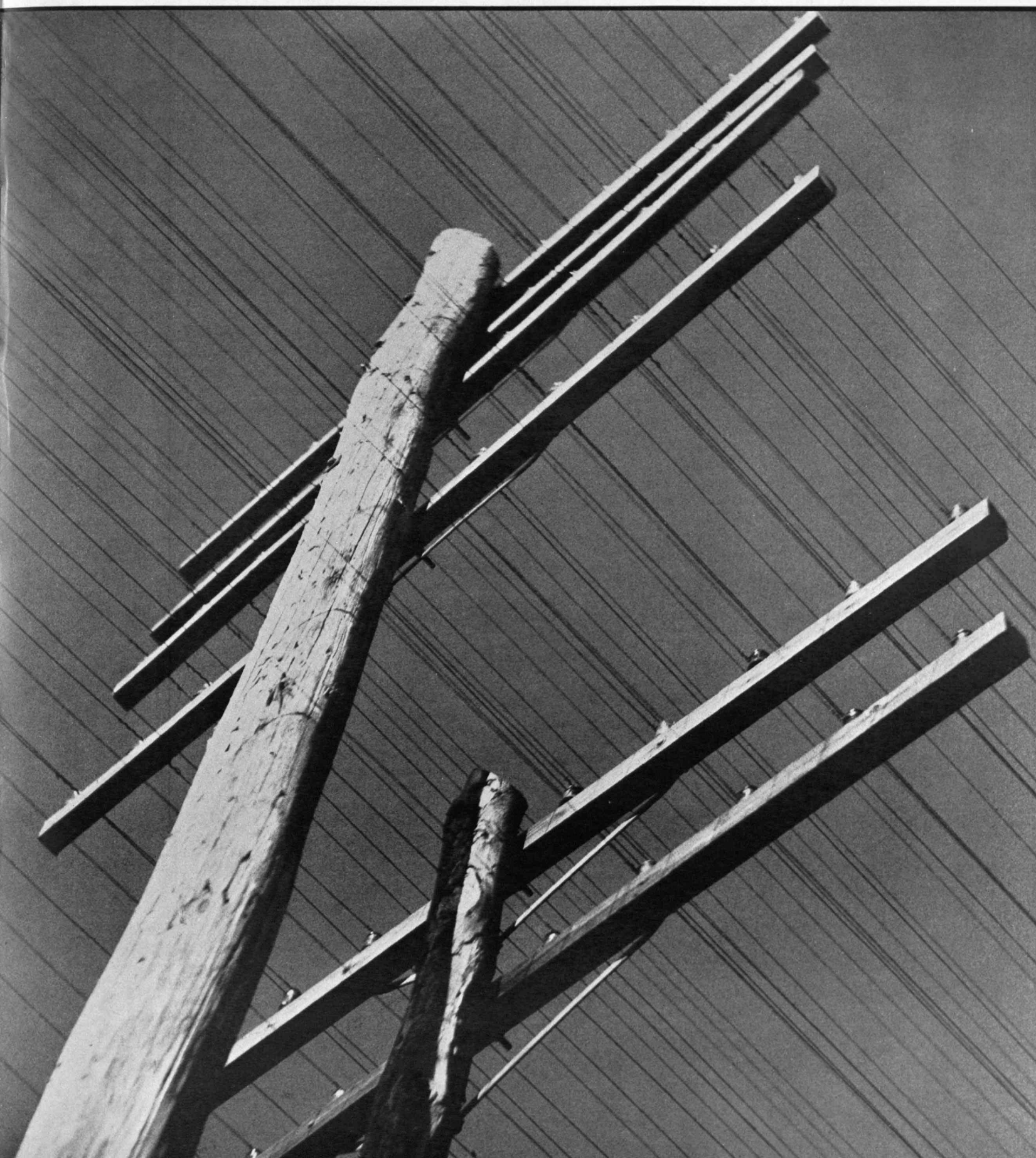
December 1932

TECHNOLOGY REVIEW



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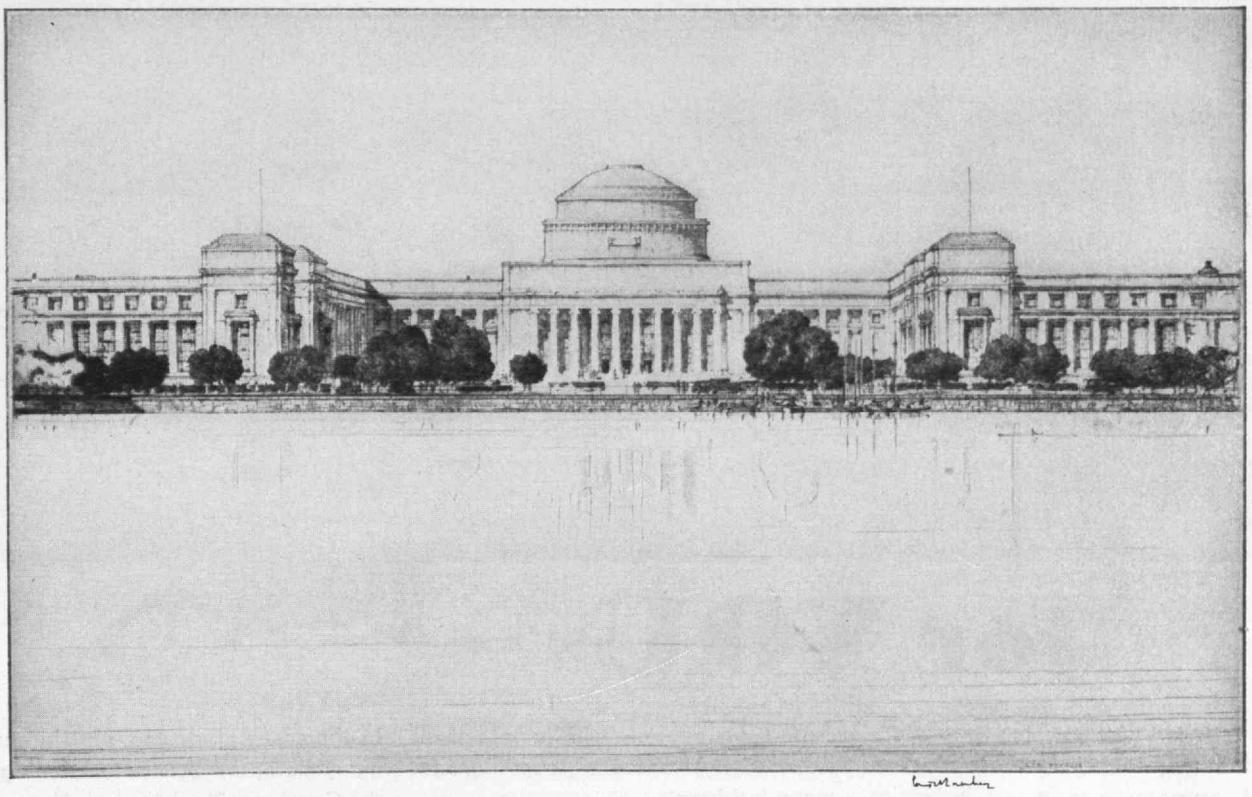
THE TABULAR VIEW

EVIDENCE that American industry is shying away from large urban centers is conclusively presented in the first article of this issue by HAROLD VINTON COES, '06. Mr. Coes is one of that small vanguard of American engineers, the members of which are thoroughly competent as engineers and who have in addition a highly developed social sense. Trained as a mechanical engineer, Mr. Coes has devoted most of his career to industrial management. At the present time, he is manager of the Industrial Department of Ford, Bacon and Davis, Inc. He is a former Vice-President of the American Society of Mechanical Engineers and a member of the Society of Industrial Engineers, American Academy of Political and Social Sciences, American Management Association, and the Association of Consulting Management Engineers. Of the last two organizations, he is, respectively, Director and Chairman of the Board. Mr. Coes' article is based on a paper he is to present early this month before the American Society of Mechanical Engineers.

ONE of the outstanding events of the past few months, notes JOHN D. FITCH, '24, in a letter to the Editor, has been the unselfish manner in which engineers of this country have gotten behind the Reconstruction Finance Corporation for the sole purpose of expediting the affairs of that organization in order that work might be made available for many people throughout the coming winter. "What the public must be made to see is that while any self-liquidating loan for a water-supply or similar project necessarily implies employment of some engineering firm in connection with its design and construction, the real benefits accrue to the hundreds of men, from common laborer to skilled mechanic, who must be employed in its construction." As an Engineer Associate of the American Engineering Council in Washington Mr. Fitch writes from a point of vantage when he describes the activities of the American engineering profession in aiding reconstruction. ¶ HUNTER ROUSE, '29, is an instructor in the Institute's Department of Civil Engineering and is, if we may use a somewhat dubious term, a hydraulician. This past summer he obtained his doctorate in Germany. According to Mr. Rouse, a number of German engineers originally opposed the construction of the huge large-scale laboratory at Obernach. Engels, one of the proponents of the project, once used the following story in an effort to convince some of his colleagues of the necessity of having something better than small-scale models: "Since the anatomy of the mouse and that of the horse are very similar, the workings of a horse's insides may well be assumed from a study of the mouse's, with a consequent saving of time, money, and horses. But if ever a horse gets sick, one will still prefer to go to a horse doctor rather than a mouse specialist." ¶ HARRY B. CHALMERS, '00, who contributes the article on streamlining to the Trend of Affairs Section, is President of the Jaray Streamline Corporation of America.

For Christmas



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THE TECHNOLOGY REVIEW

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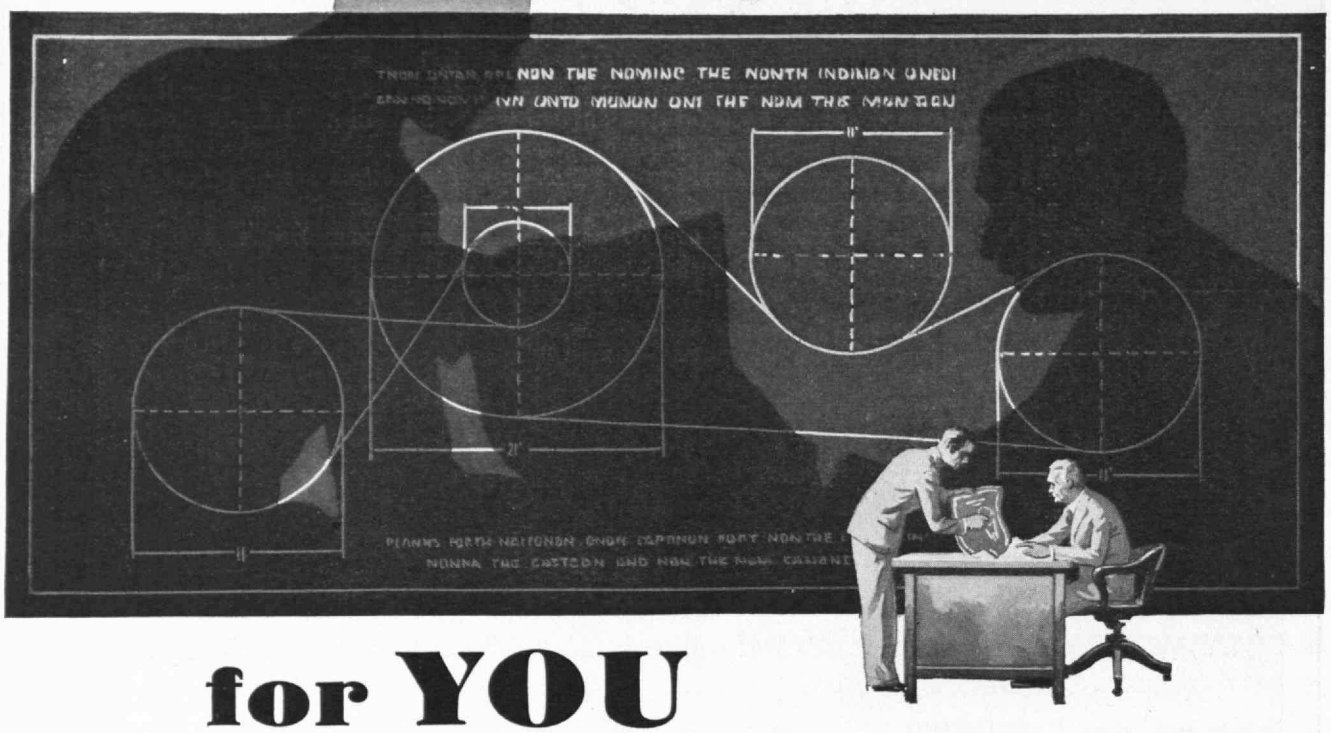
A MAN with an IDEA



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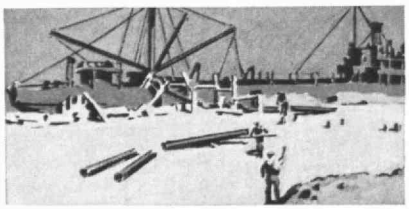

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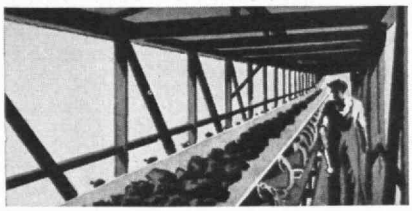

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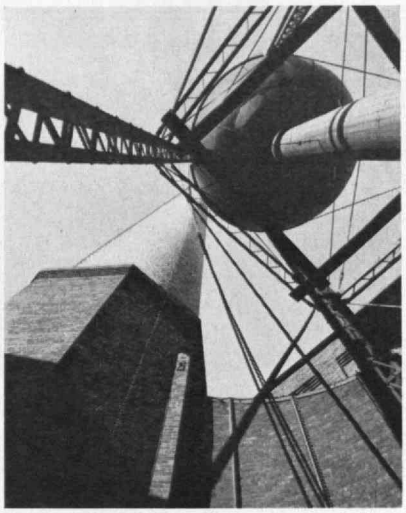

Galloway

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Edited at the Massachusetts Institute of Technology

VOLUME 35 NUMBER 3

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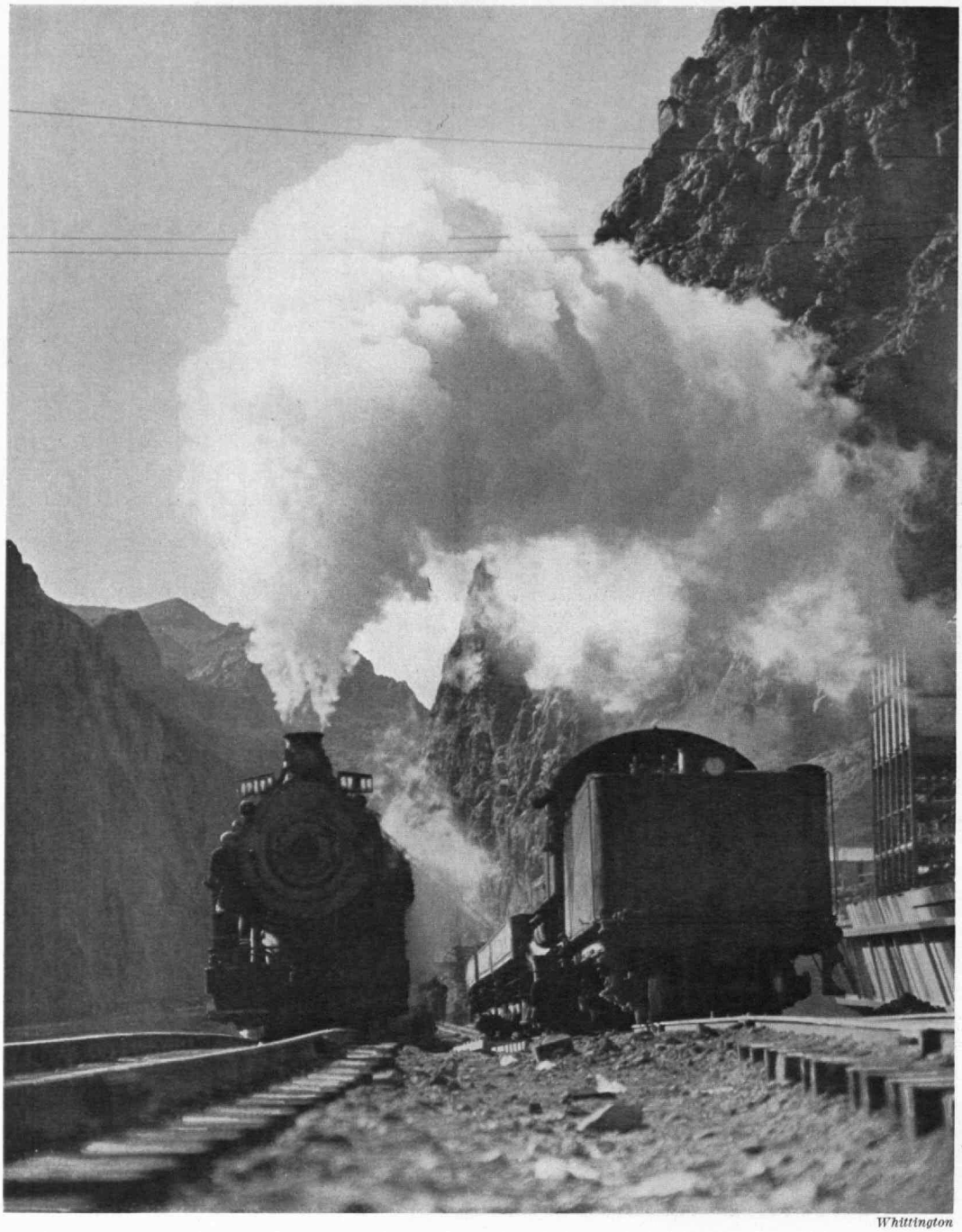

Whittington

GRAVEL TRAINS IN BLACK CANYON

On November 13 the Colorado River was diverted into the 50-foot tunnels (see The Review for October) bored to detour the stream through a mile of solid rock while Hoover dam is being built. The dam required to divert the river is itself a huge structure, for it must stand for three years, the approximate time required to build the permanent dam

THE
TECHNOLOGY
REVIEW

Vol. 35, No. 3

December, 1932

Elbowroom for Industry

Why Are Concentrated Industries Steadily Dissolving?

By Harold Vinton Coes

Is Industry Finally Recoiling from Urban Congestion? An Engineer Produces Evidence to Show That It Is, and Furthermore, That It Must — for Efficiency's Sake and for the Welfare of Labor

FAR-REACHING changes are now taking place in American industry. These changes, just discernible in some instances, seem to indicate a trend toward a better balance between urban and rural population; the development of new raw materials for industry and new sources for existing materials from agriculture; the location of industrial plants in agricultural communities to permit of lower costs and greater economic security for the workers; the greater use of branch plants and branch assembly plants to afford access to, and to serve better, the domestic market; a limitation of the concentration of industrial units in the large cities and the dissolving of some of these concentrated units by scientific translocation to more suitable localities.

As the process goes on it should result in a better total economic balance, greater economic security, and more wholesome enjoyment of life by all. In bringing about and furthering these changes the engineer, guided by economic and scientific facts, principles, and laws, will be an important factor and will play a leading part. More than ever before the engineer must become economic-minded if he is to play his part well and serve society as it should be served.

During the early stages of the establishment and development of American industry, plants were located in small communities. The first instances of organized industrial activity on the American continent were the building of a ship by the Popham Colony in Maine in 1607 and of glass making at Jamestown, Virginia, in the same year. Neither of these industries developed or continued.[1] Industry was scattered; location was governed largely by the available water power. While the development of the steam engine rendered partially independent of water power those industries in which power was an important element, it was not until the advent of electricity as a prime mover in the early 'Eighties that real concentration of industrial units began to take place. This was so even though steam and water power had brought about considerable concentration. Manufacturing then began to concentrate at those points where power generation and distribution were economical. This brought about concentration of labor, then labor specialization, until finally, when the auxiliary and service industries moved in, we had concentration of industry as we now know it in large cities.

In the beginning of industry in this country, the workers in the factories were mainly agriculturists. As industry became concentrated and specialized and labor more skilled and specialized the tendency was to drop the farms and leave that work to others (as hours were long), until we ultimately arrived at the condition now confronting us in the large cities where the workers are

[1] Holmes, "Plant Location," p. 151.

Steel concentrated in Pittsburgh . . .

. . . Tires and tubes in Akron

Galloway

. . . Automobiles

INDUSTRIAL

absolutely dependent upon a pay check for existence. It is true that in some parts of New England and in the Mid-West the workers still maintain their own homes and gardens and are to a considerable degree self-supporting during the periods of extended layoffs. In these communities one does not see the distress that prevails in the big centers of industry during a period of business recession such as the one through which we are now passing.

We have seen meat packing concentrated in Chicago; women's clothing in New York; tires and tubes in Akron; shoes in Lynn and St. Louis; automobiles in Detroit; silk in Paterson; woolens in Lowell; cotton goods in New Bedford and Fall River; men's clothing in Rochester, Cleveland, New York, and Chicago; and steel in Pittsburgh, Chicago, and Birmingham.

The Forces at Work

The factors and economic forces that brought this about are too numerous for discussion in this paper. In broad terms they were availability of power, of raw materials, of skilled labor and craftsmanship, of markets, of transportation facilities, and of local capital. We are concerned here with the reverse of the process — dissolution of concentration. What is bringing this about? It seems to the author that two groups of forces are at work:

(*a*) *Economic*
(*b*) *Sociologic*

and heretofore the sociologic factors have been given relatively little attention. In the first group might be listed such factors as

National rather than localized markets
Electrical distribution
Natural gas distribution
Hard surface roads
The automobile
The airplane
Communication lines
Trucks
Transportation costs
Better rail service — store door delivery, container cars, etc.
Time of delivery to markets
Servicing
Automatic machinery
Wastes in distribution
Higher rents and values of land
Higher cost of operation in metropolitan areas
Higher taxes in metropolitan areas
Higher cost of labor
Higher costs of municipal government
Hazards of fire due to large concentrations.

In the second group, the factors are

Uncomfortable and bad living conditions
Health of wage earners
Racketeering
Municipal restrictions
Instability of labor
Hazards of plant operation interruptions due to concentration of large aggregations of labor
Insecurity of labor.

The operation of these factors is bringing about a diffusion of manufacturing capacity. The table, "Present Distribution of Some Typical Industries," on page 86, indicates to some extent what is taking place.

The author had occasion, several years ago, to study scientifically the cost of production of insulated wire in a large metropolitan area as compared with producing it in smaller suitable urban communities and the total differential in cost of production and of distribution was about 25% in favor of the most suitable of the smaller communities. Furthermore, the living conditions for the wage earners and their economic security were greatly enhanced.

The factors permitting movement away from cities began to emerge about 1910, and the chief of these was economical power generation and distribution to points well outside the large population centers. Manufacturing plants no longer have to locate in the large centers to secure cheap and reliable power. The development of the electrical power and natural gas industries and of our railroad service, as well as our network of public highways, has given to industry a new mobility.

Comparison of Earnings of Large- and Small-Scale Industries

There is a popular impression that concentration is brought about by consolidation and merger, and that this is an economic necessity prerequisite to greater and more stable earnings. This impression is not supported by the facts.

In the early nineteen hundreds many prominent economists wrote of the "important positive advantages," as expressed by one of them,[1] due to large scale production. Another announced that "modern production tends to become concentrated."[2] It was not until a few years later that an economist expressed the idea

[1] Seager, "Introduction to Economics," p. 150.
[2] Bullock, "Introduction to the Study of Economics," p. 178.