FIG. 1. Calculated values of a and b as functions of temperature; ax, bo.

from values read from smooth curves through these plots.

If the density of an oil is known at atmospheric pressure and it is desired to calculate its density at some other pressure, it is only necessary to refer to the values of a and b of Table II at the temperature under consideration and make the calculation by means of Eq. (1). If the known atmospheric density is at a temperature different from that required in the final answer, the atmospheric density is first adjusted to the desired temperature by means of one of the methods already known to the petroleum industry, as, for example, the National Bureau of Standards tables[6] referred to already.

DISCUSSION

It is the belief of the writers that the system developed in this paper offers the best means so far described for the calculation of density of lubricating oils at various pressures from their known densities at atmospheric pressure. Taki.. all of the possible sources of error, discussed in a previous section, into account, it is believed that the error in any density computed by this system is not above 3 to 5 percent.

While the density equation, as given above was derived from data on mineral oils, it is of interest to note that it has been found to hold equally well, using the same table of values fo the constants a and b, for animal, vegetable, an fish oils, insofar as there are data available Hyde[1] obtained data at one temperature castor oil, trotter oil, rape oil, and sperm o Dow[2] obtained data at three temperatures lard oil and sperm oil. Using the atmospheri densities reported by these investigators for the oils, a number of density computations we made at various pressures and temperature using Eq. (1). The values so obtained were the compared with the experimental values reporte by Hyde and Dow. For ten such calculation made, the equation reproduced the experiment