TABLE A1. Sum of Least-Squares Deviation $[vv]$ for Least-Squares Fit of W^2 to a Polynomial in Pressure of Degree N for Shear and Quasi-Shear Modes

Coefficient	$\vec{N}$	$\vec{U}$	Sample	$N = 1$, 10^{-9} cm²/sec²	$N = 2$, 10^{-9} cm²/sec²	$N = 3$, 10^{-9} cm²/sec²
c_{44}	[010]	[001]	1	25.5	1.15	0.94
	[010]	[001]	4	33.4	1.96	1.92
	[001]	[010]	1*	20.1	1.02	0.32
	[001]	[010]	1	18.7	1.00	0.49
c_{55}	[100]	[001]	1	12.1	1.22	1.02
	[100]	[001]	3	88.2	1.92	0.88
	[001]	[100]	1	116.6	4.43	2.31
c_{66}	[100]	[010]	1	9.23	0.93	0.66
	[100]	[010]	3*	6.93	1.98	1.05
	[010]	[100]	1	13.1	5.02	4.19
	[010]	[100]	4	8.52	1.31	1.07
c_{12}	$[lm0]$	$[m\bar{l}0]$	2*	18.0	0.89	0.83
	$[lm0]$	$[m\bar{l}0]$	2	17.7	0.73	0.62
c_{13}	$[l0n]$	$[n0\bar{l}]$	4*	43.1	5.62	4.43
	$[l0n]$	$[n0\bar{l}]$	4*	48.5	7.67	7.61
c_{23}	$[0mn]$	$[0n\bar{m}]$	3*	29.7	3.26	3.01
	$[0mn]$	$[0n\bar{m}]$	3	27.2	7.00	5.91

*Run made with Arenberg PSP AFC equipment. All other data were taken with MRL PSP AFC equipment.

and for the coefficients of P^2 and P^3 for the fit to a third-order polynomial) required for the Student t test are listed for all shear and quasi-shear modes. It is apparent that, for the fit to the quadratic relation, all quantities t_n^N meet the Student t test for 95% probability ($t_2^2 > 2.1$). For the fit to a third-order polynomial, the Student t test for 95% probability is not fulfilled for either one or both of the quantities t_2^3 and t_3^3 for most modes, with the exception of modes 4, 6, and 7, for which $t_2^3 > 2.1$ and $t_3^3 > 2.1$. According to Table A1, for these three modes the reduction of $[vv]$ in changing from a fit to a quadratic relation in pressure to a cubic one is relatively large and amounts to about 50%. Because the limit of about 70% reduction assumed in the first criterion is subjective and could as well be taken as 50%, these three modes represent borderline cases, and, by relaxing the standards of the first criterion slightly, their fit to a third-order polynomial could be justified statistically. On the other hand, the corresponding t values of the coefficients of P^2 (i.e., $n = 2$) are for $N = 2$ over twice as large as those for $N = 3$, and the coefficients are therefore more precise for $N = 2$ than for $N = 3$. Thus one has the choice of fitting these modes to a second-order polynomial with standard errors of the coefficients of P^2 ranging from 4 to 7% or of fitting them to a third-order polynomial with standard errors of the coefficients of P^2 and P^3 amounting to about 12 and 27%, respectively. A decision between these two possibilities cannot be made on the basis of the first two criteria. As will be shown below, the third criterion is also fulfilled for fitting these modes to a third-order polynomial. Because all other shear and quasi-shear modes were fitted to second-order polynomials, it was decided to fit modes 4, 6, and 7 for the sake of uniformity to second-order polynomials also. It should be pointed out, however, that this assumption is an ad hoc one and introduces a truncation error of unknown magnitude. As will be shown below, this truncation error may, for the coefficients of P^2 for the pure shear modes, be as large as 50% but is likely to be smaller than this value.

For the discussion of the third criterion, the expansion coefficients A_n^N as defined by (A1) and their standard errors for $N = 2$ and $n = 2$, $N = 3$ and $n = 2$, and $N = 3$ and $n = 3$ for all shear and quasi-shear modes are listed in Table A3. Also listed are the average values $\langle A_n^N \rangle$ of all modes belonging to the same elastic modulus and their standard errors Δ calculated

TABLE A2. Quantities $t_n^N = A_n^N/\Delta A_n^N$ for Student's t Test for Coefficients of Least-Squares Fit of $\rho_0 W^2$ to a Polynomial in Pressure of Degree N according to $\rho_0 W^2 = \sum_{n=0}^{N} A_n^N P^n$ for $N = 2$ and $N = 3$

Coefficient	Mode No.	$\vec{N}$	$\vec{U}$	Sample	$N = 2$ and $n = 2$	$N = 3$ and $n = 2$	$N = 3$ and $n = 3$
c_{44}	1	[010]	[001]	1	16.59	4.62	1.63
	2	[010]	[001]	4	14.45	2.96	0.51
	3	[001]	[010]	1*	10.96	4.86	1.30
	4	[001]	[010]	1	15.10	7.12	3.55
c_{55}	5	[100]	[001]	1	38.37	8.51	1.61
	6	[100]	[001]	3	24.15	9.73	3.78
	7	[001]	[100]	1	19.67	8.26	3.72
c_{66}	8	[100]	[010]	1	11.60	0.25	2.40
	9	[100]	[010]	3*	5.70	1.93	3.27
	10	[010]	[100]	1	4.59	2.34	1.53
	11	[010]	[100]	4	8.45	0.07	1.66
c_{12}	12	$[lm0]$	$[m\bar{l}0]$	2*	10.26	2.76	1.00
	13	$[lm0]$	$[m\bar{l}0]$	2	5.88	2.47	1.43
c_{13}	14	$[l0n]$	$[n0\bar{l}]$	4*	8.95	0.002	1.72
	15	$[l0n]$	$[n0\bar{l}]$	4*	7.99	1.64	0.30
c_{23}	16	$[0mn]$	$[0n\bar{m}]$	3*	15.84	3.60	0.90
	17	$[0mn]$	$[0n\bar{m}]$	3	10.64	1.96	0.64

*Run made with Arenberg PSP AFC ultrasonic equipment. All other data were taken with MRL PSP AFC equipment.

from $\Delta = \{[vv]/p(p-1)\}^{1/2}$, where $[vv]$ is the sum of the squares of the p individual modes from the average value $\langle A_n^N \rangle$. These quantities characterize the consistency of the various modes for the same modulus.

The third criterion can be quantitatively stated as the condition that, for internal consistency, the standard errors Δ must be smaller than or of approximately the same magnitude as the standard errors of the individual modes obtained from the least-squares data fit.

From the data in Table A3 it is evident that for $N = 2$ the consistency for all shear and quasi-shear modes is good to very good. For $N = 3$ the coefficients of P^2 and P^3 are still consistent for the modes belonging to the moduli c_{44}, c_{55}, c_{12}, and c_{13}, but for the moduli c_{66} and c_{23} the coefficients are not consistent. In spite of the consistency found for $N = 3$ for the moduli c_{44}, c_{55}, c_{12}, and c_{13}, only a fit corresponding to $N = 2$ will be used in these cases, since the data have been shown not to meet at least one of the first and second criteria.

It is also apparent from the data in Table A3 that in changing from $N = 2$ to $N = 3$ the magnitude of the coefficient of P^2 (i.e., A_2^N) is increased by about 50%. The values of A_2^N for $N = 4$ (not included in Table A3) lie between