83 200 atmospheres and AgCl at 87 100 atmospheres. These were observed by following the cut-off of light with recrystallization at the transition both with rising and descending pressure. These points were noted with various sample thicknesses. The results were correlated with observed CN^- shifts at the same thicknesses, and Eq. (1) was developed. All extensions to pressures above 100 000 atmospheres were by means of this relationship and thus involved a varying amount of extrapolation. We have made numerous measurements to 150 000 atmospheres and several to considerably higher pressures. With a sample thickness of 0.0046 in. using the one-half inch pistons we obtained 201 000 atmospheres (with $p_A = 52\,800$ atmos). We have fitted our data empirically with the following relationships:

For the $\frac{3}{8}$ in. diameter piston,

$$p_C = p_A \left[1 + \frac{32.4}{p_A^{0.25} t_C^{1.25}} \right], \qquad (2)$$

for the $\frac{1}{2}$-in. diameter piston,

$$p_C = p_A \left[1 + \frac{51.8}{p_A^{0.25} t_C^{1.25}} \right]. \qquad (3)$$

Here p_C is the pressure on the center flat and p_A is the average pressure on the piston, both in thousands of atmospheres, while t_C is the thickness in the center in thousandths of an inch (i.e., for a thickness of 0.009 in., $t_C = 9$) measured at atmospheric pressure. This is obtained by micrometering each piston and then the assembled apparatus after the salt and sample are fused in, then taking the difference. Particularly with old inserts there is some extrusion and t_C at the end
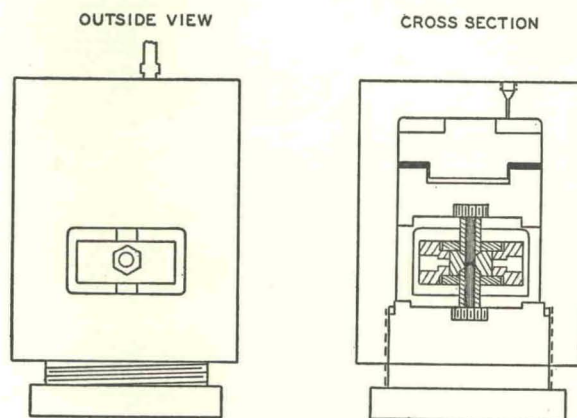

FIG. 3. Press.

of the run is slightly different than the initial t_C. (It is essential to micrometer both the assembly and individual pistons at the end as there is measurable shortening of the pistons.) Where t_C varied appreciably from the initial to the final value, it was assumed that the effective t_C varied linearly with p_A, reaching its final value at the highest p_A. Equations (2) and (3) have been tested for values of t_C ranging from 4–15 (0.004–0.015 in.).

The pressures are necessarily less accurate in Cell II, so it is desirable to make all studies in both cells allowing overlap for continuous calibration. It is difficult to estimate exactly the accuracy of the pressure determination. The transitions of the silver halides were reproducible to ±1000 atmospheres. Equations (2) and (3) reproduced a large number of experimental points with the largest deviation in t_C being 0.1 (0.0001 in.) as long as p_C was greater than 50 (50 000 atmospheres).

Figure 3 shows the press constructed for this work. The dimensions can, of course, be varied, but we used a body of AISI 6150 hardened to 45-46 Rockwell C 6 in. o.d. and $4\frac{1}{2}$ in. i.d. The windows are 2 in. $\times 2\frac{1}{2}$ in. It is necessary to back the pistons with carboloy blocks 1 in. in diam and 1 in. thick. The press is portable and can be inserted at the normal sample point of many spectrometers with minor modifications of the optics.

A wide scope of problems is opened for study by this apparatus. We are measuring electronic and vibrational spectra, absorption edges, luminescent spectra and decay, photoconductivity, and photolysis.

ACKNOWLEDGMENT

TABLE I.[a]

		Cell I (in.)		Cell II (in.)
Piston diameter		$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
Jacket diameter (B)		$3\frac{5}{16}$	$3\frac{5}{16}$	$3\frac{1}{2}$
Cell diameter (A)		1	$1\frac{1}{2}$	$1\frac{7}{8}$
Window holes				
(1)	L	0.125	0.188	0.125
	D	0.028	0.035	0.037
(2)	L	0.125	0.125	0.188
	D	0.047	0.052	0.052
(3)	L	0.188	0.250	0.188
	D	0.067	0.082	0.082
(4)	L	...	...	0.188
	D	...	...	0.100
Diameter of flat		0.125	0.93	0.093
Taper			6°	6°

[a] Note: Holes (1), (2), (3), (4) are numbered from the inside of the insert (A) to the outside.