

### A Mine In One's Back Yard

A PROMINENT lecturer, recently deceased, won high reputation on the strength of an address entitled "Acres of Diamonds." Briefly, it discussed the wandering of a man seeking riches, who finally, disillusioned, returns home to find that the homestead is teeming with the hidden wealth of a diamond mine. The average engineer is in a somewhat similar situation. He is inclined to feel that if opportunity were given him in another and newer plant, wonders in savings could be shown.

On another page is a discussion of the results obtained in a small hospital plant through an inconsiderable expenditure in new equipment and through alteration in the existing apparatus. The saving shown is equivalent to interest on over a quarter million dollars, the cost of a two-thousand-kilowatt plant. In a modern plant of this latter capacity an engineer could not expect to show a reduction in operating costs of as much as twenty per cent, which, with the usual load conditions, would fairly approximate the saving made in the miniature hospital plant.

Small power plants almost invariably offer a greater opportunity for the operating engineer to obtain substantial cost reductions than do large stations. If engineers took advantage of every means of cutting the expense, the small plant would not be the expensive luxury that it is at present and there would be less abandonment of existing plants.

### Combining Water Power and Steam Power

POWER systems have been developed in many sections of this country consisting of a number of interconnected steam and water-power stations. The economic relation between these two types of stations is based on factors that may vary through wide ranges. These factors are not only influenced by differences in geographical location, but they may be radically affected by changes in local conditions and improvements in plant design. It is on this account that many misunderstandings arise regarding the two classes of developments.

Between the two extremes of all water power and no steam and all steam and no water power may be found almost any combination of the two. Such conditions as are found in northern New York State and Canada warrant the use of little steam power. On the other hand, the power supply to large metropolitan cities is of such importance that they require a large steam reserve as an assurance against power interruptions, especially if the load carried by a water-power plant must be supplied over long transmission lines.

New York City is probably within practical transmission distance of the St. Lawrence River power. Even if this power could be delivered into the system at a lower cost than power from local steam plants, it would be a reckless undertaking to leave the metropolitan area dependent entirely upon a power source over three hundred miles away. On the Pacific Coast it has been established that steam reserve should be equal to about seventy-five per cent of the metropolitan peak where the water power is supplied over more than one transmission line. Water-power developments are far more favorably located with respect to the metropolitan districts on the Pacific Coast than the

St. Lawrence River is to the New York City district.

Under any set of conditions the two sources of power will in all cases be in economic competition. The factors that control this balance may vary widely. As an example of this, radical improvements in steam-plant design, combined with large reductions in the cost of fuel, may put water power at a disadvantage, particularly if it has to be transmitted long distances and the transmission facilities are not already in existence. It should always be kept in mind that the cost of steam power is not a stable quantity on account of the changes in the price of fuel. On the other hand, the cost of power from a water-power development is fairly constant for any particular site, except as it may be affected by the amount of precipitation. Over a period of years the amount of rainfall in a given district can be depended upon to average up to a constant value, whereas the cost of fuel has a decided tendency to increase in value.

A common belief is that the base load should be supplied from water power and the peak loads from a steam plant. This combination, however, is affected by as many factors as the combined utilization of water power and steam. Whether the low-cost base-load power is supplied from a local steam plant and the high-cost peak power from a water-power plant and transmission line, or vice versa, there is probably little choice except as decided by local conditions. A water-power plant may or may not be able to supply peak loads, depending upon the amount of storage available, while the steam plant can be used under any conditions. The conditions affecting the use of water power and steam might be enlarged upon almost indefinitely, but those enumerated show that no definite rule can be laid down for their development, but effort should be made to obtain the most economical combination, and this may involve more than the production of power at the lowest cost.

### Paternalism Is Sometimes Necessary

LITTLE sympathy is felt by *Power* for the paternal movement so apparent in governments, for the individual should possess all the prerogatives of a free agent, suffering the consequences of ill-judgment. Nevertheless, there are times and conditions when paternalism is essential, not to protect man from himself, but to insure others against the results of his folly.

A striking example of the terrible results of unrestrained individual freedom appears in the news pages of this week's issue, where the rupture of a Philadelphia unfired pressure vessel is noted. This plush steamer was built to carry steam at a very low pressure, but was so connected that full boiler pressure existed within, causing a rupture of a cast-iron door. Being unfired, the city boiler inspectors had no jurisdiction and those who had charge of the installing of the apparatus were either careless or ill-informed. From the evils of such half-baked engineering workmen have a right to be free. If laws had required the inspection of this steamer and the manner of installation, the two workmen would be alive today. The charged waste in industry extends too frequently to waste in human life.

The Bureau of Standards has evolved a method of cleaning buildings by the use of steam jets. Here is an opportunity to utilize some of that steam which is wasted up the stack in the summer time.