

A century of **PROBING THE FUTURE**

Historical highlights of Engineering News-Record's weekly role
in promoting construction progress over the past 100 years

Waldo G. Bowman

The spring of 1874 was a notable one in the annals of civil engineering and construction in the United States. The Brooklyn tower of New York's great East River suspension bridge was rising above the waterfront buildings under the watchful eye of Washington A. Roebling, and the New York & Harlem Railroad's "sunken tracks" were being built through 4th Avenue to what would eventually be called Grand Central Station. To the north, in western Massachusetts, the Hoosac Tunnel, longest yet attempted in this country, was being driven successfully.

At Chicago another tunnel, which was to bring pure water to the city, had been completed from the shore of Lake Michigan to an intake crib 2 miles out in the lake; and in St. Louis James B. Eads was striving to complete his epoch-making steel arch bridge across the Mississippi River in time for an official opening on July 4.

Farther west the rough and tough railroad gangs of the Kansas Pacific and the Santa Fe were laying track and fighting Comanches in a race to capture Raton Pass, gateway to a southwest empire and a second route to the Pacific Coast. The wobbly ribbon of rails joined by a golden spike in Utah five years earlier already provided the Union Pacific and the Central Pacific with a transcontinental line of sorts.

A seedling is planted. In that same spring of 1874 there appeared in Chicago a small 16-page journal called THE ENGINEER AND SURVEYOR. It was

published by George H. Frost, a civil engineer and surveyor, "to fill the vacancy now existing in the engineering literature of the country."

THE ENGINEER AND SURVEYOR was the first seed from which a richly foliated plant to be known as ENGINEERING NEWS-RECORD grew. A hardy perennial, it had two roots, its other stem arising about four years later when Henry C. Meyer, a public-spirited dealer in plumbing supplies, brought out another 16-page magazine in New York, which he called THE PLUMBER AND SANITARY ENGINEER.

THE ENGINEER AND SURVEYOR became ENGINEERING NEWS in 1875 when weekly publication began. THE PLUMBER AND SANITARY ENGINEER, after several changes in name, settled on ENGINEERING RECORD in 1890. Battlegrounds thus were drawn for a great competition in technical journalism, which was in nowise diminished when James H. McGraw bought the RECORD in 1902, nor later in 1911 when John A. Hill purchased the NEWS.

Like Frost and Meyer, however, McGraw and Hill were men of vision and high principles who regarded technical journalism as a means of service to the reader. Each magazine sought to serve its readers better and faster than the other by more accurate and complete coverage of news and technical developments, and to compete in this wise for advertising support. When the two publications merged in 1917, therefore, their policies were fused without

difficulty and their staffs combined with a minimum of readjustment.

The pages of the two journals brought together by the merger in 1917, and now those of ENGINEERING NEWS-RECORD, comprise the most authentic and complete history of civil engineering and construction in America that is likely to be written.

The causes that the editors have championed have more often than not been those that proved constructive. Even those that were mistaken have frequently been beneficial in stimulating thought and action that advanced the art. In any event, the magazine has been so much a part of the life and times of civil engineering and construction in America and the world for the past century that a review of some of the great events that have been reported in its pages and of some of the significant movements in which it was involved has a logical place in this issue. So back to the beginning.

The year 1874 was not a propitious one in which to launch a new publishing venture that was to depend on civil engineers and constructors for its subscribers—as Frost was to learn before the year was out. By the end of 1874, the full effect of the panic of 1872 began to be felt in the construction field. Railroad building, which then was providing work for thousands of engineers and contractors, fell off sharply, declining from 7,000 miles in 1872 to only 1,600 miles in 1875. Other types of construction were similarly affected.

By the spring of 1875, however, an upturn in business had begun. The U.S. was growing far too fast for a financial panic to check its expansion for any length of time. Bankrupt railroads were being reorganized or combined with others, and more new construction of every kind was being planned. Things began to look up for the fledgling magazine and for its readers.

An early appraisal. Editor Frost mirrored his feelings in a front page statement in the first issue of 1875. "This year just closed," he wrote, "has been a season of hard times for American engineers and surveyors . . . But civil engineers are familiar with intervals of 'nothing to do' . . . they are usually, however, men of more than average intelligence, and possessed of large practical ability, apt to devise and prompt to execute expedients to meet every emergency. We believe, therefore, that the great body of the engineering profession of the country is, at the present writing, better prepared to await, with a contented philosophy, the return of better days, than are our debt-burdened merchants, manufacturers and speculators."

Frost's comment ended on a note of optimism that was fully justified by subsequent events. "Engineering," he said, "is the science of civilization, and must ever be in the van. The time is not far distant when the services of civil engineers will be greatly in demand."

Fitting action to his own prophecy, Frost engaged Prof. Charles E. Greene of the University of Michigan to write articles regularly on how to make graphic analyses of roof trusses. He also

obtained comment on current engineering subjects from such prominent engineers as professors Charles A. Smith and Mansfield Merriman, W. Milnor Roberts (president of the American Society of Civil Engineers in 1879) and Clemens Herschel. Another useful contribution was a series of articles by Rudolph Hering discussing all the formulas then in current use for determining the safe bearing capacity of wood piles.

It was in this same period that the journal inaugurated what since has become a regular practice, firsthand reporting of accidents of technical significance. Frost, returning from a meeting of the ASCE in Boston, was in New York when the fall of a strand from a cable of the Brooklyn Bridge, then under construction, killed two workmen.

Going to the bridge early the following morning he was given full details by C.H. Paine, the engineer in charge, who took him to the top of one tower where he made sketches of the devices used in positioning the strands. These sketches were reproduced in Frost's report of the accident in the next issue of **ENGINEERING NEWS**. It was information that the readers could not have obtained from any other source.

Tenement house reform. In the meantime, the **PLUMBER AND SANITARY ENGINEER**, later to become **ENGINEERING RECORD**, had started publication. Marking a great need for improving the unsanitary condition of New York slum dwellers, the journal, scarcely a year old, started a competition in 1878 for the best design for a tenement house to be built on a standard 25 x 100-ft

city lot. It put up a modest prize and got some well known architects and public-spirited citizens to serve as judges. Over 200 plans were received and publicly exhibited, receiving much newspaper publicity. That in turn resulted in meetings to discuss tenement house reform, out of which grew the Sanitary Reform Society, which sponsored the tenement house act of 1879.

A similar piece of journalistic initiative the same year involved publication of an article, "Requirements for the Drainage of a House," a summary of Meyer's findings as a result of earlier studies of the defects of plumbing systems. Substantially the same rules were later prescribed by the boards of health of Springfield, Mass., New York City and Brooklyn. At a still later date they became the basis for the New York plumbing law, passed in 1881.

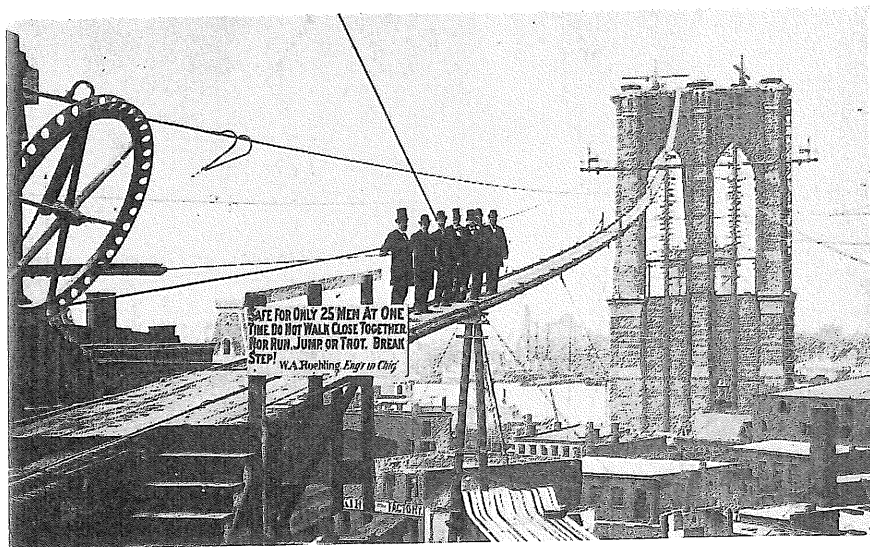
News for engineers. What were some of the other events that engineers were now able to learn about for the first time through magazines directed to their interests and written in their language?

One example, in June, 1875, was that a contract had been let to the American Bridge Co. for the Point Bridge at Pittsburgh, involving a new departure in suspension bridge design: The cables were to consist of stiffened chains of wrought-iron links.

In August, 1875, the **NEWS** carried a note that said, "Columbus, Ohio, is paving its Main Street with patent materials which form a smooth and hard surface. The street is first covered with broken rock and leveled up with finely broken stone and sand upon which the composition is poured, then rolled."

At about the same time it reported, "The company organized some time ago under the name of the Hudson River Suspension Bridge and New England Railway Company is again bringing to public notice the long proposed plan of spanning the Hudson River at New York with a railway bridge." Although this one did not materialize, the magazine was able to report shortly thereafter the letting of contracts for a bridge over the Hudson at Poughkeepsie.

In the Oct. 28, 1876, issue appeared two pages of advertisements for the steel cable wire for the East River suspension bridge. Signed by W.A. Roebling, the call said, "Sealed proposals will be received by the trustees of the New York and Brooklyn Bridge up to the first day of December, 1876, for the



Brooklyn Bridge cable spinning in the middle 1870s found editor Frost climbing this catwalk for a detailed description of the job.

manufacture and delivery in Brooklyn, N.Y., of 3,400 net tons of steel cable wire for the East River suspension bridge. The general character of the wire is as follows: It must be made of steel, it must be hardened and tempered and, lastly, it must be galvanized."

Early accidents. The first major railroad accident involving an iron bridge occurred at Ashtabula, Ohio, Dec. 29, 1876, during a heavy snowstorm. A double-track deck bridge of 157-ft span (a Howe truss, 12 ft deep) collapsed under a passenger train, killing 92 passengers and crewmen. Avoiding the type of lurid account common in the newspapers of the era, the NEWS undertook to give its readers all available details as to the structure itself and all engineering facts that could be garnered from official reports, thus rendering a distinctly new service for engineers.

The practice of on-the-scene reporting was inaugurated early. One of the first instances was a trip into one of the airlocks of the heading being advanced from the New Jersey pierhead line for the Hudson River tunnel in 1880. Frost was invited to inspect the work. On entering the airlock, according to Frost's account, "the manager of the machine gave the wheel a turn and the torture began. It started a noise sounding like the escape of steam from a steamboat's pipe. Another turn, and the sound was as of two steamboats' pipes. Here the manager was kindly content for a few minutes to cease operations. The noise continued just the same, however, and we began to feel a choking sensation in the throat and a strange ringing in both ears."

The result of this trip to the airlock was a detailed description of the tunnel work, with a large sectional drawing. But before it could be published, disaster overtook the project. An undiscovered air leak over the passageway through bad ground between the airlock and the tunnel started a blowout that flooded the tunnel, drowning all but a few men who were near enough to the lock to escape. So the published description appeared in the same issue as a news account of the accident.

Early days on the Mississippi. About this time, too, James B. Eads was much in the news. He had completed the Mississippi River bridge at St. Louis and won a settlement out of court from the Roebblings for infringement of his patent on the use of airlocks for pneumatic caissons. Next he turned his attention

to plans for making the Mississippi River deeper and maintaining a channel through the passes in the delta. A long controversy between Eads and General A.A. Humphreys, Chief of Engineers, who opposed his ideas as impractical, ensued. Humphreys had lost a previous battle with Eads on the matter of hindrances to navigation created by the St. Louis bridge.

ENGINEERING NEWS at first sided with General Humphreys, criticizing Eads for intemperate language. The issue revolved around depth measurements on which payments depended. When the Secretary of War ordered that reports on measurements be made to him instead of Humphreys, the editors appear to have concluded that Eads had some justification for his sharp words. In any event, they wrote, "We hope no influence will be brought to bear to jeopardize the success of an experiment worth more to the profession, as an experiment alone, than it will cost, and in the event of success, of untold benefit to the country at large." Eads' plan did succeed in maintaining a channel of adequate depth without dredging, thus establishing a new principle of river hydraulics.

In a later issue the journal reported, "Captain Eads has also another idea which he is prepared to defend. He advocates the use of cutoffs to permanently lower the floodline of the river so as to do away with levees en-

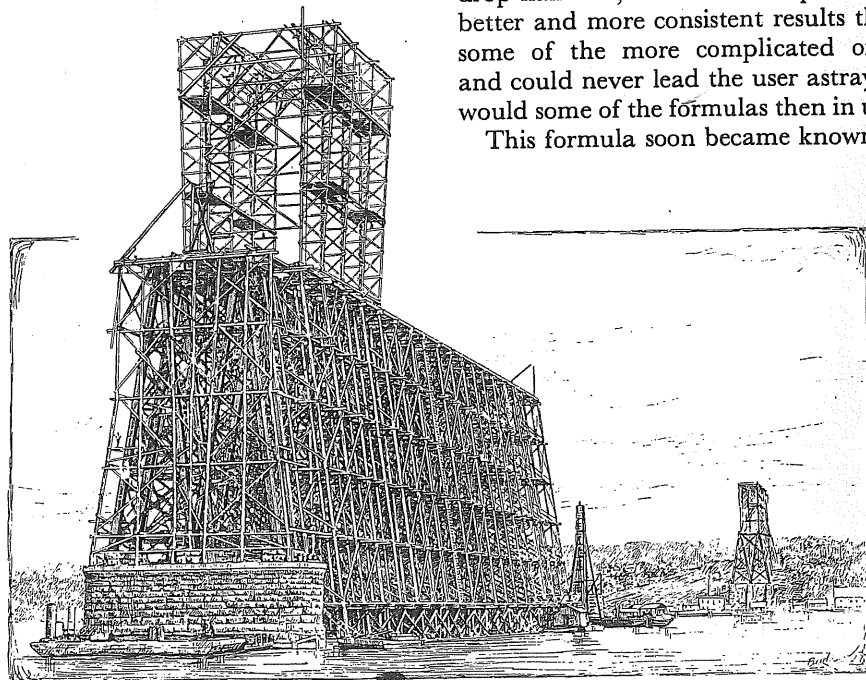
tirely. No doubt if such a scheme is practicable, it would be a great saving of money as the expense of the levees as recommended by the commission is some \$40,000,000." This idea was to be the center of another controversy several decades later, but the use of cutoffs finally was approved.

Pile driving formulas. Chief editors during those formative years of the 80s and 90s were Charles F. Wingate of the RECORD and D. McN. Stauffer, Arthur M. Wellington and C.W. Baker of the NEWS. Wellington became perhaps the best known as a result of his monumental book, THE ECONOMIC THEORY OF THE LOCATION OF RAILWAYS. He also acquired some unexpected fame by his handling of the subject of pile driving formulas.

In 1888 a reader inquired as to the best formula for determining the safe bearing capacity of a pile. This letter was answered in the December 29 issue by John C. Trautwine who recommended use of the formula given in his CIVIL ENGINEER'S POCKET BOOK. Wellington did not agree with Trautwine's recommendation. He made a study of that formula, along with others then being proposed and used, and wrote a long footnote to the Trautwine letter, which has since come to be recognized as one of the most important statements ever made on that subject.

In that footnote Wellington gave a very simple formula for determining the safe load on piles driven with a drop hammer, which he said produced better and more consistent results than some of the more complicated ones, and could never lead the user astray as would some of the formulas then in use.

This formula soon became known as



Published in *Engineering News* in 1887, this sketch of the falsework for the Poughkeepsie, N.Y., bridge over the Hudson was made by F.P. Burt of the staff.

the ENGINEERING NEWS pile formula. Many discussions of it ensued; these were summed up by Wellington in the issue of Nov. 17, 1892, in a set of "Rules of Practice for Pile Driving and Safe Load of Piles." These rules included a modification of the drop hammer formula for use when piles were driven with a steam hammer. It is this formula that still has use today.

The Johnstown flood. Stauffer was the central figure in another famous instance of reporting when in 1899 the failure of an earth dam on the south fork of the Conemaugh River resulted in the inundation of Johnstown, Pa., with a loss of life estimated at 2,300. With F.P. Burt, an associate editor with a remarkable facility for making sketches, Stauffer immediately set out to provide the readers with a firsthand account. They had considerable difficulty in reaching the dam, lived on sandwiches for a couple of days, and spent one night in a barn. The resulting report was complete as to essential engineering details.

Soon after the failure, reports appeared in the daily papers to the effect that an incompetent engineer had been placed in charge of the reconstruction. The seriousness of that charge caused Wellington to make a thorough investigation. As a result he stated in a later issue, "Our information is positive, direct and unimpeachable that at no time during the process of rebuilding the dam was any engineer whatever, young or old, good or bad, known or unknown, engaged on or consulted as to the work—a fact which will be hailed by engineers everywhere with great satisfaction as relieving them as a body from a heavy burden of suspicion and reproach."

The Panama Canal. Stauffer was also the central figure in reporting on the

Panama and Nicaragua canal work. An ever increasing amount of space in ENGINEERING NEWS was given to these two projected canals during the 80s and 90s. For the most part, comment was critical as to the promotional methods of Ferdinand de Lesseps, the builder of the Suez Canal, who had organized a canal company for the Panama work. "By way of a fair start," the journal bluntly said, "the promoters modestly ask the proverbial guileless and trusting public for a nominal credit of \$80,000,000."

The French began work at Panama actively in 1883 and continued until the company failed in 1888. This failure injected a spark of new life into the rival Nicaragua Canal project and, early in 1891, the president of the canal company invited Stauffer to join a party that was going down to see the work that had actually started at its eastern end. En route, his ship ran aground on a reef in the Caribbean. He was stranded for six days before being picked up by a rescue vessel and taken to Greytown, the port at the Atlantic end of the canal.

Publication of Stauffer's reports of progress on the never-to-be-completed Nicaragua Canal began in the issue of June 6, 1891. They were illustrated with drawings made by Burt from Stauffer's photographs. For 20 years thereafter both the NEWS and the RECORD were filled with articles of controversy, criticism and construction as the scene shifted to Panama and to one of America's proudest construction enterprises.

In all these pioneer publishing activities, editors Wellington and Stauffer were aided by constant encouragement from publisher-owner Frost, who also lent a hand on editorials now and then. In one of these early in 1894, he dis-

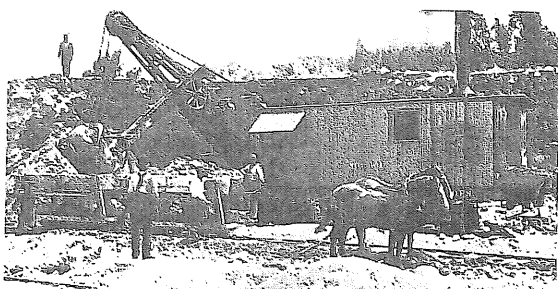
cussed the advantages that could come from an association of municipal engineers, and thus he was partly responsible for the organization later that year of the American Society of Municipal Improvements, forerunner of today's large and influential American Public Works Association.

Typhoid fever and water supplies. Not only the chief editors and the publisher, but the other specialist members of the editorial staff were prominent in the important activities of those early journalistic days, just as they have continued to be. One of these staff members was M.N. Baker, who had compiled the MANUAL OF AMERICAN WATER WORKS, a listing of financial and technical information and a directory of officials of all waterworks companies, which was published annually by the NEWS from 1888 to 1897.

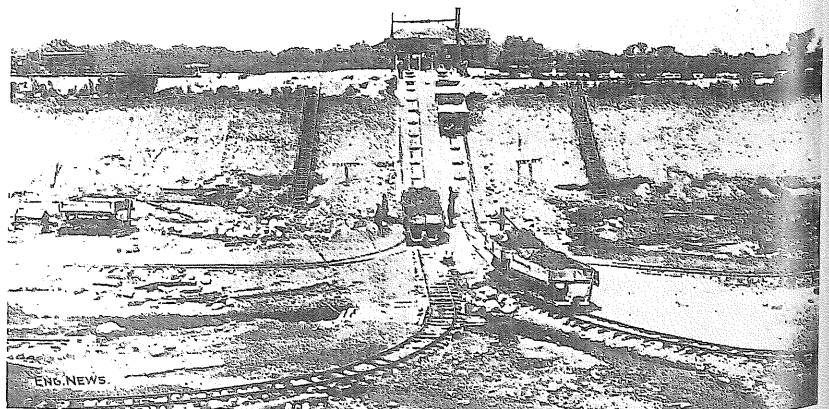
During that time Baker came into close contact with developments in water purification. Learning that William T. Sedgwick and Allen Hazen had written a paper entitled "Typhoid Fever in Chicago," which indicated a definite connection between a sewage-polluted water supply and high typhoid rate, Baker obtained a copy of the paper. Published in ENGINEERING NEWS along with two following editorials, the information attracted wide attention.

Appearing at a time when Chicago was preparing for an influx of people for the World's Columbian Exposition of 1893, the revelations are believed to have been a factor in the decision to pipe spring water from Waukesha, Wis., for use on the fair grounds.

ENGINEERING NEWS, at any rate, began a campaign directed by M.N. Baker to arouse public interest in elimination of polluted water supplies. The waterworks associations and many state and local health agencies later partici-



Chicago drainage canal marked beginnings of mechanization in construction—steam shovel excavation (above) cable-incline haulage (right)—described and analyzed in 1895 in a series of articles by staff editor C.S. Hill.



pated in the campaign, and in 1917 Baker summed up the success of the endeavor in an editorial "Vanishing Typhoid and a Bit of Editorial Retrospect."

The Chicago drainage canal. Another staff member, C.S. Hill, who like Baker was to serve for nearly 50 years before he retired, chalked up another first in technical journalism just before the turn of the century. What he did was to elevate the planning and engineering of construction to an equal status with design. Sent to Chicago to open a regional office there, he arrived to find the booming prosperity of the early 90s slipping off into another financial depression. The World's Fair was over, and the city was experiencing the inevitable letdown. The only large job under way was the drainage canal that the city had undertaken to reduce the pollution of its drinking water supply.

An on-foot survey of every one of the 27 miles of the canal convinced Hill that a wealth of useful information could be reported. "To me," he said in later years, "the greatest revelation was that construction had a technique as profound as that of design; was just as true an art and science; was influenced by even more variables than was design; was as exacting of ingenuity and creative brainpower as was design; and required the added capacity for shrewd business foresight and direction."

The response from contractor readers to Hill's articles was enthusiastic. No such detailed analysis of a construction contractor's operations or presentation of his procedures had ever been published before. Everything was covered from plant layout to feeding the men. With a skill for which he later became well-known, Hill set down for contractors on other projects a job study of great value. A notable feature of these articles was the large number of schematic drawings of construction operations prepared from sketches he made on the job.

Better concrete. In the late 90s, concrete in the U.S. was made with natural cement. Little portland cement was manufactured in the U.S. and engineers knew little about its properties. Almost no reinforced concrete was being used. Accounts in foreign journals of the use of portland cement in Europe and the bold adventures of French and German engineers in the use of reinforced concrete led Hill to conclude that information about portland cement and its use in reinforced

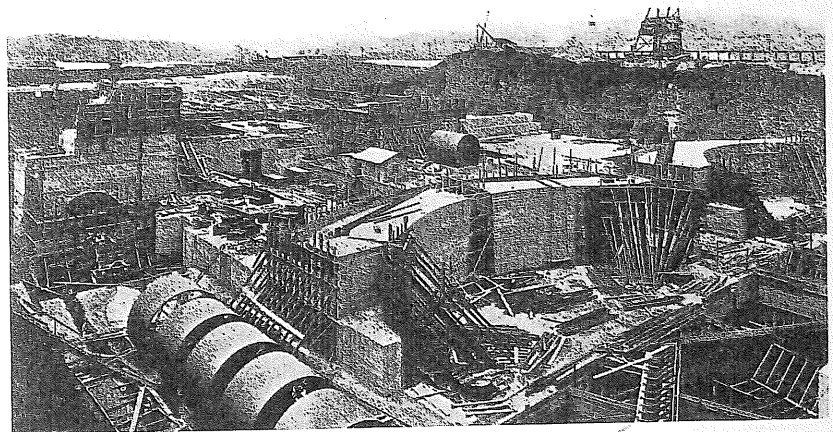
concrete would be of great value to American engineers.

About that time, Hill said in later years, he came under the influence of the enthusiasm of E.L. Ransome and Fritz von Emperger, both of whom had been experimenting with reinforced concrete. The result was a number of articles, beginning about 1897, on cement manufacture and technology, and on reinforced concrete and concrete construction methods. Most of Hill's time for 10 years was given over to the preparation of these articles. Out of them came the book REINFORCED CONCRETE, by A.W. Buel and C.S. Hill. Published by ENGINEERING NEWS in 1903, it was the first treatise on reinforced concrete design and construction in the English language.

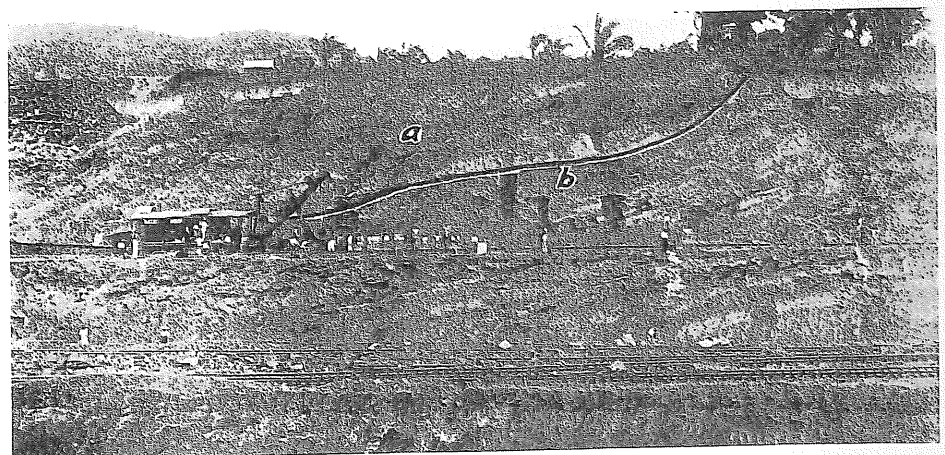
A few years later, in 1906, a young engineer, three years out of Cornell, joined the ENGINEERING NEWS staff and was given concrete design and construction as his principal assignment. His name was Frank C. Wight, and in his all-too-short life (he died suddenly

in 1927 at age 45) he left an indelible imprint on the concrete art particularly, and indeed on the whole spectrum of civil engineering. By 1913 he was managing editor of EN. After the 1917 consolidation he was managing editor of ENR, and finally he was its chief editor for the brief time from 1924 until his death. A driving worker, an attractive personality and a dedicated professional, Wight wrote with a force and elegance that persuaded readers to action. In the field of concrete this persuasion centered on such essentials of the day as conscientious design, protection of cold weather work and more and better cement research.

On this latter point he early encouraged P.H. Bates of the U.S. Bureau of Standards to write about his ideas and studies of special purpose cements as opposed to the single, standard portland cement that dominated U.S. building work. Bates was the pioneer who led the way to federal and American Society for Testing and Materials (ASTM) specifications for such special



Panama Canal as covered by Engineering Record in 1910 was in the lock construction stage, as here at Gatun.



Slides in Panama Canal slowed construction progress. In 1912 Engineering Record published this view, the black line marking the surface of hard underlying material (b) on which soft, saturated overburden (a) slid into the canal.

cements as high-early-strength, moderate heat, low heat and sulfate-resisting types. Wight did not live to see this significant development, but there can be no doubt that he played a substantial part in bringing it about.

Quebec bridge collapse. But many things were to happen in the two decades before the untimely end of Wight's life and career. One warm August afternoon in 1907, for example, about 100 men were working on the south arm of the great cantilever bridge that was being built across the St. Lawrence in Quebec. There was a certain amount of tenseness in the air because the day before an inspector had been sent in haste to New York to report to the consulting engineer, Theodore Cooper, that one of the lower chord members was bent inward about 2 in. From New York the inspector was to go to Phoenixville, Pa., to carry the same word to the staff of the fabricators.

At that time the south cantilever over the river had been completed, the big traveler at its outer end was being dismantled, and erection of the suspended span with lighter equipment was under way. But the general foreman, knowing how the lives of his men depended on that bent or bending chord member, was frankly nervous, telling the resident engineer that he thought they were playing with death.

Without further warning, death came to 74 of the men, including the foreman and the resident engineer. Slowly at first the outer end of the great

span began to sink, and then with appalling swiftness the whole structure collapsed into tangled wreckage.

Cooper, in New York, after hearing the inspector's report, had wired the plant at Phoenixville not to add any more weight to the bridge. But before the plant had relayed the word to Quebec, the collapse had occurred.

Editor C.W. Baker was vacationing in Vermont at the time. Immediately he telegraphed his New York office to have associate editor F.E. Schmitt join him at Quebec, since Schmitt had been following the work on the bridge closely.

Meeting in Quebec the next morning, the two editors journeyed by trolley and on foot to the bridge, where they found Henry Holgate, head of the board set up by the Canadian government to report on the failure, examining the remains of the lower chord member that had been under observation just before the collapse.

The following noon Schmitt left for New York with his notes and sketches made on the ground, some photos from the engineer's file (taken before the accident) and some exposures of his own showing details of the collapse. At New York, while these photos were being developed and copied by a sketcher in a form for linecuts, Schmitt interviewed Theodore Cooper and prepared his report, spending the night before the next issue went into the mails in the print shop passing copy to the compositors as it was written.

The result was a detailed report of the accident and a discussion of its probable cause—which subsequently was fully supported in the findings of the official report on the failure.

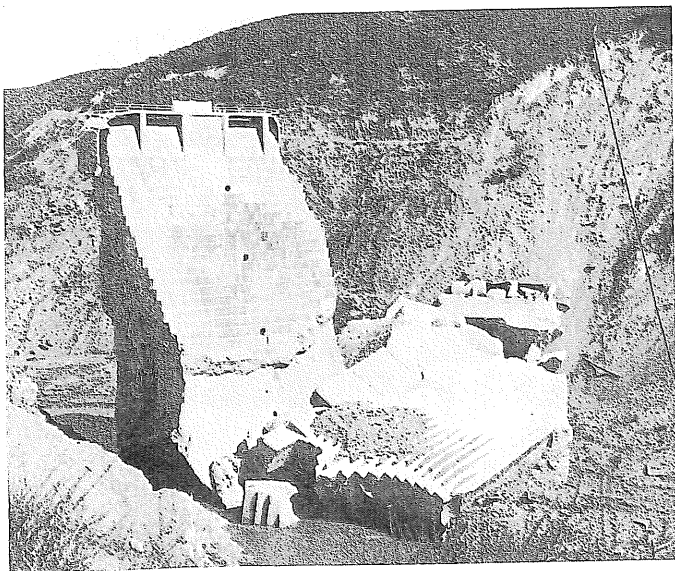
Nine years later, when the suspended span of the redesigned Quebec Bridge fell into the river while being lifted into place from barges, a similar job of fast and complete reporting was carried out. This time an editorial staff member witnessed the actual collapse, and telephoned the news.

The RECORD expands. When the first collapse occurred at Quebec, ENGINEERING RECORD had given no space to reporting the accident. At the time of the second failure, however, it gave its readers a fairly detailed account. This was due to the culmination of changes in editorial policy that had been taking place over many years.

During this time there was a definite trend away from articles on plumbing toward the broader field of sanitary engineering under the editorship of John M. Goodell. An outstanding example is found in a series of articles by George E. Waring on the importance of separate sanitary sewers, and another series on water wastage, which gave details of British practice in waste prevention. The RECORD also started publishing a series of articles on the construction operations on the Chicago drainage canal about a year after Hill's articles appeared in the NEWS. That series was the first clear evidence of the growing competition between the two journals, which was to become so keen before their consolidation in 1917, and which revealed the RECORD as the champion of the field construction men.

In 1915 the RECORD editors undertook to challenge the leadership of the NEWS in the field of concrete design and construction through the publication of a series of articles on the use of a microscope in determining how to improve the quality of concrete. They were written by Nathan C. Johnson, engineer of tests for the Raymond Concrete Pile Co. At the time the RECORD published the articles, the NEWS had given its readers only a brief summary of Johnson's findings as presented earlier before the ASTM.

A few weeks later the RECORD presented additional results of Johnson's studies in an article entitled "Water, the Chief Factor in Making Good Concrete." It pointed out the disadvantages of too wet a mix, a subject that had only been referred to briefly in the



Failure of Los Angeles' St. Francis Dam on Mar. 12, 1928, was extensively described in the following week's issue of ENR as a result of quick on-site reporting and photographing by Pacific Coast editor N.A. Bowers.

pages of the NEWS up to that time and one that later years proved to be of outstanding importance.

Recruiting engineers for war. The first issue of ENGINEERING NEWS-RECORD, the merged EN and ER, appeared on April 5, 1917, just as the U.S. was entering World War I. Within a short time the editorial and business staffs of the new magazine undertook to aid in recruiting engineers for the regiments then being organized to go to France. Highway engineers were badly needed, but normal recruiting methods, which worked so well in getting men for the railroad regiments, drew much too small a response, due chiefly to the fact that most of the eligible men were out of reach of the recruiting points.

So it was decided to try to reach them through the pages of ENGINEERING NEWS-RECORD. Large notices telling of the need were published in its editorial pages, and many of the advertisers gave up their normal space for similar messages. Interested men were instructed to get in touch with the nearest recruiting station of the 23rd Engineers, the highway unit then being organized.

The response was both immediate and amazing. Hundreds of highway engineers and construction men from all over the country signed up. Later, similar methods were used to find men for the quarrying and bridge-building regiments.

An engineer war correspondent. By late summer of 1917, American engineer regiments were beginning to take their places alongside their British, Canadian and French fellows on widely separated sections of the active front in France, in French ports and on French highway and rail lines. To bring first hand reports of this work to the readers, it was decided to send associate editor R.K. Tomlin to France as a war correspondent. The proposal was welcomed by the Chief of Engineers, U.S. Army, and by December Tomlin was on his way. He visited most of the operations on which American engineers were engaged and wrote accounts of their work which were published currently by ENR and later reprinted in book form.

Introducing soil mechanics. During the early 20s ENR pioneered in publishing information about what is now commonly known as soil mechanics. This began with the publication in September, 1920, of a paper by the then little-known scientist, Karl Terzaghi, who, while teaching at Robert College

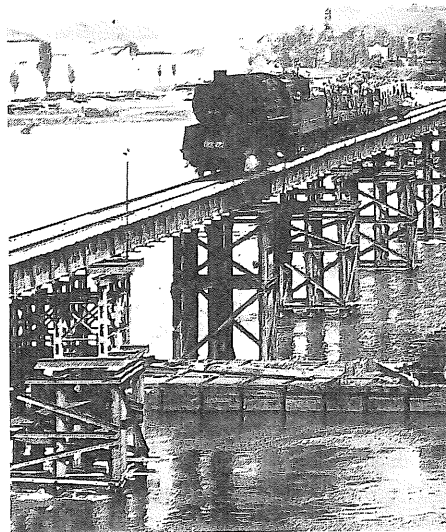
in Turkey, had undertaken to develop new earth pressure theories.

The early studies reported in this paper appeared to be so significant to F.E. Schmitt, then associate editor, later editor of ENR, that he suggested to Terzaghi that he send in more detailed reports of his later studies and findings. These were published as a series of eight articles in the latter part of 1925. In 1926 the series was reprinted in pamphlet form, and for a considerable time this was the only English text on that subject.

Practical application of the theories propounded by Terzaghi soon began in this country. Early in the 30s the Los Angeles Bureau of Waterworks and Supply began applying them to the compaction of soils in large earth dams. The outcome was the development of an entirely new procedure for engineering control of such work. Included were simple tests for determining the suitability of materials for earth dams and for checking compaction.

These methods were described in four articles written by R.R. Proctor, field engineer of the bureau, and published by ENR in 1933.

Three years later ENR published another notable series of articles reporting further developments in the application of the principles of soil mechanics to earth dam construction. These related to work on dams built for flood control in the Muskingum River valley in Ohio, and were written by Theodore T. Knappen and R.R. Philip of the U.S.



Military engineering by U.S. forces in World War II was widely reported from all theaters by ENR editors. This bridge over the Rhine is typical.

Engineer Office at Zanesville, Ohio. Reprinted, both series were still in demand a dozen years later. Since then the art of soil mechanics has grown by leaps and bounds until there is today a whole family of consulting engineers who specialize in this 50-year-old science introduced to American engineers by ENR.

Great floods. From the time of the Johnstown flood, reporting of such disasters has been a basic tenet of practice on the ground that lessons from failures are potent aids to better design and construction. And as flood control structures—dams, levees, cutoffs, wasteways and the like—multiplied, accounts of their functioning under flood loads had similar engineering significance.

Only by firsthand, eye-witness accounts, in most instances, can such news be brought to the reader. Thus it was that in 1927, W.W. DeBerard spent 10 weeks in the lower Mississippi Valley studying the effects of that year's disastrous flood and discussing with local people the several proposals for flood protection that were then under consideration. These observations were published in a series of articles which provided background against which to appraise the new flood control plans when they were made public later.

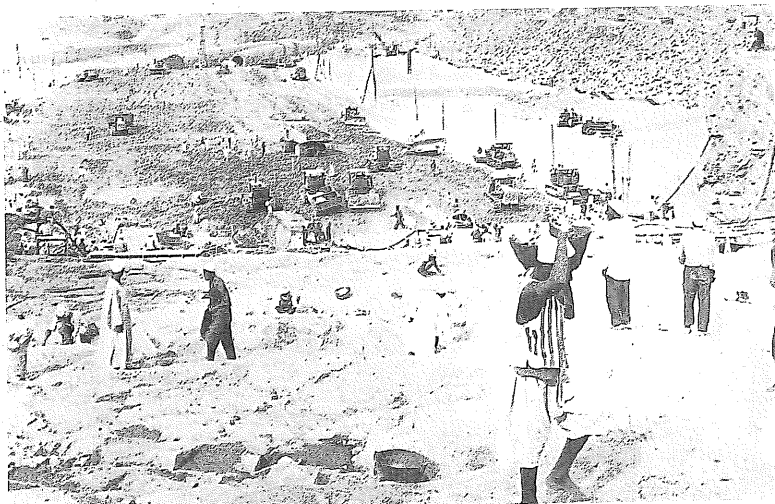
In 1936 the floods and other results of the New England hurricane were similarly reported by Waldo Bowman, V.T. Boughton, E.J. Cleary and H.W. Richardson, who covered the various devastated areas in a matter of a few days for publication in the next week's issue. The process was repeated in 1937 by both DeBerard and Richardson on the Mississippi and Ohio river floods.

Extensive, costly construction was carried out to contain these New England and Mississippi valley streams, and with considerable success. But there were other rivers and even greater storms to come to fill them to overflowing. This was spectacularly demonstrated in 1952 when the Kaw in Kansas produced what was then described as the most costly flood in U.S. experience. The river discharged twice as much water into the Missouri River at Kansas City as it had in its previous record breaker in 1903. This flood and the remedial measures were quickly and thoroughly reported in ENR by J.R. Carr, associate editor headquartered in Chicago. Carr also became an expert on Missouri River floods and the construction of the nine major dams that were built to reduce them.

Devastating earthquakes. As in covering floods, field reporting has also been the practice on earthquakes, but staff coverage of earthquakes has often been aided by outside specialist counsel. Items relative to the San Francisco quake of 1906 and the one in Tokyo in 1923 had appeared in the magazine, but it was not until the Long Beach, Calif., earthquake of 1933 that thorough coverage was inaugurated. Here widespread damage to school buildings had occurred, so that much criticism of inadequate seismic provisions in building codes followed.

N.A. Bowers, Pacific Coast editor in San Francisco, who had gone to Long Beach immediately after the quake, engaged H.D. Dewell, San Francisco expert on seismic design, to write articles relating the damage to necessary remedial measures. Later, George W. Housner of the California Institute of Technology acted as an ENR advisor in evaluating the damage in subsequent earthquakes. More recently, Henry J. Degenkolb, consulting engineer in San Francisco, has served in a similar capacity on quakes in Mexico City in 1957, Skopje, Yugoslavia, in 1963, Anchorage, Alaska, in 1964, Caracas, Venezuela, in 1967 and Managua, Nicaragua, in 1973.

Use of such experts supplemented the firsthand reporting of ENR editors or correspondents. Frederick S. Merritt went to Mexico to cover the '57 quake; Jack H. McMinn went to Anchorage in '64; and ENR's chief editor, Arthur J. Fox, Jr., covered Managua. Correspondents covered the Skopje and Caracas quakes.



Egypt's Nile River Dam at Aswan is one of many projects covered by ENR editors in their worldwide travels since World War II.

St. Francis dam failure. On Mar. 12, 1928, St. Francis Dam in southern California failed. In the Mar. 22 issue appeared an eight-page report by N.A. Bowers, Pacific Coast editor, written within 36 hours of the failure and including pictures and drawings. In the same issue an editorial said: "A great dam has gone out. For the first time in history a high dam of massive masonry has failed and every fear of the destruction pent up in such work is realized. In human respects, the memorable Johnstown catastrophe of 39 years ago was greater. But the washing out of an old and neglected earth dam was not an engineering tragedy as was the destruction of St. Francis Dam. Here the highest embodiment of modern dam-building science crumbled into ruin, taking a toll of hundreds of lives as the price of mistaken confidence in its strength.

"No final statement of why the dam failed can be made until the official inquiries already begun are concluded. But Mr. Bowers' examination of the site as reported in the following pages points unmistakably to fatal weakness in the foundation . . . The present disaster contains no fact or happening that would justify restriction of dam construction. It points the need, however, for an effective check on individual judgement concerning foundations where many lives are at stake."

The official examinations and conclusions bore out these original contentions. As a result, California passed a law requiring all dam designs to have state approval, thus setting up a protective measure that had been proposed

by the editors of ENGINEERING NEWS following the failure of the dam that caused the Johnstown flood in 1889.

Many special reports. Recognizing that it is not enough merely to publish the news of the industry week by week and feature stories on important projects as they occur, ENR has consistently followed the practice of periodically focusing attention on important problems or situations that would benefit from roundup and analysis of available information. Thus in 1920 a report on the future of inland water transportation was published. In 1923 a survey of reclamation policies and practices appeared at a time when this country's thinking with respect to this important engineering operation was undergoing questions and criticism. In 1924 C.S. Hill published a long series of articles on winter construction, bringing to the attention of the industry many practices which would enable the seasonable peak of operations, which occurred in the spring, summer and fall, to be evened out over a 12-month period.

In the 30s and covering a four-year period up to 1937, eleven articles totaling 80 pages appeared on the design and construction of the San Francisco Bay bridge, written by C.H. Purcell, chief engineer, Charles E. Andrew, bridge engineer, and Glenn B. Woodruff, engineer of design. Reprinted, the articles constituted a valuable treatise on what was then, and may still be, the world's greatest bridge building enterprise, with its twin suspension bridges in tandem, long-span cantilever bridge and new types of foundation sinking to unprecedented depths.

Other special reports, to be mentioned later in these pages, have carried on this practice of in-depth reporting and analysis up to the present day.

Wartime construction. Long before the U.S. became directly involved in World War II, it became obvious that the struggle was to be more of an engineer's war than any previous one. Also because of security requirements the normal type of reporting could not be followed, yet there was urgent need for widespread dissemination of information about new designs and methods of construction.

As this latter need was fully appreciated by the engineering heads of the Army, Navy and Army Air Corps, arrangements soon were made for passes for editors to visit restricted operations and for fast clearance of copy they pro-

duced. As a result, ENGINEERING NEWS-RECORD was able to report details of methods and materials used on war plants and at many military installations without violation of security restrictions.

Later, as it became certain that this country would soon join the conflict, it became evident to Waldo Bowman, who had become chief editor, that adequate coverage of the engineering operations on the farflung battlefronts would call for on-the-scene staff reporting.

The first opportunity to institute this practice came in 1942 when our government started to build a highway to Alaska. Construction's interest in the project ran high, but specific information as to how the work was being accomplished was almost completely lacking. To meet this need, with the cooperation of the Army Engineers and the Bureau of Public Roads, H.W. Richardson was sent to prepare firsthand reports.

Beginning at the south end, Richardson worked north, sending in his notes and pictures by airmail. He was present at the "holing through" of the pioneer road near the boundary between Yukon Territory and Alaska, getting the only pictures of that historic event. And then by making his way to the upper end of the highway, he became the first person to travel over the entire road.

Similarly, in 1943 when the U.S. government undertook to complete the Inter-American Highway to the crucial Panama Canal in Central America, A.N. Carter was sent to visit the many scattered construction operations from Mexico south.

In the meantime, on the homefront the head of the Navy's Bureau of Yards and Docks, Admiral Ben Moreell, had created a new kind of work and fighting force to carry out his building responsibilities, which were mushrooming around the world. Named Construction Battalions, or CBs, and soon nicknamed Seabees, these units, to which it was hoped experienced construction men would be attracted, were being trained in special camps and in special ways. Bowman was invited to witness this training, and his report "The Seabees are Coming" was reprinted several times by the Bureau of Yards and Docks as an aid to its recruitment, a development reminiscent of the time in World War I when ENR aided in recruiting engineers for the Army's highway regiments.

Then came the time when the war activities of American engineers began to reach into the far corners of the globe, and the need for wider coverage by the magazine became imperative. Bowman went to England, North Africa and Persia, while E.J. Cleary took over the assignment in South America where sanitation was the requirement of first magnitude with which American engineers were grappling. Richardson departed on another visit to Alaska and on out to the Aleutian Islands.

The following year N.A. Bowers was given the assignment to cover airfield, road and port work in the South Pacific, a trip that took him all the way to Australia. Bowman went to Europe again that year to cover operations on the continent, particularly port, camp and road construction and the great bridging operations attendant to the crossing of the Rhine. At the same time Richardson went to the Philippines and Japan on a trip that included coverage of the atomic destruction at Hiroshima.

Use of the military airmail services frequently made it possible for ENGINEERING NEWS-RECORD to give its readers reports from these editor-war correspondents within a week or two after they were written. The most significant example of this was Bowman's report of the collapse of the Remagen Bridge while American Army engineers were trying to repair damage caused by German shells and diving aircraft. This captured structure had afforded U.S. forces their first Rhine crossing. Bowman spent the morning on the bridge a scant two hours before it collapsed. And two weeks later ENR published a complete report together with sketches and pictures, an account that would never have been a part of the historical record without ENGINEERING NEWS-RECORD's practice of personal reporting of news.

Reconstruction postwar. The end of World War II found Europe in shambles and the U.S. in need of all kinds of facilities whose construction had had to be postponed. ENR had maintained a continuing inventory of all projects seriously proposed for postwar construction, whose total had reached an awesome number of billions of dollars. Broken down by types of facilities—housing, hospitals, water supply, sanitation, power, highways, flood control, airports, schools, etc.—this backlog list gave ENR readers planning data available from no other source.

As engineers and contractors got busy on these jobs, reporting the result-

ing news and technical developments required super intensive efforts on the part of the entire editorial staff. And one of the new aspects of this work was foreign reporting focused on reconstruction work in Europe. This reporting was fostered by the U.S. Marshall Plan, which provided massive financial aid to the war-devastated countries; by our continued military presence in Europe, which required the building of many kinds of support facilities; and by the fact that U.S. consulting and construction firms were being engaged to do significant numbers of these jobs.

The transition from ENR's war reporting to on-site staff coverage of reconstruction abroad would have been natural in any case, but it was helped along when Bowman was asked by Secretary of War Henry Stimson in the spring of 1947 to accompany a dozen newspaper editors and publishers on an appraisal survey of U.S. military accomplishments in Germany. This was a two-week task, but Bowman stayed on for six more weeks to report more broadly on reconstruction.

The resulting series of articles, covering such subjects as bridge rebuilding on the Rhine, rubble clearance in Berlin, hydropower and housing in Austria and port rebuilding in France as well as hydropower and canalization on the Rhone, marked the beginning of a policy of foreign reporting by staff editors that has made ENR preeminent in the field of world wide construction reporting.

In subsequent years Bowman went to Europe many times, also to North Africa, the Middle East, Southeast Asia, India, Japan, the USSR and Australia. Among the articles that resulted were a number that gave the first and most complete information on such notable and controversial developments as the U.S. airbases in Morocco and Spain (1953 and 1955); France's pioneer tidal power plant on the Rance River (1956 and 1964); Russia's first huge Siberian hydroplant at Bratsk (1962); and Egypt's Nile River dam at Aswan (1961, 1965 and 1968).

Such on-site staff reporting continued without interruption. Arthur Fox, who became chief editor in August, 1964, has covered more than 30 countries on reporting assignments. Granted a unique opportunity in 1968 to visit two of the world's tallest dams, under construction in the south and southeast regions of the USSR, Fox brought out the first substantial stories on 1,040-ft

Nurek Dam, an earthfill, and on 892-ft Inguri Dam, a concrete arch.

Other notable foreign reporting must include the magazine's coverage of construction in the Vietnam War. Herbert Cheshire of the Washington staff went first to Vietnam. Managing editor Joseph F. Wilkinson and chief editor Fox followed.

Of great and indispensable aid to ENR in its foreign construction coverage are the correspondents in the McGraw-Hill World News organization. Established in the world's largest cities after World War II, these reporters greatly expanded ENR's ability to bring its readers significant business and technical news promptly and accurately.

Better basis for decisions. Another post World War II transition, also designed to keep the magazine's contents realistically related to the readers' evolving needs for information, took place through the 50s. Inaugurated by Robert F. Boger, who had occupied the position of publisher of *ENGINEERING NEWS-RECORD* since 1948, the changes emerged from his credo that "the purpose of business magazines is to help their readers make better decisions, many of which, in the case of our modern day ENR readers, are not of a technical nature."

Boger, a wise and thoughtful student of the publishing business, was also convinced that television, new recreation habits and other trappings of modern living were seriously competing for the reader's time. Shorter, more compactly written articles were one answer to this competition and an aid to the reader. Further aid, especially in decision-making, could be provided by more business and political news.

It was in these years under Boger that the magazine ceased to be an engineering journal and became truly the news magazine of the construction industry—serving architects, planners and financial people as well as engineers and contractors.

The editorial staff, mostly engineers to that time, was enlarged by a lawyer, Charles J. Harding, and a financial and real estate writer, Robert J. Stinson. Also an economist-statistician, James Webber, was engaged to assist Elsie Eaves, the manager of the department concerned with such business aspects of construction as proposed projects, volume figures, bidding information, cost trends and the ENR cost indexes. Eaves, a graduate engineer and the first woman to become a full member of the

American Society of Civil Engineers, was widely recognized and much in demand for her knowledge of construction costs and trends during the four decades that she was a member of the ENR editorial staff.

Big roadbuilding. In 1950 toll road financing became possible and acceptable in the face of the inadequacy of the nation's roads to serve the needs of the growing multitudes of automobiles and trucks. An important result of this new money was that it permitted design of lengthy routes of modern, limited-access highways with the certainty that they would be built in their entirety instead of piecemeal as too often happened under tax-supported financing. Many such toll roads were built and described fully in numerous ENR articles.

Yet even the toll road boom failed to produce enough modern roads—or to convert the free-road advocates to this financing method—with the result that the federal highway authorities, aided by the concerned committees of Congress and backed by President Eisenhower, came up with the legislation providing for a 10-year, \$56-billion program for a 40,000-mile system of free roads. The country was already committed to spend \$47 billion on the existing system over the same period, so the program being considered was really of \$100-billion size. Congress passed the legislation in 1956, and the toll road boom was over.

In the meantime, ENR editors, believing such a stepped-up road program was necessary and healthy for the country, developed a special report and devoted an entire issue to the "Eisenhower Grand Plan for Roads." It set forth the pros and cons, the proposed routes and mileages, the road cross sections and the bridge proposals, and the financing alternatives, including the unique Highway Trust Fund.

Stories of the 60s. Events of the 60s gave rise to the stories that dominated the latter years of the magazine's first century—and set the stage for the beginning years of its second. Major events spawned major stories, both in length and in number, which required major efforts on the part of the editors, sometimes singly, sometimes in teams. A revealing statistic is that when San Francisco's \$800-million Bay Area Rapid Transit system started initial operation in the fall of 1972, after 17 years of planning and construction, the project had been the subject of 177 items in

the magazine, ranging from five-page articles to 10-line briefs.

Such extended coverage was not unique since such projects as Grand Coulee Dam, New York City's Delaware River water supply, Chicago's record-breaking 960-mgd filter plant, and flood control on the Mississippi and Missouri rivers, to name a few, were also in ENR's pages for many years.

A more recent instance of editorial devotion to a project of outstanding importance relates to Canada's Manicougan River dam known as Manic 5, one of seven dams built by Hydro-Quebec on two St. Lawrence River tributaries. Senior editor W.W. Jacobus, Jr., first visited the site of this world's largest multiple arch dam in 1963 when the first bucket of concrete was being placed. After various other visits he was also there to see the last bucket placed in the fall of 1968. Jacobus authored a popular book on Manic 5 which was illustrated with some of the fine pencil drawings of artist Lili Rethi whose work depicting many notable construction scenes had periodically appeared in *ENGINEERING NEWS-RECORD*.

It was the 60s that brought to the readers such far-reaching and interesting stories as those concerned with the great launching base program for the Atlas, Titan and Minuteman missiles; with the airport program for the jumbo jets; with the completion of the Narrows suspension bridge at New York; with computer-aided design for tall building frames and for highways where photogrammetry also played a part; with nuclear power plants and with pumped storage for power; with hard-rock tunneling by machine; and finally with the facilities built on Florida's east coast for the unprecedented space program which included the 125-million-cu-ft vehicle assembly building for the great Moon rockets.

Not stopping with these earthbound outer space projects, ENR editors put fact and fancy together following a plan drawn up by Pacific Coast editor D.G. Ellingson, and came up with a special report on "Construction on the Moon" in the July 24, 1969, issue.

Of more lasting importance in this era of the 60s was the inauguration in 1964 of an annual listing of the 400 Largest Construction Contractors in the country and in 1966 of the 500 Largest Design Firms. Accompanied by text that discusses the figures, analyzes the areas of growth and comments on

the standings, the lists have become a popular yearly feature.

Man of the Year. ENR instituted another important annual event in 1966, the selection of Construction's Man of the Year. It evolved from Fox's practice of citing in an annual year-end editorial 35 or 40 individuals who had distinguished themselves during the year by achievements benefiting the construction industry. He conceived the idea of gaining additional favorable public notice for the construction industry and its enormous contributions to society by going a step further with the annual citations: that is, by selecting from the list of honorees one individual of special distinction and naming him Construction's Man of the Year. The program has been a success.

Spotlighting labor abuses. ENR's Management and Labor Department under Charles J. Harding has for years been relentless—in news, special reports and editorials—in spotlighting labor abuses and the too-frequent management acquiescence in them. So it was not surprising to find the magazine seeking to expose the reasons for the low productivity on far too many construction projects.

Edward M. Young, veteran staff member who had been a contractor before he was an editor, was given an assignment—virtually a year's leave of absence from other duties—to get the facts on management and labor attitudes and practices as they related to productivity. Young's enthusiasm was highest when he was covering a job that offered some excitement—deep-sea diving to inspect a bridge foundation or taking photographs from a 300-ft crane boom—so he was quickly off and away on his assignment.

Working as a supervisor for a testing laboratory, in order to gain quiet access to construction jobs, he interviewed more than 500 representatives of construction companies and traveled some 30,000 miles. Everyone he visited insisted on anonymity, but then talked fully and freely.

After nearly a year of such investigative reporting, Young's findings resulted in a story clearly showing that all of the horrible examples of low productivity, which to then had only been rumored—featherbedding and restrictive work practices of every kind—were all too real. Nearly 20,000 reprints of the article, which was published Feb. 24, 1972, were sold. Both contractor and labor organizations requested and were

granted reprint privileges. Stories based on the article appeared in 150 newspapers. And finally, READER'S DIGEST published for its 17 million readers an article on the subject written by Young.

The pollution crisis. As this history is being written, "pollution" is a household word, and efforts at abatement of water, air and solid waste pollution are being pursued at every level of government. It was not always thus, and it was not until the late 40s that state sanitary engineers got federal help in enforcement of clean-up orders from the Water Pollution Control Act of 1948. At about the same time they got a measurable increase in status when sewage treatment became known as pollution abatement and could thus be a subject of polite conversation.

But polluted streams and the treatment of municipal and industrial wastes had always been civil engineering concerns, and the subject of articles and editorials from the very beginning of the magazine. Remember that one of its ancestors was THE SANITARY ENGINEER. Thus it was natural that the editors should take an interest in impending legislation to extend the expiring 1948 Act. But Arthur Fox, who was the sanitary engineering specialist on the staff at the time, took the then unusual step of organizing a seminar to discuss what should be done, and inviting the nation's top authorities on pollution abatement to attend. The proceedings of the highly successful meeting, held in

St. Louis, were reported in a five-page article in the June 7, 1956, issue. When the Water Pollution Control Act of 1956 was passed and signed by the President, its provisions, including \$50 million a year in construction grants for 10 years, were in close agreement with the results of the ENR seminar.

Also significant in these mid-century years was the establishment, through an eight-state compact, of the Ohio River Valley Water Sanitation Commission (ORSANCO), the first serious attempt to extend cooperation and enforcement beyond state lines. And in 1949, after one year of existence, the commission came to the staff of ENGINEERING NEWS-RECORD for its first executive director and chief engineer. This was Edward J. Cleary, then executive editor of ENR, and he served ORSANCO effectively and with distinction until his retirement in 1972. Mention should also be made of two other staff members who were sought out for important positions involving water improvement and supply—F.E. Schmitt, chief editor, 1928 to 1940, who served as special assistant to the chief engineer of the U.S. Bureau of Reclamation from 1940 to 1958, and W.W. DeBerard, veteran western editor, who was Chicago's city engineer from 1941 to 1952, and its chief water engineer from 1952 to 1962.

As debate and developments, and some progress, continued to be made in pollution abatement, seldom a week



Changing skylines spurred articles on many notable buildings. Three in Chicago were the 100-story John Hancock Center of 1970, the 32-story Wrigley Building of 1921 (with clock) and the 36-story Tribune Tower of 1927 (right).

went by without an article or editorial on the subject in ENR. Air pollution and then thermal pollution (hot water discharged into streams from power plants) became germane to the discussions.

Construction cost data. Both ENGINEERING NEWS and ENGINEERING RECORD began publishing contractors' bid prices soon after the magazines were established. Later, materials prices and labor rates appeared occasionally, but publication of these data on a regular basis was not started until the end of 1909. By that time these figures were in demand by engineers for use in estimating future work and by contractors in making bids, especially in areas where they were not familiar with local construction costs.

After World War I, when many engineers became engaged in valuation work, these monthly figures also proved useful in determining the cost of jobs done in earlier years. Out of this application of current construction data to valuation work came the realization that an index, which would show trends in construction costs similar to the index compiled by the U.S. Bureau of Labor Statistics to show the trend in living costs, would be of great value not only to the construction industry, but to utility commissions and financial houses. Consequently such an index was compiled in 1921. The costs of 1913, the most recent normal year, were chosen as the bench mark and were assigned a level of 100.

Later in 1921 the ENR staff compiled a volume index, also based on 1913 data, which made it possible to compare physical volume of construction from year to year regardless of fluctuation in costs.

By 1938 it became clear that the ENR Construction Cost Index, which used common labor rates as one of its components, did not give as true a picture of building construction as it did of heavy construction. An ENR Building Cost Index was, therefore, devised in which skilled labor rates were used. The two cost indexes have been published together ever since.

As time went on, more and more attention (and with greater sophistication) has been paid to cost reporting and analysis by that vital part of the staff now known as the Business Data Department. It formerly compiled an annual roundup of cost information but since 1957, these roundups have been published in four quarterly cost is-

sues. Charts of the indexes are a part of these issues. Each week, too, the department's input to ENR editorial includes from one to three pages of construction materials prices in 20 cities along with a "Scoreboard" page, presenting a wide variety of significant cost data in tabular or chart form. Always included is a column containing four construction market indicators: the cost indexes; bid volume; new capital totals; and the amounts of new plans announced for different types of construction. Since an average of 1,200 new projects are announced daily in the U.S., compilation of these indicators has had to be a computer-aided operation.

ENR began a new cost-information service in 1972, an occasional two-day conference and exposition called COSTEC (for cost estimating and control). A brainchild of James Webber, then manager of the Business Data Department, COSTEC was aimed at establishing closer contact and information exchange among users and innovators (often the same person) in electronic data techniques of estimating and running construction jobs.

To know the readers. Over the years ENR has been able to recognize—and often to anticipate—the informational needs of its readers. A basic reason for this is that the editors "lived with" rather than just "looked at" the profession and industry they sought to serve. And membership in organizations of construction people is a prominent example of this "living with" principle. Thus, different members of the editorial staff at various times have been members of ASTM (American Society for Testing and Materials); ACI (American Concrete Institute); AREA (American Railway Engineering Association); ARBA (American Road Builders Association); ICOLD (International Commission on Large Dams); WPCF (Water Pollution Control Federation); AWWA (American Water Works Association); ASCE (American Society of Civil Engineers); BRAB (Building Research Advisory Board); The Moles; and others.

Since 1925, when associate editor W.T. Chevalier was elected a national director of ASCE, four other staff members (and four staff alumni) have been elected to the three-year term of this office. One of them, Waldo G. Bowman, was also vice president, 1958 and 1959, and served as national president of the society in 1964.

The means for collecting the news have changed radically over the course

of the past century, reflecting both changes in the construction industry and in the reading habits and information needs of its members. Many more sources of information are available. Developing civilization has created new diversions (some necessary, others merely tempting) to reduce reading time. The complexity and scope of construction have increased tremendously. Financing needs are vastly increased. Problems with labor and legislation that affect business of every kind have become the necessary concern of all in construction.

All this has had an effect in changing magazines that seek to serve their readers adequately. They have had an effect on ENGINEERING NEWS-RECORD. An interesting statistic: Of the 1,477 editorial pages published in 1973, about 14% were devoted to news out of Washington that was potentially useful to the decision makers in the construction industry. Articles of all kinds are shorter, compactly written and confined to essentials without excess verbiage. Color is used to enhance readability of charts and quick comprehension of photographs.

Editors also travel farther and faster almost every year. The statement was made in 1968 that the editors "in the last 12 months have visited every continent in the world with the exception of Antarctica." In 1969, managing editor Joseph F. Wilkinson removed this exception by going to the Antarctic bases of the Navy's Seabees to report on the engineering and construction aspects of living and working in perpetual cold.

One wonders whether George Frost and Henry Meyer, if they could return briefly today, would recognize any trace of the journals they founded a century ago in an ENR that now goes literally to the ends of the earth for stories and sets them by methods as new as space travel. However, they would find one principle unchanged. It was put into words by James H. McGraw in the first issue of the merged ENGINEERING NEWS-RECORD in April, 1917: "The paper must be above personalities, above the editors and publishers—it must be an institution. Its principles must be so grounded in truth that they cannot be changed, its policies so well crystallized that they appear unconsciously in every issue and impress themselves on the reader, its traditions so entwined with the interests of its readers that it cannot without an unthinkable shock divorce itself from their service." ■