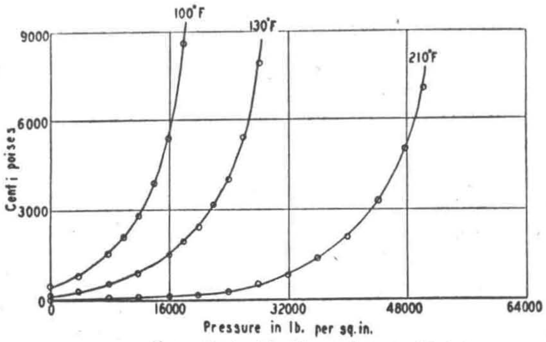

Fig. 1 Absolute Viscosity vs. Pressure - Oil No. 1.

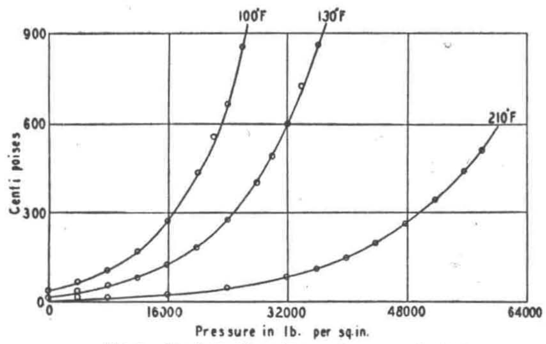

Fig. 2 Absolute Viscosity vs. Pressure - Oil No. 2

The pressure effects were studied in the High Pressure Laboratory of the Department of Physics and the apparatus was similar to that used in the previous study.[1] A rolling-ball viscometer, the temperature of which was regulated by a thermostated bath, was used in measuring viscosity over a pressure range of 58,000 lb./in.^{2} at temperatures of 100°, 130° and 210°F. A new calibration curve was necessary since the angle of tilt was less than that used in the previous study. Consequently, for long roll times the absolute coefficient of viscosity, μ, is given by (See Eq. (3) of previous paper):[1]

$$\mu(7.36-\rho)/155.5T.$$

As before, ρ is the density of the oil in absolute units and T is the corrected roll time in seconds. The characteristics of the calibration curve were so similar to the one used previously that it is unnecessary to reproduce it here.

TABLE I. *Data on Pennsylvania oils at atmospheric pressure.*

Oil No.	Characteristics	Boiling-Point Range, In degrees F 10 mm Hg absolute pressure	Molecular Weight	Viscosity Index	Density (g/cm³) 100°F	130°F	210°F
1.	Commercial "Bright Stock"	583–664	706	102	0.879	0.869	0.841
2.	Commercial "Neutral"	459–588	368	100	.860	.849	.821
3.	High Boiling Point Fraction From Oil 4	517–534	370	117	.841	.830	.801
4.	Solvent Refined "Neutral"	450–567	352	116	.838	.827	.798
5.	Medium Boiling Point Fraction From Oil 4	482–504	342	122	.836	.825	.796
6.	Low Boiling Point Fraction From Oil 4	453–478	310	127	.832	.821	.792

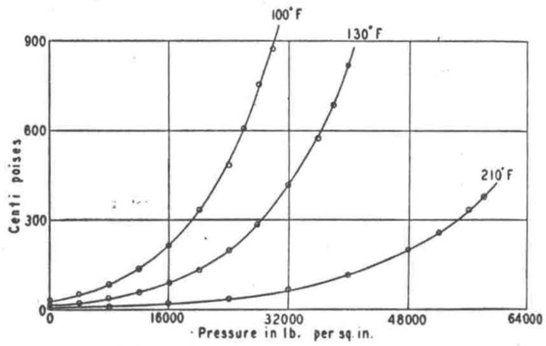

Fig. 3. Absolute Viscosity vs. Pressure - Oil No. 3

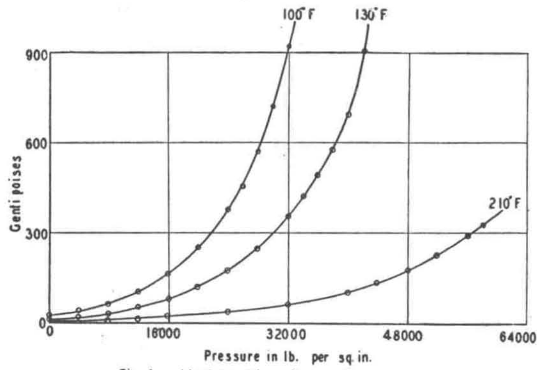

Fig. 4. Absolute Viscosity vs. Pressure-Oil No. 4

Data and Discussion

The viscosities, measured independently by the capillary pipette and rolling-ball methods, are given in Table II. The results by both methods agree closely, the worst disagreement being about eight percent at 210°F for a viscosity of about four centipoises.

The viscosities at higher pressures are recorded in Figs. 1–6.

On examining the data shown on curves in Figs. 1–6, it will be observed that the oil having