chalmers Corp., pumps.

VIEW OF LAGOONS where solids settle out of washwater used to clean sand filters before being discharged into Appomattox River. The Raw Water Pump Station is shown in the background.

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SANFORD BRICK CORPORATION
SANFORD, N.C.
Container Control Facility, with Inspection Stations on the left, Weigh Stations on the right, and Control Building in the center.

McGAUGHY, MARSHALL & McMillan and ED CARSON ASSOCIATES
LANDSCAPE ARCHITECT
Contractors:
H. L. TEMPLE, INC.
W. B. MEREDITH II, INC.
AMES & WEBB, INC.
CENTURY CONCRETE
RON KILBY
Photography

The $2,150,000 Container Control Center for Norfolk International Terminals is the result of a long period of planning and programming for Maritime Terminals, Incorporated, operators of the port, and McGaughey, Marshall & McMillan, a Norfolk-based architecture and engineering firm.

Norfolk International Terminals (NIT) is located in Norfolk, Virginia, at the port of Hampton Roads at the mouth of the Elizabeth River. It is one of four general cargo facilities in Tidewater Virginia, NIT provides container, break bulk and specialty commodities handling facilities for import/export cargo.

NIT is served by the interstate highway system through a direct connection to I-64 via International Terminal Boulevard. It is served by major southern railroads with feed service to and from Baltimore, Philadelphia, Charleston, and Wilmington.

The original facility, completed in 1922, included two large finger piers mounted with cargo transit sheds, rail delivery and back-up rail yards, and warehouses of concrete блок
During World War II, the terminal was used for troop embarkation and shipment of tanks, equipment, and cargo. After the war, the U.S. Navy operated the port for a short period until it was declared obsolete by the General Services Administration. In 1966, the port was acquired by the Norfolk Port Authority. Work immediately began to construct the first container port in Hampton Roads. The original wharf supporting the finger piers was converted to a container berth, and warehouses were removed to provide a container storage area. A second container berth and back-up area were initiated soon after.

In 1972, NIT was acquired by the Virginia Port and Industrial Authority, which organized a quasi-public agency, Maritime Terminals, Incorporated, to operate the port. Under the direction of William J. Thompson, Director of Engineering and Maintenance, Maritime Terminals initiated plans for further development of its container facilities. In conjunction with Gaughy, Marshall & McMillan, a plan was formulated for construction of additional container berths and back-areas, and development of the entrance and container flow control areas.

The Container Control Center presented unique problems. In addition to studies and industrial engineering applications of container flow and inspection facilities, McGaughy, Marshall & McMillan studied potential problems involving protection of adjacent residential areas from visual and aural disturbances.

The first phase of the project included the entrance roadway. The existing two-lane concrete roadway had been built in 1922 and included no landscaping or entrance vistas. A new 4-mile roadway was designed to accommodate three types of vehicles: normal traffic for office workers and gshorenmen; break bulk tractor-trailer traffic; and container-on-chassis traffic. In addition, this phase included landscaping, street lighting, gate controls for security purposes, and other elements of a very important heavily-used industrial entrance.

The second phase of the project included preparation of the container area comprising over 60,000 square yards of pavement. This plaza serves as a key-up area for both bound and outbound containers prior to weighing, inspection and release, or acceptance into the terminal. Included in this phase of work was the construction of a 200 by 80-foot canopy over nine inspection booths.

The third floor includes over 1,000 square feet of raised floor system for a complete in-house computer operation. The master computer for the center controls movement and location as well as billing of every box and chassis on the terminal. Control entry includes the outbound computer terminal at the gates as well as the inbound terminal.

The installation and covering of the container truck inspection stations constituted the next phase of construction. Included in this phase was the erection of a 200 by 80-foot canopy over nine inspection booths. The canopy has clearance in excess of 20 feet with a central catwalk along the 200-foot length so that each container can be inspected from above with a minimum of stairway climbing. Access to the catwalk is provided by two spiral staircases located a third of the way from either end of the canopy. Below the canopy, each of the nine inspection booths has a dual capacity, with the ability to handle both incoming and outgoing traffic. A tenth booth on the

(Continued on page 39)
Everyone's heard the saying: "Water, water, everywhere and not a drop to drink." In a similar vein, the same might be said for solid waste: "Garbage, garbage, everywhere, but what are we going to do with it?" Resource recovery and solid waste disposal are two of the hottest topics currently being discussed by government and industry professionals.

Henrico County, Virginia is actively supporting and participating in the Richmond Area Metropolitan Resource Recovery Program to develop long-term solutions to its waste disposal problems. The time span between now and the anticipated availability of the resource recovery facilities is such that the county had to employ an interim solid waste disposal site.

What resulted is believed to be a first in Virginia since the present, stringent sanitary landfill design requirements became effective. Basically, no artificial leachate collection mechanisms are employed, no artificial leachate treatment is provided, nor are artificial, impervious bottom liners or top covers employed. Yet the landfill, which will handle municipal refuse, will not contaminate offsite areas with leachate, gas or erosion sediments.

In the design of sanitary landfills, the control of water is critical. All rainfall entering, all runoff or percolation to ground water leaving, and any surface or ground water approaching the site must be controlled. Accordingly, Weston's Earth Sciences Department made a thorough investigation of the site and surrounding area, evaluating soils and substrata conditions and the nature of the ground water in the area. At the same time, Weston's Virginia office analyzed site topography and surface water drainage. One of Weston's findings in the evaluation was that surface water drainage and ground water movement in the area is in a southerly direction. The ground water moving toward the site from the north will be intercepted at the northern edge of the fill area by a perforated pipe and gravel-packed trench. This will divert the ground water to the surface water on the east side of the fill. Surface water north of the landfill will follow the natural drainage in a southerly direction and do one of two things:

1. Some of the water will infiltrate the ground surface north of the ground water interceptor and flow to the perforated pipe which will discharge it to the drainage channel bordering the east side of the fill. The north ground water interceptor will be placed a sufficient distance from the north toe of the fill to prevent leachate from contaminating the intercept ground water.

2. Some of the water will become surface runoff. In this case the water will run into a drainage channel paralleling the north ground water interceptor and will also discharge to the surface water on the east side of the fill.

A sequence of drainage channels and berms and leachate collection pipes will be constructed along the Eastern and Western boundaries of the site. These channels and berms will be used to prevent surface water from entering the fill area from either side. The leachate collection pipes will intercept and...
achate that may move toward the east as the landfill expands, particularly near the north and west boundaries of the landfill. The gravel-packed leachate collectors and north ground water interceptor will serve to intercept methane gas to prevent off-site migration. An almost 30 ft. thick clay layer that lies underneath the site virtually eliminates vertical ground water movement. Additionally, an approximately 600 ft. rip along the south edge of the property contains a blend of sand, silts, and clays that will be used for leachate renovation. All leachate that is generated in the site will flow in a northerly direction through the renovation zone where various chemical, physical and biological processes will "naturally treat" the leachate to an acceptable quality. The gravel-packed leachate collectors and north ground water interceptor will serve to intercept methane gas to prevent off-site migration.

In addition to the many technical aspects, the landfill will also offer a number of aesthetic features that will allow it to blend in almost unobtrusively with the surrounding neighborhood. The entrance is framed by colonial brick work and proceeds down a 600 ft. grassed median separated roadway, lined by ornamental pear trees. The operating area of the landfill will be visually screened from the road traffic, blocking public view of the actual landfill site.

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WITH THE advent of PL 92-500, the Town of Wytheville initiated planning studies directed toward a cost effective solution to meet the more stringent standards for discharging municipal wastewater to state waters.

R. Stuart Royer & Associates was commissioned to prepare a report detailing the alternatives and presenting recommendations for the type of facility, its size, location and financial aspects of a plant to meet the present and future needs of the area.

Extensive testing of the wastewater was conducted during the study stage of the project to determine design parameters. The final recommendation was to construct an activated sludge type plant with capacity for an average daily hydraulic flow of 2.6 million gallons per day and biologic capacity for 20,000 persons.

The project included several interesting facets including available land, emergency power sources, and industrial dischargers.

Industry in the area produces a significant wastewater flow; however no single source alone produces a significant amount. Therefore, work was started early to develop a cooperative spirit with industrial dischargers recognized as having potentially harmful wastes. The cooperation received has been excellent and where necessary pre-treatment units are being installed by industry. The town as well as industry have installed extensive monitoring for quantitative and qualitative analysis of flow received as well as that discharged, and communication systems have been established to allow each to warn the other of any impending problems.

Subsurface exploration of the site revealed a weathered shale vertically inclined with a ground water table approximately two feet above bedrock. Several units would be subjected to hydraulic uplift in the event of dewatering and therefore a system of rock anchors was installed to prevent flotation.

In order to maintain continuous operation, it was essential that standby electric service be available. The site chosen for construction had two separate sources of power within easy access. An economic evaluation indicated that two separate sources should be brought to the plant rather than to construct and maintain an on-site generating facility.

The existing primary treatment plant is situated on a small parcel of land on the north bank of Reed Creek. The only suitable site for a new facility which could be found was across the river. Generally, construction of a pump station would be necessary to convey wastewater to the new site. Such facilities are costly to construct and operate. During design it was found that by relaying several hundred feet of the main truck sewer, an inverted sewer could be employed to convey wastewater across the river to the plant, which will lead to considerable saving in the future operation.

Performing on-site tests of aerated equipment to verify oxygen transfer efficiency and mixing capability.

Visible in top of picture is the aerated sewer which receives flow through inverted syphon under river.
Modern laboratory facilities allow the operator to determine the chemical and physical properties of the waste.

The plant was designed as a conventional activated sludge process with provision for expansion to twice its present capacity. Process units include: aeration, grit removal, primary clarification, final clarification, disinfection, and recirculation. Solids handling facilities include flotation thickening, complete mix anaerobic digestion, and vacuum filtration. Flow instrumentation is provided at all points necessary to control the treatment process. Sludge is automatically recirculated in direct proportion to influent flow to relieve the operator of time consuming adjustments and to optimize plant efficiency.

The plant also includes an attractive control building with modern laboratory, office, and garage workshops located on a hillside overlooking the entire plant. The operator can monitor the entire process from the control building, and if necessary make some adjustments without leaving the building.

Flow enters the plant through a single pit housing a barminator, grit collector, and an influent measuring Parshall flume. This is followed by four rectangular primary clarifiers. Plant piping allows raw waste to be diverted past the primary clarifiers to the aeration basin in order to increase the solids load to the reactor. The aeration basin is followed by dual centerfeed circular clarifiers with vacuum sludge drawoff.

Waste activated sludge is pumped to the aeration basin through variable speed centrifugal pumps. The speed of these pumps is manually controlled to recirculate the return sludge flow in direct proportion to influent flow to the plant.

Clarified effluent from final settling is used for all non-potable water within the plant including fire protection, chlorination, and high pressure water for air flotation of waste activated solids. The air flotation process is used for thickening sludge prior to digestion. The anaerobic digester produces methane gas in sufficient quantities not only to burn and heat the building but also to maintain the digester contents at 90°Fahrenheit. Digested sludge is dewatered through vacuum filtration and the solids are disposed in an approved landfill. Sand drying beds are provided as a back up for vacuum dewatering.

The practice of backup facilities is followed throughout the plant. All tanks and major equipment are provided with backup either through dual units or through alternate pipe arrangements which allow multiple use of various units. Therefore, it is highly unlikely that the plant will malfunction due to electric power failure, normal equipment outage or by maintenance.

Flow was diverted to the plant in February 1978 and final testing as well as completion of the plant is expected in late spring of the same year, at which time the total facility should present a pleasing atmosphere which will instill a sense of pride in operating personnel. All structures are spaced apart for ease of future expansion and grassed areas surround the facilities. A paved roadway circles through the plant.
providing easy access to maintenance vehicles and delivery trucks, and concrete walkways connect the various units. The entire plant layout is an attempt to assist plant personnel in maintenance as well as operational functions and to provide an environment which encourages good housekeeping and efficient operation.

The total construction cost of the plant was approximately $3,750,000 of which three-quarters was paid by grant from the Environmental Protection Agency. The cost to the Town of Wytheville was approximately $800,000.

Rahman Construction Corporation of Richmond, and Rouse International of Marlowe Heights, Md., jointly submitted the low bid and were awarded the job as prime contractor.

Suppliers of major equipment were
- Barminutor - Chicago Pump; Gr
- Collector, Primary Clarifier and Fin
- Clarifier - Link-Belt; Mechanic
- Aerators - Envirex; Digestor Cover
- Sludge Heater and complete mixing system - P.F.T.; Vacuum Filter, Flo
tion Thickener - Envirex; Instrument
- and Chlorination - Wallace Tiernan.

Subcontractors & Suppliers
- Armco Steel Corp., Richmond, slu
gates; Pomona Pipe Product
- Greensboro, N.C., clay pipe; Lynchburg
- Foundry, Lynchburg, cast iron pipe
- Falwell Excavating Co., Inc., Lyn
hburg, clearing, grading, excavation; Pendleton Construct
- Corp., Wytheville, ready mix concrete
- Rowland Electric Co., Inc., Marli
electrical work; Montague-Botts Co.
- Lynchburg, reinforcing steel; Northe
- Iron Works, Bethayres, Pa., miscel
aneous metal; Trimble Co., doors; Wil
liamson & Wilmer, Richmond, hoist
- DeZurick, plug valves; Valley Air Co
ditioning Corp., Roanoke, HVAC
- Allis-Chalmers (through American P
olution Control, Richmond), centrifug
wastewater pumps; Marlow (through Haywood Inc., Charlotte, N.C.), posi
placement sludge pumps; Moyer
- progressive cavity sludge pumps; a
 Borg-Warner, variable speed drives.

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The terminal is thus supplied with a pleasing and impressive entrance, and a Container Control Center which expedites the smooth flow of an extremely complex system of traffic and paper work, enabling NIT to maintain the rapid pace established for its pier and storage areas.

Subcontractors & Suppliers
(Norfolk firms unless noted)
and, when we were drawn in 2½ years later, American industry was converted into a gigantic effort for producing the materials of war at a cost of $300,000,000,000 which raised the national debt to $247,000,000,000. It was with this spread of national wealth that the South began to partake of U. S.

The reasons for the migration to the sunshine states are fairly obvious. The most obvious and the least mentioned was the coming of air conditioning. This not only removed lassitude from workers during the long, hot summers, but gave inhabitants a pleasant relief from the smothering and frequently damp heat. Also, for industries specifically, the labor was cheaper and freer from the demands and disruptions of unions. As an intangible, Americans have always been a migratory people, moving first west of the Alleghenies, and then successive waves westward ended at the Pacific Ocean.

As part of this, Americans as a whole care little for old places, though they love to drive around in new cars to purchase antiques from old houses converted into antique shops in places passed by time and ceaseless movement. The country is so littered with abandoned, decaying buildings that societies for the preservation of America's past seek to reclaim those that are reclaimable, more as relics than for serving any useful present purpose.

Now, in the Saturday Review article, Mr. Sutton writes of efforts in the Northeast and Midwest to see government aid in halting the newfound Sunbelt prosperity, which they claim comes at a cost to the prosperity to which these once-dominant regions have long been accustomed. In a large conference called in Washington, a major face-off occurred between New York Senator Daniel Patrick Moynihan and George Governor George Busbee, both whom warned of the dangers of politicizing regional growth and each declared himself "agin" it.

Moynihan, who is justly admired for his brilliant mind and off-the-cuff rhetoric, made the point that the Northeastern states' traditional "ethic of collective provisionism... which our time is associated with the active national liberalism of the New Deal... resulted in a "considerable transfer" of resources from the South and West."

Propounds the question: "What happens to this tradition of national liberalism if it turns out, twenty generations later, that while the South was willing to accept the resources the North to get it going, it has intention to reciprocate now that the Northeast is in need?"

I suppose a Southerner's honest reply would be that since the "resources the North" were used to devastate a century ago, and that during its years of scorned neglect it saw nothing of the Northeastern "ethic of collective provisionism," the Northwest has now struggled along as the South struggled. But that would be the kind of regional confrontation of which we already have too much in the whole conglomerate of regions and separate interests.

I do think the rim of the Sunbelt (necessarily the South) has benefited from the transfer of military installations, about which Moynihan is quite bitter; but I'm not sure he's in sound position in predicting calamity that would follow the loss of "the liberalism that the Northeast gave the nation." For that liberalism is not in part responsible for the plight...
Moynihan’s native New York City hose impending bankruptcy he feels would be to the Northeast what Herman’s march was to the South."

For the Senator’s sadness over the city and approaching collapse of New York, I have only sympathy. Although I experienced the magic of New York in my young and early middle years when it was the world’s greatest city, such a change I have not visited there for many years and never expect or desire to again. The same is true of countless New Yorkers. With never a thought of belts, they simply got out. Many went no further than nearby counties in New York state or Connecticut or northern New Jersey.

In the many reasons for the passing of power from a community, the Liberals did their part in the decline of New York (as with other cities) by announcing the lot of blacks in the now-bound South, and by implication sold out promises of a land of milk and honey. In New York, vast areas of the city once occupied by middle-class and upper-middle-class families have come ever-spreading ghettos of blacks and Hispanics, most of whom we have no marketable skills in an intensely competitive metropolis. Since they came with high expectations, any, thoroughly dislocated in an alien world to which they have neither loyalty or responsibility, turned to streetimes against persons. Many more insisted on welfare, whose financial cut-go replaced the incomes of the former occupants who have fled.

Yet the Liberals, abetted by greedy, scrupulous fellow-townsmen, have in doing even the lunatic practices of the economically retarded members of Congress, spent prodigiously of what they did not have. In the early wild days stock manipulation, "Uncle Dan'l" lost heavily when he sold shortock that he did not own. Of his savior he wrote, "He who sells what isn’t his’n, must make it up or go to prison." This can be changed to read, "Those who spend what isn’t theirs, must take the consequences — or their sins."

What is happening in New York and any other old cities, not all in the northeast or Midwest, is not caused certainly not directly) by the rise of the so-called Sunbelt. In a probably reversible drift, the great old cities as have known them belong to the past do the once thriving mining towns, or the once boisterous "cowtowns" where the trail drives met the new railroads, or en some of the railroad towns eminently. What Senator Moynihan is really talking about is power. The old Northeast, never considering power’s concentrations and shifts, its...

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words, where deceit was praised as shrewdness and such traits as moderation and generosity were regarded as weakness. "That good will which is the chief element in a noble nature was laughed out of court and vanished. Every man distrusted every other man."

Edith Hamilton, in her *The Greek Way*, sums this up: "That was where the race for power brought the Athenians in the end."

Now, it seems to me, America is heading in the same direction. It probably started with the *hubris* following the power ruthlessly applied by Sherman (who had no interest in slavery one way or the other and rather disliked Negroes) and others in bringing ruin to a weaker people. The "good ole boys" from Georgia did not need come to Washington for any revenge for Sherman. Sherman and those like him (such as Sheridan the proud devastator of personal property in Virginia) carried with them the seeds of nature's revenge for power cruelly used in callous arrogance.

Because the country was so rich in natural resources and so advanced in the technologies of mass industrial production, the nation became an international power — for one brief moment the international power — despite the erosion of its character and the declining caliber of persons running the government. By the time Carter came along as candidate for the Democratic presidential nominee, he got the jump and the early publicity on a generally uninspiring field of rivals. In the presidential election he squeezed by, bumbling Ford about whom the best that could be said was that he was a decent man and whose own campaign suffered from the goring inflicted by Reagan's power-driven slashings.

However, as in a poor year of 3-year-old thoroughbreds, the winner of the big stake races becomes the "champion," so Carter and his cohorts became the "leaders." He might not have fared so badly except for the empty, and empty-headed, promises delivered in the piety of his "born again" Christianity. (Who were his heroes before his resurrection? — Attila the Hun and Al Capone?) Then, in his jumps from Cabbageville, he endeavored to lead the world, or manipulate it, while palming off his ailing country with the incoherent variety of verbal programs.

For the moral leadership a president should give in contrast to the Trading Post of Congress — votes exchanged for personal property in Virginia) carried with them the seeds of nature's revenge for power cruelly used in callous arrogance.

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