● The announcement which Elliott Company is now making of another forward step in the development of boiler feedwater deaeration equipment is particularly timely and fitting. For it was just 30 years ago—in 1918—that W. S. Elliott, founder of the Elliott Company, started the research work which, within a very short time, resulted in the first commercially successful deaerator. Since then deaeration has been accepted as a necessary feedwater conditioning step. Deaeration became a necessity when boiler temperatures and pressures began to increase and the general use of boiler feedwater treatment removed the scale-forming properties of the water, leaving boiler, economizer, and pipe surfaces exposed to the action of dissolved oxygen and other corrosive gases in the feedwater.

ELLIOTT spray-tray heater is step forward in deaeration development

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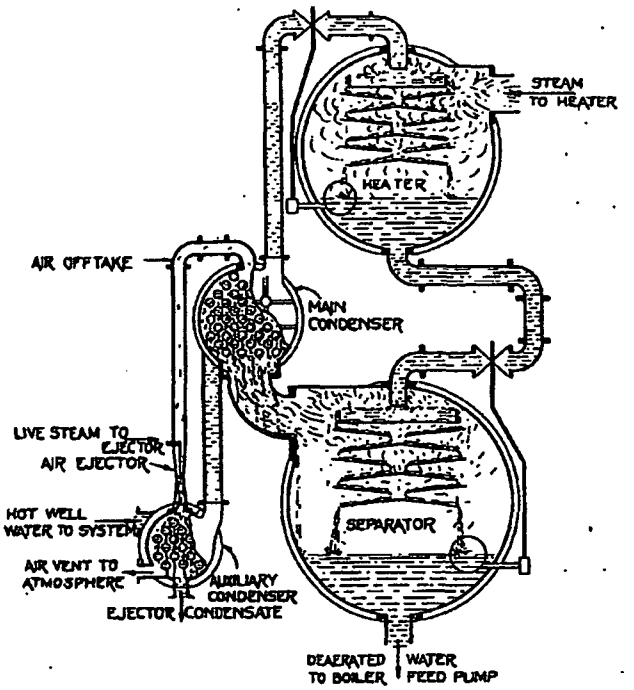
The new Elliott spray-tray deaerating heater is the latest in a series of steps or developments in deaerating equipment. A brief look at this development will show the trend toward simplification of the equipment required to accomplish mechanical deaeration. Note that to accomplish deaeration the water must be at the saturated temperature corresponding to the steam pressure maintained inside the shell of the unit. This reduces the partial pressure and solubility of the air component at the water surfaces to the absolute minimum, and the noncondensable gases can then be concentrated at one point and moved out of the system.

The original approach to the development of mechanical deaerating equipment involved the heating of water in one shell, then taking this heated water into a second shell in which pressure was maintained at some point below the pressure



Diagrammatic sketch illustrating the operation of the first Elliott deaerator, which was of the vacuum type.

corresponding to the temperature of the heated water. When the heated water was introduced into the second chamber, explosive boiling or flashing resulted, thus releasing the dissolved gases. The original equipment of this type consisted of a direct-contact open heater, a flash chamber, a vent condenser, an air ejector, and the ejector aftercondenser. The water at an assumed temperature of 40 F, flowed through the tubes of the vent condenser and aftercondenser, where the temperature was raised about 25 degrees by means of steam from the flash chamber. The water at 65 F then entered the direct-contact open heater, where it was heated to about 210 F with steam. The heated water was then introduced into the flash chamber where the pressure was maintained at 8.38 psia, with a corresponding temperature of 185 F. The pressure of 8.38 psia was maintained by the vent condenser and the air ejector equipment.

The flash type of equipment was not inefficient from the standpoint of Btu's used, as it heated from 40 to 185 F, but it did represent a loss in temperature, as steam at about 212 to 215 F was necessary to get 185 F water.