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ABSTRACT

The absorption by water vapor between 2800 and 4500 cm^{-1} has been investigated. Spectra have been obtained for samples at pressures from 0.48 torr to 10 atm, and with absorber thicknesses varying from 8×10^{-4} to 0.7 gm cm^{-2} . Transmission spectra are shown along with extensive tables of transmittance, integrated absorptance, and the integrated absorption coefficient. Results are presented for samples chosen to provide information about the strengths, widths, and shapes of many of the absorption lines. The combined strength of the ν_1 and ν_3 bands has been found to be $28 \pm 1.5 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$; and the strength of the $2\nu_2$ band is $3.5 \pm 0.7 \times 10^3 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$.

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SECTION 1

INTRODUCTION AND SUMMARY

Nearly all the absorption by water vapor in the $2800 - 4500 \text{ cm}^{-1}$ region is due to the ν_3 , ν_1 , and $2\nu_2$ bands.¹ The origins of these bands for H_2O^{16} , the most common isotope, are at: ν_3 , 3755.92 cm^{-1} ; ν_1 , 3657.08 cm^{-1} ; and $2\nu_2$, 3151.60 cm^{-1} . Their relative intensities are approximately $\nu_3:\nu_1:2\nu_2 = 120:12:1$. Besides the H_2O^{16} lines, there are other isotopes whose normal abundances are: H_2O^{18} , 0.20%; H_2O^{17} , 0.037%; and HDO , 0.027%. Additional lines are also due to transitions in which the lower level is vibrationally excited; but at atmospheric temperatures, the only level of any significance is the lowest, ν_2 . The abundance of molecules in this level is only about 0.04% as great as that in the ground state at room temperature; therefore, even its contribution is slight.

Several factors make it important to have a detailed understanding of the absorption in this region: The absorption bands are sufficiently strong that the H_2O content can be measured spectroscopically by various types of instruments such as high-altitude balloons or aircraft with the sun serving as a radiation source. Good detectors and sources exist and the background emission by the earth and the reflected solar radiation are relatively low. Thus, this region has several advantages for many types of communication systems.

Considerable work has been done previously on the absorption in this region by Howard, Burch and Williams² and by Burch, France and Williams.³ From the results of these workers, it is possible to determine the average transmittance for a wide variety of samples over a spectral interval greater than approximately 10 cm^{-1} wide, provided the sample is near room temperature and the pressure is uniform. For many engineering purposes, this is

adequate; but, in order to account for variations in temperature, pressure and H₂O concentration over the path, it is necessary to know strengths and widths of the lines. Because of the relatively low spectral resolution used in the previous work, the results are not adequate for the determination of these basic line parameters.

Gates, et al¹ have calculated and tabulated strengths and widths of most of the lines in this region; but these calculations were necessarily based on limited data, some of which were not obtained for the purpose of providing this information. Furthermore, all the factors involved in calculating strengths and widths are not completely understood; therefore, the calculated values should be checked and possible corrections should be made.

The present investigation was undertaken for the purpose of supplying data from which the basic line parameters could be determined as well as to provide spectra to aid in interpreting atmospheric spectra. Information about the differences in the shapes and widths of self-broadened and N₂-broadened lines was also obtained; the results of this phase of the investigation appear in Section 3.

Spectra of more than 20 different samples in the 3847 - 3860 cm⁻¹ and 3895 - 3932 cm⁻¹ are shown in Section 4, along with tables of transmittance and integrated absorptance. These regions were chosen since they are particularly good for interpreting atmospheric spectra. They are relatively free of absorption lines of other atmospheric gases and the H₂O lines cover a wide range of strengths. The lower wavenumber region contains a few very strong lines, making it convenient for comparison with samples containing very little H₂O, such as the path between the sun and a very high balloon. The 3895 - 3932 cm⁻¹ region contains several reasonably well isolated lines which are much weaker, making it useful for the comparison of larger samples, such as the path traversed by solar radiation to a balloon or aircraft at lower altitude. The higher wavenumber region also contains a relatively clear window about 8 cm⁻¹ wide; careful investigation of this window could be useful in placing the zero absorptance curve on a solar spectrum.

Spectra of a few samples at 5 and 10 atm are shown in Section 5. Strengths of many of the lines can be obtained easily from these spectra, and the accompanying tables of $-\frac{1}{u} \int \ln T(\nu) d\nu$, where $T(\nu)$ is the transmittance and u is the absorber thickness in gm/cm².

Section 6 contains spectra of some large samples showing many very weak lines. Also included are spectra of some samples at low pressure which are useful for determining half-widths of many of the lines. Sections 4, 5 and 6 also contain tables of transmittance $T(\nu)$ versus ν and integrated absorptance $\int A(\nu) d\nu$ versus ν , where the values are calculated from the spectra shown.

SECTION 2

EXPERIMENTAL

2.1 GAS SAMPLING

Samples of H_2O and H_2O mixed with non-absorbing broadening gases were contained in two different absorption cells which have been described previously.⁴ The longer cell has a base length of approximately 30 meters and was used at path lengths from 121 to 933 meters. It is approximately 0.9 meters in diameter and can be evacuated to less than 1 micron of Hg or pressurized to as much as 2.5 atm. The shorter cell has a base length of approximately 1 meter and was used for paths between 2.10 and 32.9 meters. It can be evacuated or pressurized to as much as 15 atm.

Sample pressures less than approximately 0.06 atm were measured with a U-tube oil manometer, and those in the range $0.06 < P < 2$ atm with a U-tube Hg manometer. All pressures > 2 atm were measured with a bourdon-type gauge.

Gases were handled by the use of a manifold system attached to the absorption cells. N_2 and other broadening gases were obtained from commercial cylinders. Liquid H_2O was put in a metal container and "pumped on" for a few minutes to reduce the amount of dissolved gases before it was allowed to "boil" into the previously evacuated absorption cell. The liquid was usually heated in order to reduce the filling time.

A few samples were studied with the absorption cell heated several degrees above ambient in order to increase the partial pressure of H_2O without condensation. When measuring pressures of the samples in which p was greater than the vapor pressure at room temperature, the sample gas was

confined to the absorption cell and a small part of the manifold system which could be heated. The heated part of the system included a small U-tube containing vacuum pump oil. One leg of the tube was connected to the sample gas and the other to the part of the system including the pressure gauges. The pressure in the latter part was adjusted until the heights of the oil in both legs of the U-tube were the same. The pressure indicated by the gauges was then the sample pressure.

The absorber thickness u of H_2O was calculated for each sample at room temperature from the following equation.

$$\begin{aligned} u(\text{gm/cm}^2) &= 9.75 \times 10^{-7} p(\text{torr}) L(\text{cm}), \text{ or} & (2-1) \\ &= 7.41 \times 10^{-4} p(\text{atm}) L(\text{cm}); & (\text{gm/cm}^2 = \text{precipitable cm}) \end{aligned}$$

L is the path length in cm and p is the partial pressure of H_2O . The coefficient can be calculated on the basis of the perfect gas law. The above equation is valid for room temperature, 296°K , but it must be multiplied by $296/\theta^\circ \text{K}$ for other temperatures.

Two factors make it more difficult to work with samples containing H_2O than most other gases which occur in the atmosphere. The first is the relatively low H_2O partial pressures to which the worker is limited because of the low vapor pressure near room temperature. The second difficulty arises from the adsorption of H_2O on the walls of any container, particularly the absorption cell. Adsorption makes sampling of H_2O vapor difficult since the amount may be great and is dependent upon the nature of the surface and the temperature. Furthermore, the adsorption or the desorption process may require several hours to come to equilibrium. This produces uncertainties in the determination of the amount of H_2O vapor in the optical path of an absorption cell since the amount may change considerably during the course of a set of measurements.

As a typical example, in working with our large absorption cell we might calculate the amount of liquid H_2O which would be required to produce a partial pressure of 15 torr if it all appeared as vapor. If this amount were then put into the absorption cell after it had been evacuated, the partial pressure in the cell would be approximately 11 torr instead of the calculated value of 15 torr. Thus, we conclude that more than 25% of the H_2O admitted to the cell adsorbed on the walls during the filling process which required approximately 20 minutes. If the sample were allowed to remain for an hour, the pressure would have dropped to approximately 10 torr; twenty-four hours later it might be as low as 9 torr. Thus, we see that a lot of adsorption takes place within a few minutes, but considerable time is required for the sample to come to equilibrium.

As another example, if the cell were allowed to remain with 10 torr H_2O in it for several hours, then pumped to a pressure of 5 torr and all the valves closed, the pressure would increase to as much as 6 torr within an hour. Several more hours would be required for the pressure to become stable.

We see that as much as 30 to 50% of a sample put in the large absorption cell may be adsorbed on the walls. Therefore, fluctuations in this amount might cause serious errors in the determination of u . The percentage of the sample adsorbed on the walls of the shorter absorption cell has not been measured. Its surface-to-volume ratio is considerably greater, but the walls were honed in order to reduce the effective surface, and thus the amount of adsorption.

The partial pressure p , and thus the absorber thickness u , can be determined accurately for pure H_2O samples since p can be measured directly. But because of the large fluctuation in p which may occur after a sample of $H_2O + N_2$ has been introduced to the cell, the determination of the absorber thickness of such a sample is much more difficult. It is not safe to assume that p remains constant after adding N_2 ; therefore, p was monitored by the use of a dew-point meter installed inside the absorption cell. The apparatus contained a Peltier cooler which cooled a flat, polished surface approximately 0.5 cm in diameter which was illuminated by a small bulb. Condensation of H_2O on the polished surface was detected by the use of a small photocell. When the polished surface was dry, very little light was reflected to the photocell; but as condensation started, the thin film of H_2O scattered light to it. The temperature at which condensation started was measured by a small thermocouple fastened to the surface on which the condensation occurred. After a sample had remained in the absorption cell sufficiently long for it to reach equilibrium, repeated measurements of the dew point were consistent to less than $\pm 0.1^\circ C$.

In order to make a mixture of $H_2O + N_2$, the absorption cell was first evacuated and pure H_2O was added. N_2 was not added until the H_2O partial pressure was essentially in equilibrium. The amount of time required to approach equilibrium could be greatly reduced by first introducing more H_2O than would be required. This was allowed to remain in the cell for several minutes, then part of it was pumped out to give the desired pressure. After gaining some experience, we were able to obtain H_2O partial pressures to within two or three percent of their equilibrium value within a period of one or two hours.

Immediately before the N_2 was added, the pressure was measured and a dew point reading was made. N_2 was then slowly added to the absorption cell with the sample being mixed constantly by a small fan mounted inside the cell. While scanning the spectra, dew-point readings were periodically taken to monitor p . The dew-point reading of the pure H_2O sample whose pressure could be measured accurately served as a calibration for the dew

point apparatus. Thus, it was not necessary to rely upon the temperature calibration of the thermocouple or upon published values of vapor pressure at different temperatures. However, our dew-point readings for pure samples were always within a few tenths of a degree of the accepted values. Since p was allowed to approach equilibrium before the N_2 was added, the dew-point readings after the addition of N_2 were very nearly the same as those before. Thus, the dew-point apparatus served only as a monitor, and we were not dependent upon its absolute accuracy.

We investigated the possibility of the dew-point apparatus giving a different reading for the same p at different values of total pressure P . It was apparent that more heat was absorbed by the cooler at higher pressures since more current was required to cool it to a given temperature. If the heat flow caused a temperature gradient between the point at which the condensation occurred and the point at which the temperature was being measured, we would expect the temperature gradient to increase with increasing pressure. If this were true, one would then expect that the dew-point reading for a given p would depend upon P . In order to minimize this effect, we adjusted the apparatus so that the spot at which condensation was being observed was within two or three millimeters of the thermocouple used to measure the temperature. The surface joining these two points was made of a copper alloy with good heat conductivity so that the temperature gradient should be minimized. The leads to the thermocouple were made of fine wire to reduce the heat flow through them.

In order to check the possibility of such a systematic error, we introduced a sample of H_2O into the cell and waited until we were sure it had reached its equilibrium pressure. High-purity N_2 was then added very slowly to the cell with the gases being mixed constantly. The dew-point was measured at various pressures up to 10 atm. We repeated this procedure two or three times and did not detect any difference in the dew-point reading as the pressure was increased. Thus it seems safe to assume that our dew-point readings were not dependent on P .

In a previous model of our dew-point apparatus, there was a thin disk of germanium between the thermocouple and the surface on which the condensation occurred. With this unit there was apparently sufficient heat flow through the germanium with the cell at high pressures that the dew-point reading changed with increasing pressure. For this reason, this first model was modified. The germanium disk was originally tried because it could be polished to provide a very smooth surface which scattered very little light onto the photocell unless a film of H_2O was present. Germanium was used instead of glass or some other substance which could be highly polished because of its high conductivity. The copper alloy surface scatters more light but the contrast in light between dry and wet is still good.

When possible, p was maintained between approximately 4 and 12 torr when operating near room temperature. The lower limit was determined by the smallest value at which dew-point readings could give accurate measurements of p . Values of p greater than about 12 or 15 torr were avoided in order to eliminate the possibility of condensation if some of the H_2O were crowded to one portion of the absorption cell as the N_2 was being added. If this occurred and the vapor pressure of H_2O were exceeded, part of the H_2O might condense on the walls of the cell, and considerable time would be required before it evaporated and equilibrium was obtained. The absorber thickness was varied by changing the number of passes of the light through the cell.

Values of u are probably accurate to better than ± 4 or 5% for most of the samples included in this investigation. In general, the greater the value of p the better the accuracy.

2.2 TEST FOR EFFECT OF H_2O ADSORBED ON SURFACES OF MIRRORS

From the above discussion, we can calculate that the amount of H_2O adsorbed on the walls of the large absorption cell corresponds to a thickness of approximately 1 micron of liquid when the cell contains 10 torr of H_2O vapor. Since this much is adsorbed on the walls, we might expect some to be adsorbed on the surface of the mirrors in the multiple-pass optics. The objective of the experiment summarized here was to determine if any systematic errors in the absorption measurements might arise from absorption by H_2O adsorbed on the mirrors.

Since the mirror surfaces are much smoother than the walls of the cell, we would expect the surface density of H_2O to be considerably less on the mirrors, but even very small amounts might cause considerable error in some spectral regions, depending upon the absorption characteristics of the film of adsorbed H_2O . For example, if the film absorbed radiation as if it were liquid water, a layer 1 micron thick would reduce the intensity at 3 microns by about one-half.⁵ If the film behaved as a gas, its effect would be much less obvious since the absorption coefficient of vapor is less.

We assembled an optical system inside of a tank which could be evacuated and filled with H_2O or air to any desired pressure as long as the vapor pressure of H_2O was not exceeded. Light from a Nernst glower was directed through one of two optical paths within the absorption cell, out through a window and was focused on the entrance slit of a small grating spectrometer mounted in a vacuum tank. In one of the alternate paths, which we will call path A, the radiation traversed the cell with a path length of approximately 2-1/2 meters through the sample. Path A contained four reflecting surfaces from front surface aluminized mirrors. Path B had exactly the same path length through the vapor; but there were

40 mirror reflections in this path. It was possible to change from one light path to the other in a few seconds by rotating one of the mirrors with a screw assembly which was turned from outside the tank by a rotating seal.

Since the distance traversed through the vapor was exactly the same for both paths, any difference in the spectra would be due to the effect of the 36 extra reflections in path B compared to that in path A. Background curves were obtained through both paths with the cell evacuated so we could account for the reflection characteristics of "dry" mirrors.

Spectra of several different samples were obtained through the region from about 3100 cm^{-1} to 4000 cm^{-1} . The spectra were examined carefully in the region near 3850 cm^{-1} where there are very strong H_2O lines and near 3300 cm^{-1} where there is a maximum in the absorption coefficient of liquid H_2O .

After accounting for the difference in the backgrounds of paths A and B, we were not able to see any significant difference between two spectra obtained through the two different paths for the same gas sample. Therefore, any possible absorption by 36 films of H_2O on the mirror surfaces is much smaller than that by $2\frac{1}{2}$ meters of vapor. Thus, it seems safe to conclude that any possible absorption due to H_2O adsorbed on the surfaces of the mirrors of a multiple-pass cell is negligible if the distance the radiation travels through the gas is as great as 6 or 7 cm per reflection from each mirror surface. It is quite possible that the minimum distance per reflection is considerably less. Of course, it should be recalled that these measurements were obtained at room temperature; and it is possible that there is a significant effect at lower temperatures since adsorption is known to increase with decreasing temperature.

Of course, this result has application in other optical systems besides multiple-pass absorption cells. It applies to any optical system in which mirror surfaces are exposed to air.

2.3 RECORDING AND CALIBRATION OF SPECTRA

The spectra were obtained with an Ebert-type spectrometer whose main mirror has a 75 cm focal length. It utilized a small grating having a ruled area $64 \times 64\text{ mm}$ with 300 lines/mm and blazed at 3.2 microns. The grating was used in the first order and a Ge filter eliminated overlapping orders of wavelengths less than $1.8\text{ }\mu$. Thus, this system was limited to $\lambda < 3.6\text{ }\mu$ ($\nu > 2800\text{ cm}^{-1}$), since second order radiation of $\lambda > 1.8\text{ }\mu$ would be present when operating at longer wavelengths. A Nernst glower was used as a radiation source, and a PbS cell cooled with liquid nitrogen served as the detector.

The spectrometer is "home made" and was contained in a tank which could be evacuated to essentially eliminate absorption due to atmospheric gases outside the absorption cell. The spectrometer tank, as well as another vacuum tank containing the radiation source and chopper, were connected to the absorption cell by means of flexible bellows.

Approximately the same resolution schedule was used in recording all the spectra: the approximate spectral slitwidths at five different wavenumbers are given in Table 2-1.

TABLE 2-1
SPECTRAL SLITWIDTHS

Wavenumber (cm^{-1})	Spectral Slitwidth (cm^{-1})
2800	0.40
3200	0.46
3600	0.56
4000	0.67
4400	0.80

Background curves were obtained with the absorption cell evacuated for each number of passes for which sample spectra were scanned. The background curves were different for different numbers of passes since the reflectivity of the mirrors in the multiple-pass optics varies with wavenumber. The appropriate background curve, which represents 100 percent transmittance, was then fitted to each spectrum and traced on it. The transmittance was determined from the ratio of the deflection of the sample spectrum to that of the background curve at the same wavenumber.

Each spectrum was examined and compared with others for consistency. Small changes were occasionally made to account for "drift" or spurious deflections which were not reproducible. A few of the spectra on which there was considerable noise were scanned two or three times and a smoothed "average" spectrum was used.

The spectra of samples contained in the shorter absorption cell ($L \leq 32.9$ meters) were digitized while they were being scanned. Pairs of values, one related to transmittance and the other to wavenumber, were punched on IBM cards which served as input for a computer program used to calculate transmittance, integrated absorptance, and integrated absorption coefficient as a function of

wavenumber. Copies of portions of the program output are included in Sections 4, 5 and 6. Spectra of samples contained in the longer absorption cell ($L \geq 121$ meters) were scanned before the digitizing apparatus was obtained. They were replotted and digitized by use of the apparatus described in Appendix C of Reference 4.

The positions of most of the absorption lines observed in the present investigation have been measured or calculated previously^{1,6,7}. More than 200 of them were used for wavenumber calibration of the spectra; those used are listed in Table 2-2. The calibrated points are sufficiently close that the spectra are linear in wavenumber between them.

TABLE 2-2
CALIBRATION TABLE

Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹
380	2801.51D	413	3004.65	446	3169.58	479	3322.99
381	2809.34D	414	3010.23	447	3178.13	480	3329.66
382	2814.99D	415	3012.52	448	3185.21	481	3334.64
383	2819.48H	416	3015.56	449	3196.10	482	3336.71
384	2821.85D	417	3022.35	450	3199.73	483	3340.22
385	2830.02H	418	3025.78	451	3209.75	484	3345.96
386	2835.03D	419	3030.72	452	3214.14	485	3351.24
387	2841.54D	420	3031.74	453	3219.39	486	3357.00
388	2845.24D	421	3035.79	454	3222.02	487	3361.68
389	2850.92D	422	3048.95	455	3227.47	488	3364.31
390	2858.87D	423	3056.38	456	3229.91	489	3367.62
391	2871.46H	424	3059.93	457	3233.00	490	3370.98
392	2879.82H	425	3064.40	458	3236.67	491	3374.69
393	2890.15H	426	3067.01	459	3240.09	492	3380.41
394	2893.82H	427	3077.93	460	3244.96	493	3383.07
395	2901.82H	428	3079.69	461	3254.15	494	3385.69
396	2906.72H	429	3082.60	462	3257.23	495	3392.90
397	2912.13H	430	3087.18	463	3260.44	496	3397.21
398	2930.10H	431	3093.69	464	3265.09	497	3403.49
399	2935.23	432	3096.90	465	3270.48	498	3408.83
400	2954.17	433	3101.16	466	3273.60	499	3413.09
401	2955.61	434	3103.02	467	3276.40	500	3420.49
402	2961.53	435	3107.32	468	3280.06	501	3423.24
403	2966.00	436	3109.74	469	3282.94	502	3427.93
404	2973.25	437	3114.47	470	3288.47	503	3431.06
405	2975.10	438	3115.87	471	3291.35	504	3442.52
406	2977.96	439	3118.12	472	3294.18	505	3447.25
407	2980.35	440	3121.66	473	3297.49	506	3455.79
408	2984.20	441	3126.80	474	3303.25	507	3458.70
409	2987.49	442	3133.05	475	3308.80	508	3462.70
410	2991.93	443	3142.79	476	3310.50	509	3466.87
411	2993.68	444	3151.34	477	3313.27	510	3475.01
412	2995.38	445	3167.92	478	3317.26	511	3480.71

D, H The lines marked with D and H are HDO and H₂O, respectively.
taken from Migeotte et al⁶. The remainder were obtained from
Gates et al¹.

TABLE 2-2

CALIBRATION TABLE (Cont.)

Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹
512	3482.24	545	3607.03	578	3779.50	611	3975.00
513	3488.20	546	3612.55	579	3784.56	612	3982.18
514	3491.13	547	3519.64	580	3789.33	613	3995.03
515	3495.16	548	3626.24	581	3796.43	614	4008.59
516	3496.63	549	3630.71	582	3801.43	615	4019.99
517	3501.54	550	3633.86	583	3806.91	616	4025.39
518	3503.28	551	3638.09	584	3816.07	617	4044.92
519	3504.74	552	3642.57	585	3821.79	618	4060.40
520	3509.57	553	3649.27	586	3826.74	619	4073.87
521	3511.59	554	3652.93	587	3831.67	620	4079.42
522	3517.40	555	3656.35	588	3835.02	621	4088.16
523	3518.99	556	3659.94	589	3837.85	622	4106.04
524	3522.73	557	3668.79	590	3843.78	623	4133.70
525	3525.60	558	3674.97	591	3852.07	624	4138.79
526	3527.05	559	3679.44	592	3857.28	625	4149.49
527	3529.07	560	3684.55	593	3861.80	626	4159.25
528	3530.75	561	3688.45	594	3865.12	627	4172.36
529	3536.24	562	3696.34	595	3870.12	628	4181.44
530	3542.90	563	3701.75	596	3874.42	629	4191.32
531	3543.63	564	3703.42	597	3880.20	630	4204.77
532	3545.21	565	3712.20	598	3885.68	631	4216.44
533	3548.34	566	3718.97	599	3891.32	632	4230.15
534	3552.21	567	3722.19	600	3901.91	633	4239.95
535	3557.14	568	3726.62	601	3906.05	634	4250.91
536	3560.14	569	3732.13	602	3917.23	635	4264.36
537	3563.61	570	3736.69	603	3920.06	636	4275.56
538	3570.50	571	3741.06	604	3925.26	637	4294.58
539	3574.47	572	3747.41	605	3930.60	638	4306.69
540	3579.33	573	3752.21	606	3934.09	639	4329.75
541	3583.60	574	3756.61	607	3942.70	640	4356.13
542	3588.75	575	3759.79	608	3950.00	641	4407.50
543	3595.35	576	3765.79	609	3956.85	642	4493.93
544	3600.98	577	3769.80	610	3969.14	643	4512.54

SECTION 3

SHAPES OF SELF-BROADENED AND N_2 -BROADENED ABSORPTION LINES

The absorption coefficient $k(\nu)$ of a single absorption line is given by

$$k(\nu) = S f(\nu), \quad (3-1)$$

where S is the strength of the line and is constant at a given temperature. The shape function $f(\nu)$ is normalized so that

$$\int_0^{\infty} f(\nu) d\nu = 1. \quad (3-2)$$

For a Lorentz line,

$$f_L(\nu) = \frac{1}{\pi} \frac{\alpha}{(\nu - \nu_0)^2 + \alpha^2}, \text{ or} \quad (3-3)$$
$$k_L(\nu) = \frac{S}{\pi} \frac{\alpha}{(\nu - \nu_0)^2 + \alpha^2}.$$

α is the half-width and ν_0 is the line center.

At temperatures and pressures usually encountered in studies of atmospheric transmission, the shapes of absorption lines are determined by collision broadening, or pressure broadening, whichever term is preferred. Only at pressures less than a few hundredths of an atm, or at elevated temperatures, is Doppler broadening important. A wide variety of absorption data obtained under quite different conditions and at different wavenumbers indicate that the shape of collision-broadened lines is given approximately, but not exactly, by the Lorentz equation for $\nu - \nu_0$ less than a few cm^{-1} .

It is not possible to determine directly the true shape of infrared absorption lines because of the finite slitwidth of spectrometers used in making the measurements. The half-width of an absorption line at STP is of the order of 0.1 cm^{-1} , which is approximately the same as the best resolution obtainable. The modification of a spectrum due to the spectral slitwidth is greatest near the line center where $k(\nu)$ changes fastest, and the information obtainable from measurements farther from the line centers is limited by overlapping of adjacent lines. For a very good discussion of line shape measurement and the method for accounting for spectrometer slitwidth, the reader is referred to an article by Benedict, Herman, Moore and Silverman.⁸

In the microwave region, very good resolution is possible and direct measurements of line shape can be made. However, there are only limited data available and their applicability to the infrared is doubtful. Microwave studies have shown that line width is proportional to the pressure of a gas of constant composition and that $k(\nu_0)$, the absorption coefficient at the line center, is inversely proportional to pressure as predicted by the Lorentz equation.

The curve of growth of a single infrared absorption line is usually a function of the shape within 1 or 2 cm^{-1} of the center. Such curves show a dependence on pressure and absorber thickness which is similar to that expected for the Lorentz shape; but they, of course, do not prove that the lines are exactly Lorentzian. Measurements a few cm^{-1} from the line centers of various gases indicate deviations from this shape; some are stronger (super-Lorentzian) and some weaker (sub-Lorentzian). Results of two investigations, one by Winters, Silverman and Benedict⁹ and one by us,¹⁰ indicate that the extreme wings of CO_2 lines, 10-200 cm^{-1} from the centers, may be sub-Lorentzian by as much as a factor of 10 to 1000.

On the basis of the information on line shapes summarized above, it seems logical to express the shape by the Lorentz equation times a correction function F , as follows:

$$f(\nu) = f_L(\nu) F = \frac{1}{\pi} \frac{\alpha F}{(\nu - \nu_0)^2 + \alpha^2} \quad (3-4)$$

Certain characteristics of F might be expected for H_2O lines since they occur for other gases. From curve of growth data, we expect that $F \approx 1$ for $\nu - \nu_0$ less than 1 or 2 cm^{-1} ; but the measurements in the extreme wings indicate that $F \ll 1$ for very large $\nu - \nu_0$, at least for CO_2 . The CO_2 absorption coefficient was found^{9,10} to be proportional to pressure in the extreme wings; thus, if we assume α is proportional to pressure, F must be independent of α for $\nu - \nu_0 \gg \alpha$. However, our results¹⁰ tend to show that F is a function of α as well as $\nu - \nu_0$ when $\nu - \nu_0$ is the same order of magnitude as α .

The expression for the half-width of a collision-broadened line as given by kinetic theory is

$$\alpha = \frac{1}{4\pi} \sum_L N_L (D_{aL})^2 \left[2\pi k\theta \left(\frac{1}{m_a} + \frac{1}{m_L} \right) \right]^{1/2}, \quad (3-5)$$

where N_L is the number of molecules of the L th type per unit volume, D_{aL} is the sum of the optical collision diameters of the absorbing molecule and a molecule of the L th type, m_a is the mass of the absorbing molecule and m_L is the mass of the molecule of the L th type. θ is the temperature and k is Boltzmann's constant.

For a sample of $H_2O + N_2$ at constant temperature, α can be expressed by an equation of the following form,

$$\alpha = C_a p + C_{N_2} p_{N_2}. \quad (3-6)$$

Pressures of H_2O and N_2 are denoted by p and p_{N_2} , respectively; C_a and C_{N_2} are constants.

In the earth's atmosphere, most of the broadening of H_2O lines arises from collisions with N_2 , which constitutes approximately 80% of the air. It is, therefore, desirable to relate α of a mixture to an equivalent pressure P_e defined so that $P_e \rightarrow p_{N_2}$ for a very dilute mixture ($p \ll p_{N_2}$). Thus

$$\alpha = C_{N_2} P_e. \quad (3-7)$$

P_e for an $H_2O + N_2$ mixture is then given by

$$P_e = Bp + p_{N_2} = P + (B-1)p, \quad (3-8)$$

where P is the total pressure and the self-broadening coefficient $B = C_a/C_{N_2}$, the ratio of the self-broadening ability to the N_2 broadening ability.

The purpose of the investigation described in this section was to determine a reliable value of B , or a function relating B to other experimental parameters, and to see if the correction function F for self-broadened lines is significantly different from that for N_2 -broadened lines.

A typical set of measurements were carried out as follows:

A spectrum was scanned through the region from approximately 3842-3860 cm^{-1} for a sample of pure H_2O at a pressure of 15.4 torr and a path length of 416 cm. A tracing of this spectrum

is shown as Curve A1 in Figure 3-1. The multiple-pass cell was then evacuated and adjusted for a path length of 1648 cm; H₂O vapor was then added to a partial pressure of 3.9 torr, giving the same value of u as in the Sample A1. A spectrum of the pure H₂O at a pressure of 3.9 torr would, of course, show considerably less absorption than that of Sample A1 because of the lower pressure. N₂ was added to the sample and spectra were scanned at total pressures of 40, 60 and 71 torr. Only the portions of these spectra near the maxima and minima of absorptance are shown since the small separation between them and A1 is difficult to illustrate in the other regions. The increase in absorptance with increasing pressure is noted. Although neither A2, A3 or A4 is exactly coincident with A1, they are sufficiently close that we can interpolate or extrapolate to determine the total pressure which would be required of the H₂O + N₂ mixture to match spectrum A1 at any given wavenumber. We define this to be the matching pressure.

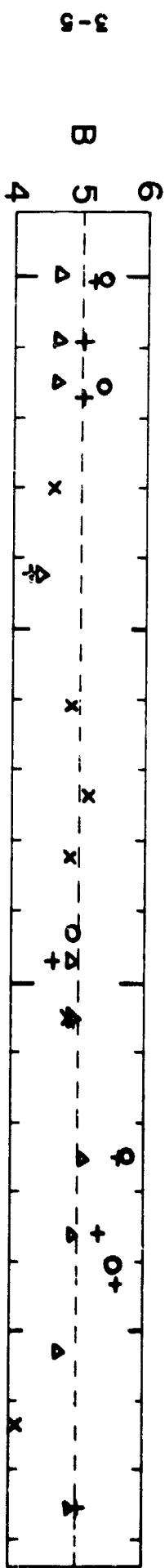
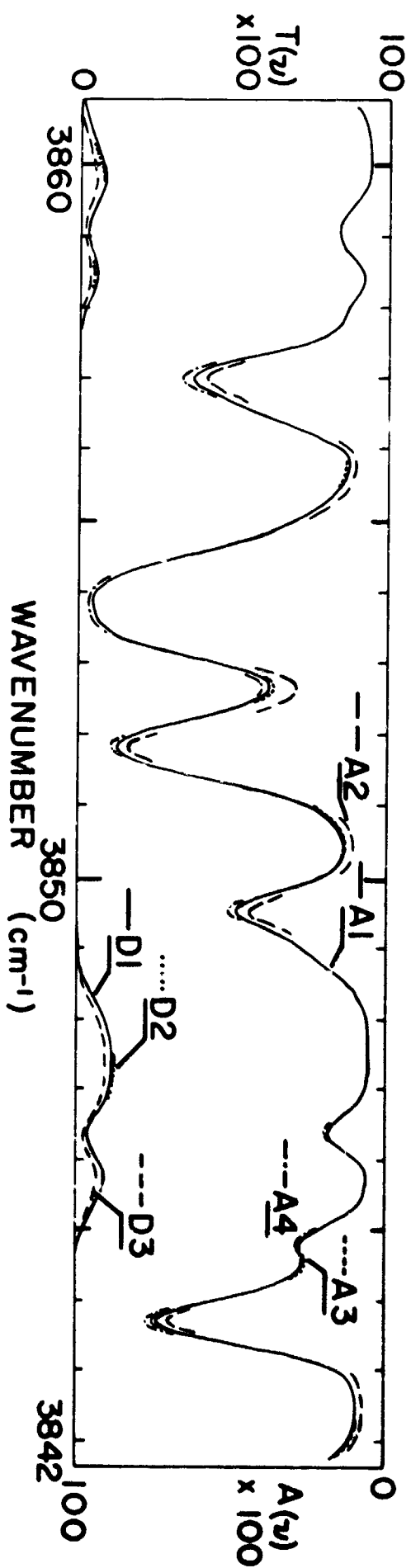
We see from A2, A3 and A4 that the absorptance increases with increasing pressure at the line centers near 3844, 3850, 3852 and 3857 cm⁻¹. At first, this may seem to be opposite of what we would expect on the basis of Equation(3-3) where f_L decreases with increasing α at $\nu = \nu_0$. The increase in $A(\nu)$ which we observe is a result of the finite slitwidth of the spectrometer which averages over a small interval. Although $k(\nu)$ decreases with increasing α for $\nu - \nu_0 < \alpha$, it increases for $\nu - \nu_0 > \alpha$. When the slitwidth of the spectrometer is a few times greater than α , the increase in $k(\nu)$ for $\nu - \nu_0 > \alpha$ causes $A(\nu)$ to increase more than the decrease in $k(\nu)$ for smaller $\nu - \nu_0$ causes it to decrease. The net result is that $A(\nu)$ increases with increasing α . When the spectral slitwidth is less than α , or when $A(\nu)$ is small, the expected decrease in $A(\nu)$ with increasing pressure can be observed.

The absorptance observed with a spectrometer having slit function $\mathcal{S}$ is a function of $\mathcal{S}$, u and $f(\nu)$. $\mathcal{S}$ and u are the same for A1 to A4; therefore, any difference in the spectra is due to a difference in $f(\nu)$. At the absorptance maximum near 3857 cm⁻¹, A3 is essentially coincident with A1; thus, we conclude that $f(\nu)$, or at least its average over the narrow region of coincidence, is the same for the corresponding samples. Now, if we assume that the central portion of this line has the Lorentz shape ($F = 1$), we conclude that the half-width of this line, and thus P_e , is the same for A1 as for A3. By substituting the pressures in the two samples in Equation(3-8) we arrive at

$$B_{15.4} = B_{3.9} + (60 - 3.9),$$

(3-8a)

$$\text{or } B = 4.9.$$



Sample	u	P (Torr)	P (Torr)	Temp. °K	Symbol
A1	6.27×10^{-3}	15.4	15.4	296	
A2	"	3.9	40	"	
A3	"	3.9	60	"	X
A4	"	3.9	71	"	
D1	7.25×10^{-2}	102	102	337	
D2	"	25.8	450	"	O
D3	"	25.8	550	"	

FIG. 3-1

SPECTRA SHOWING COMPARISON OF SELF-BROADENED AND N_2 -BROADENED H_2O LINES.

The lower portion shows calculated values of the self-broadening coefficient B.

It is apparent from the spectra that the matching pressure varies from one wavenumber to another; thus a matching of $f(\nu)$ at one wavenumber does not correspond to matching at another. Since we do not know values of α , we cannot determine if the failure to match at the same pressures is a result of different α 's or different F 's, or both. At any wavenumber, we can find a matching pressure, which means that P_e is the same for both samples at that wavenumber. We can then find a value of B by substituting the pressures in Equation (3-8). This value of B is not simply a ratio of half-widths as given in the simplified derivation of Equation (3-8), but it may also include differences in the correction function F .

B was calculated at several different wavenumbers from spectra A1 to A4; the calculated values are represented in the lower portion of the figure by the x's. Most of the absorption in the regions of minimum absorptance is due to the wings of the neighboring lines and is so small for the Samples A1 to A4 that reliable values of B could not be determined. Therefore, spectra D1, D2 and D3 were obtained for samples having considerably larger p and u . The temperature was increased to permit the usage of larger p without condensation. The values of B calculated from these spectra are indicated by o's at four different wavenumbers in the lower portion of the figure. The other symbols represent two other sets of samples of intermediate u and p . We see that all of the calculated values of B occur between 4 and 6, with most of them between 4.5 and 5.5. At any given wavenumber, there is less than $\pm 10\%$ difference in the values; this much could be attributed to experimental error.

If, as an example, F were the same near the line centers for self-broadened lines as for N_2 -broadened lines but was greater in the wings of self-broadened lines, B would be greater in the regions between lines than near the centers. No correlation is apparent between the values of B and locations of the points relative to line centers, indicating that there is certainly not a great difference between a self-broadened line and an N_2 -broadened line between about 0.2 and 2 cm^{-1} from the centers. We will see below that this is not the case for CO_2 lines.

These data provide essentially no information about the relative shapes for $\nu - \nu_0$ greater than approximately 2 cm^{-1} since nearly all the absorption at any point in the interval shown is due to lines whose centers are within this distance. Also, we cannot learn much about the region within 0.2 or 0.3 cm^{-1} from the center because of the averaging by the finite slitwidth.

It is important to consider some of the possible sources of error in these measurements. Besides the usual problems of noise, placement of the background curve, etc., the results are subject to systematic errors if the absorber thickness u is not the same in both samples being compared. For example, if u in Samples A2, A3 and A4 were slightly less than that in

Sample A1, the matching pressure would be increased. Furthermore, the matching pressure would be different at different wavenumbers, even if the shapes $f(\nu)$ were the same for both types of lines, since increasing the pressure has a different effect in the wings of the lines than near the centers. For example, a two percent error in u would probably result in only a 3 or 4% error in B at a point where most of the absorption is due to the wings of lines. This is true because $k(\nu)$ is proportional to pressure in the wings, causing the absorptance to be equally dependent on u and P_e . However, under many conditions, the absorptance observed near the center of the line is more strongly dependent on u than on P_e ; in fact, as pointed out above, the absorptance might even decrease with increasing P_e . Therefore, a two percent error in matching u could result in a considerably larger error in the value of B near the line center.

We also obtained spectra over two other short intervals at slightly higher wavenumbers. The calculated values of B also occurred between 4 and 6 with no apparent correlation with distance from line centers.

Two similar sets of measurements were also made with He as the broadening gas instead of N_2 . The broadening ability of He was found to be only about $1/5$ to $1/4$ as great as that of N_2 and, again, there was no correlation between broadening ability and distance from the nearest line centers. Helium was chosen since we have found in another investigation¹⁰ that the distant wings of He-broadened CO_2 lines are much weaker than self-broadened lines having the same half-width. Thus, it seemed appropriate to see if such a phenomenon also existed for He-broadened H_2O lines. Of course, the present results do not provide any information about the relative shapes for $\nu - \nu_0$ greater than about 2 cm^{-1} ; but they do indicate that there is not an appreciable difference between He-broadened and self-broadened H_2O lines for smaller $\nu - \nu_0$.

Our results do not rule out the possibility of small variations in B from one line to another; in fact, there are indications of small variations. But, because of the uncertainties in the measurements, differences of only a few percent cannot be observed. However, in the spectral regions covered any possible differences in B between lines is probably less than $\pm 20\%$.

It is interesting to compare the results shown in Figure 3-1 with those of a similar set of measurements of CO_2 absorption shown in Figure 3-2. Since the problem of adsorption by CO_2 on the walls of the absorption cell is much less serious than for H_2O , it is possible to measure CO_2 samples more accurately; thus, the reproducibility of the data is better. We see from Figure 3-2 that there is a definite correlation between the matching pressure and the positions relative to the centers of the absorption lines. We obtain a matching pressure of 46 torr, which corresponds to $B \approx 1.2$ near the line centers; but this increases to approximately 1.3 in the regions midway between the lines which are only approximately

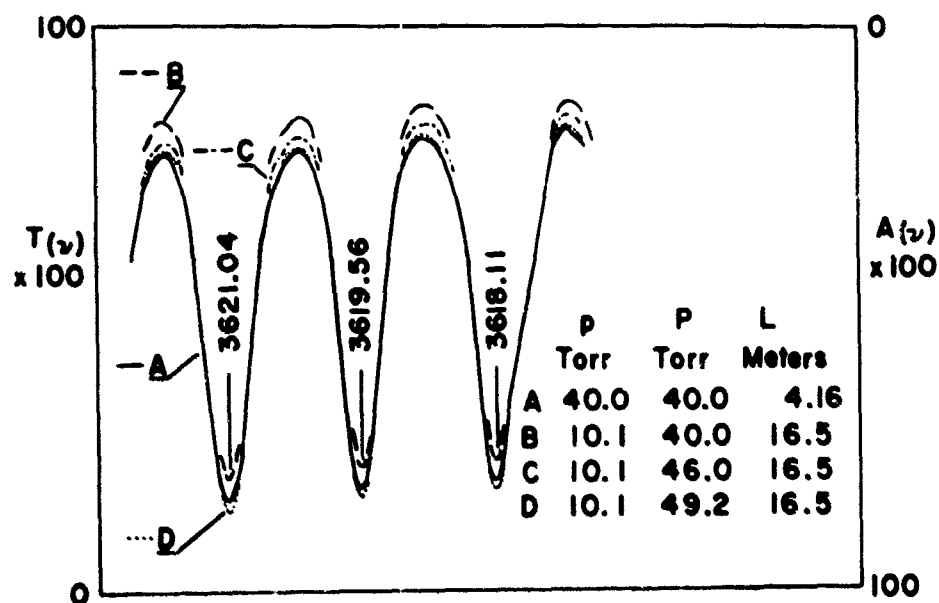


FIG. 3-2 SPECTRA SHOWING COMPARISON OF SELF-BROADENED AND N_2 -BROADENED CO_2 LINES.

The pressure of the $CO_2 - N_2$ mixture that is required to match the pure CO_2 sample is seen to be greater between the lines than near the line centers. Such a correlation between matching pressure and distance from the line centers was not observed for H_2O lines in Fig. 3-1.

0.7 cm^{-1} away. The spectral region shown in Figure 3-2 was chosen because it is relatively free of weaker CO_2 lines arising from transitions from excited states. Therefore, most of the absorption at the points midway between the lines which are apparent is actually due to the wings of the stronger lines and not due to much weaker lines not resolved in the spectra. Similar differences between B near the line centers and in the wings has also been observed with larger samples and in other parts of the spectrum, including the $3\nu_3$ band near 1.4μ .

On the basis of the results shown in Figure 3-2 we conclude that, unlike H_2O lines, there is a significant difference in the shapes of self-broadened and N_2 -broadened CO_2 lines as close in as a few tenths of a cm^{-1} from the line centers. We cannot conclude whether either of these lines has the Lorentz shape, but it is certain that both do not.

A few years ago we¹¹ carried out a similar set of measurements in order to determine self-broadening coefficients for CO_2 and H_2O . These measurements were made with considerably lower resolution so that it was not possible to observe the regions between individual absorption lines. Therefore, the values of B represented averages over several lines. They appeared to depend somewhat on the position within a band and to a lesser extent upon the pressure and absorber thickness used in the measurements. The values for CO_2 varied between approximately 1.2 and 1.4; so we used 1.3 as an average in the analysis of the data. These results are consistent with the present ones, since in the earlier measurements made with lower resolution, the samples were chosen to provide absorptance sufficiently large that it could be measured with good accuracy. Therefore, regions near the line centers were probably opaque and all of the growth caused by increasing the pressure occurred in the regions between the lines; the effective value of B would then be that corresponding to the wings of the lines.

In regions between lines which are farther apart, it is possible that B would be larger than 1.3, and even as large as 1.4. Similarly, an effective value as small as 1.2 might be appropriate for regions where the lines are close together. It is also possible that there is a small dependence of B on J-value; but the consistency of our results indicates the variation is not more than a few percent.

In the earlier work, we also obtained an effective value of $B = 5$ for H_2O self-broadening for the bands near the 1.9 and 2.7μ from measurements made with lower resolution. This result is also in good agreement with those shown in Figure 3-1.

Palmer¹² has published some H_2O data which provide information about self-broadening and N_2 -broadening in the $200\text{--}600 \text{ cm}^{-1}$ region. Palmer's spectra were obtained with a spectral slitwidth between 4 and 10 cm^{-1} , which is sufficiently wide to include several absorption lines. Benedict¹²

suggested an empirical equation based on Palmer's data which relates an effective self-broadening coefficient to the transmittance $T(\nu)$. Written in our notation, it becomes

$$B = 11 - 5 T(\nu) = 6 + 5 A(\nu). \quad (3-9)$$

The need for an equation relating B to $T(\nu)$ was attributed to differences in the shapes of self-broadened and N_2 -broadened lines; the relative strengths of the wings of the self-broadened lines being greater. When $A(\nu)$ is small, most of the absorption occurs near the line centers; but as $A(\nu)$ approaches unity, the regions near the line centers are opaque and most of the growth occurs in the wings. Therefore, the value of B used for small absorptance should correspond to that near the centers of individual lines, and the value used for large absorptance to wings of the lines.

We see that Palmer's results are quite different from ours. The minimum value (6) of B in Equation (3-9) is larger than any observed by us. Furthermore, we could see no significant difference between the line centers and the wings; but Palmer's data indicates almost a doubling of B . It does not seem probable that such a great difference between the two sets of results could be due to experimental error. Thus, it appears that there is a greater difference between self-broadened and N_2 -broadened H_2O lines at the lower wavenumbers studied by Palmer than at higher wavenumbers.

Bignell, Sledy and Sheppard¹³ have also attempted to determine the ratio between self-broadening and N_2 -broadening in the region from approximately 800 to 1200 cm^{-1} . Their measurements were made on the absorption of radiation from the sun by H_2O in the earth's atmosphere. They accounted for the very weak H_2O lines which occur in this region and determined a continuum absorption due to the extreme wings of the very strong H_2O lines at higher and lower wavenumbers. Thus, the absorption they measured was due to the extreme wings, and their results would not necessarily be expected to agree with ours. They found that the self-broadening of H_2O in this region was probably as much as 30 times that of N_2 -broadening. Such a change in the ratio of self- to N_2 -broadening at various distances from the centers of the lines is certainly large and may even appear to be somewhat surprising. But it does not seem too improbable in view of the fact that such great variations have been observed for CO_2 lines by us;¹⁰ these results will be published within the next several weeks.

SECTION 4

3847-3860 and 3895-3932 cm^{-1} REGIONS

4.1 DISCUSSION AND TRANSMISSION SPECTRA

This section deals with two short spectral regions, 3847-3860 cm^{-1} and 3895-3932 cm^{-1} . Copies of the spectra are shown in Figures 4-1 through 4-6; the numbers enclosed in rectangles refer to the numbers assigned to the samples whose parameters are shown in Table 4-1. The numbers shown in the second panel from the top of Figure 4-2 refer to calibration lines whose wavenumbers are given in Table 2-2. The wavenumbers of these lines as well as many others not resolved in the spectra have been tabulated by Gates et al.¹

Spectra of the two different spectral regions are shown in separate panels in Figure 4-1 through 4-4 for Samples 1 to 16 which were contained in the shorter absorption cell. Samples 17 to 29 were contained in the longer absorption cell; the spectra of these samples are shown in Figures 4-5 and 4-6, where both regions are contained within the same panel. The spectra in the latter two figures were replotted by the technique described in Appendix C of Reference 4 and appear on a scale quite different from that used in the first four figures. Spectra of Samples 23, 26, 27, 28, and 29 are not shown for the 3847-3860 cm^{-1} region since the absorbance is nearly complete at all wavenumbers within this interval.

The two short spectral regions described in this section were studied in considerable detail since they are useful in interpreting spectra of paths through the atmosphere. The 3847-3860 cm^{-1} region contains some very strong lines and is particularly useful for comparison with spectra of relatively small samples of H_2O . As an example, it is useful for interpreting solar spectra obtained from a high altitude balloon or

aircraft where the radiation has passed through only a small amount of H_2O . The other spectral region contains several lines which are much weaker, making it useful for a comparison with samples containing more H_2O , such as the path between the sun and an aircraft or balloon at lower altitudes. Spectra of the $3895\text{-}3932\text{ cm}^{-1}$ region can also be useful in placing the curve corresponding to zero absorptance on a solar spectra. By comparing a solar spectrum with one of the laboratory spectra having approximately the same integrated absorptance over a group of lines such as those between 3895 and 3908 cm^{-1} , the average absorptance over the adjacent window from 3908 to 3916 cm^{-1} could be estimated. The average absorptance observed over the window is essentially independent of spectrometer slitwidth provided it is less than about 5 cm^{-1} . Of course, the ratio of the integrated absorptance over the window region to that over the cluster of lines is not constant but depends on the pressure and absorber thickness. But a reasonable estimate of the integrated absorptance, and thus the average absorptance, over the window region can be obtained by such comparison; and since it is small for many samples, the curve corresponding to zero absorptance can be located on a solar spectrum with reasonable accuracy.

4.2 TABLES OF TRANSMITTANCE AND INTEGRATED ABSORPTANCE

Table 4-2 contains values of the observed transmittance $T(\nu)$ versus wavenumber in the $3847\text{-}3860\text{ cm}^{-1}$ region. Values are tabulated at intervals of 0.2 cm^{-1} , which is sufficiently close that the original spectra could be reconstructed with little loss of structure by plotting the points and joining them with straight lines. Small errors in such a replotted spectrum would occur near the centers of some of the absorption lines; a little of the line might be "cut off," but the error introduced in the calculation of the integrated absorptance is negligible. Values of $T(\nu) > 1.0$ which appear occasionally in the transmittance tables are a result of noise on the sample spectra.

Table 4-3 consists of values of integrated absorptance $\int_{\nu'}^{\nu} A(\nu) d\nu$ versus wavenumber for the same samples over the same spectral region with values tabulated at intervals of 0.5 cm^{-1} . The lower limit of integration ν' is shown at the top of each column. The integrated absorptance between any two points within the interval can be calculated from the difference between the values tabulated at those two points. The calculations are based on spectra composed of straight lines joining points corresponding to the transmittance values given in Table 4-2.

Tables 4-4 and 4-5 are the tables of transmittance and integrated absorptance, respectively, for the $3895\text{-}3932\text{ cm}^{-1}$ region.

TABLE 4-1
SAMPLE PARAMETERS

Sam. No.	p torr	P torr	P* e torr	p atm	P atm	P* e atm	L Path m	u gm/cm ²
1	4.0	4.0	20	0.00526	0.00526	0.0263	2.10	0.00080
2	4.0	40.0	56	0.00526	0.0526	0.0737	2.10	0.00080
3	4.0	210	226	0.00526	0.276	0.297	2.10	0.00080
4	4.0	745	761	0.00526	0.980	1.001	2.10	0.00080
5	6.4	6.4	32	0.00842	0.00842	0.0421	4.16	0.00260
6	6.4	46.0	71.6	0.00842	0.0605	0.0942	4.16	0.00260
7	6.4	200	226	0.00842	0.263	0.297	4.16	0.00260
8	6.4	731	757	0.00842	0.962	0.996	4.16	0.00260
9	6.4	6.4	32	0.00842	0.00842	0.0421	12.4	0.00772
10	6.4	46.0	71.6	0.00842	0.0605	0.0942	12.4	0.00772
11	6.4	200	226	0.00842	0.263	0.297	12.4	0.00772
12	6.4	731	757	0.00842	0.962	0.996	12.4	0.00772
13	6.4	6.4	32	0.00842	0.00842	0.0421	32.9	0.0205
14	6.4	46.0	71.6	0.00842	0.0605	0.0942	32.9	0.0205
15	6.4	200	226	0.00842	0.263	0.297	32.9	0.0205
16	6.4	731	757	0.00842	0.962	0.996	32.9	0.0205
17	0.48	0.48	2.40	0.00063	0.00063	0.00316	469	0.0219
18	1.95	1.95	9.75	0.00256	0.00256	0.0128	237	0.0450
19	3.80	57.0	72.2	0.00500	0.0750	0.0950	121	0.0448
20	7.50	7.50	37.5	0.00987	0.00987	0.0493	121	0.0885
21	7.52	38.8	68.9	0.00989	0.0511	0.0907	121	0.0887
22	7.35	192	221	0.00967	0.253	0.291	121	0.0867
23	7.35	723	752	0.00967	0.951	0.989	121	0.0867
24	7.50	7.50	37.5	0.00987	0.00987	0.0493	469	0.343
25	7.47	36.7	68.6	0.00983	0.0509	0.0903	469	0.341
26	7.47	192	222	0.00983	0.253	0.292	469	0.341
27	7.52	7.52	37.6	0.00989	0.00989	0.0495	933	0.684
28	15.3	15.3	76.5	0.0201	0.0201	0.1006	469	0.699
29	15.3	1525	1586	0.0201	2.01	2.08	469	0.697

* $P_e = P \cdot 4p$ in accordance with Equation (3-8) and the results of Section 3.
All samples were at room temperature, 296°K.

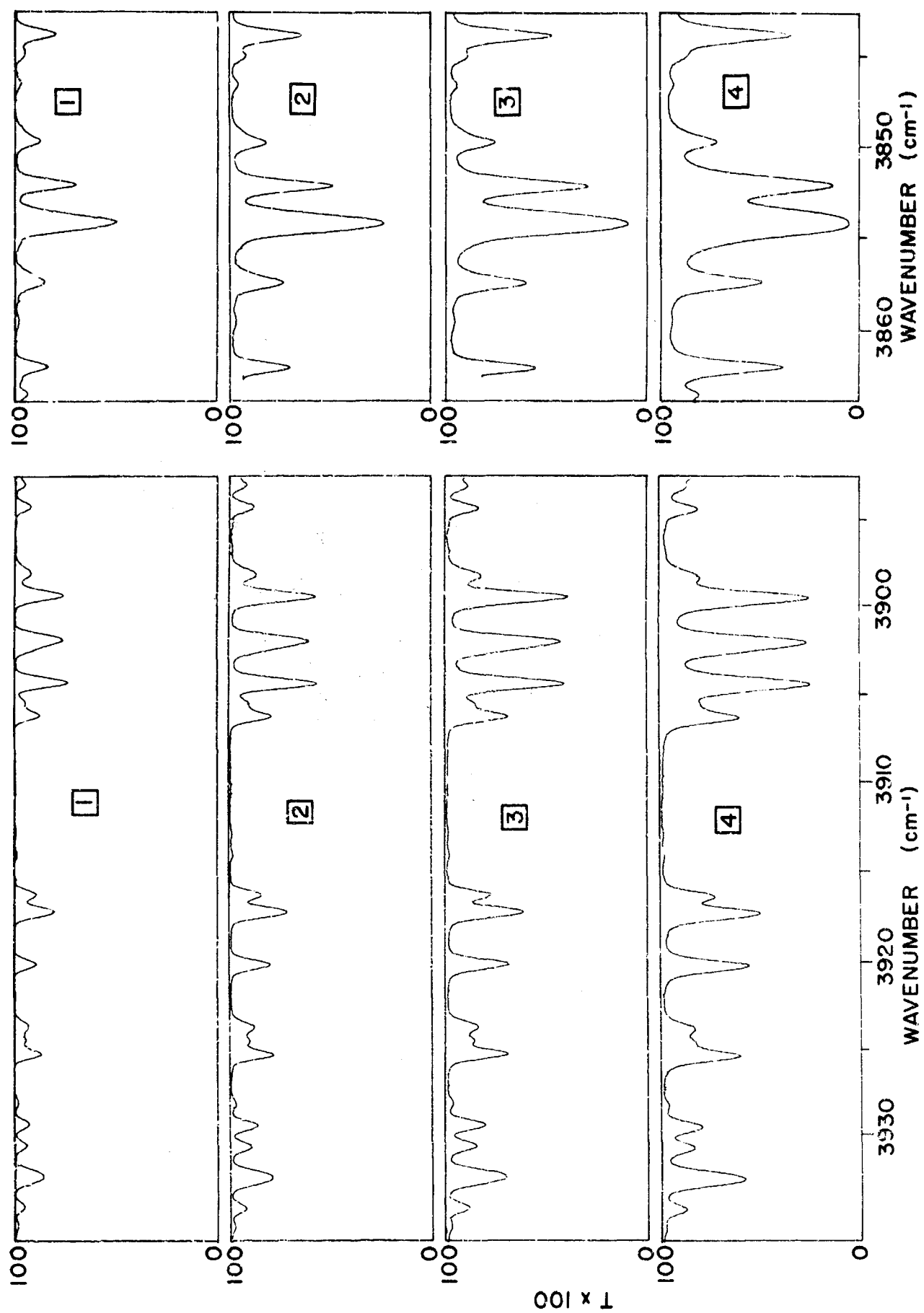


Fig. 4-1

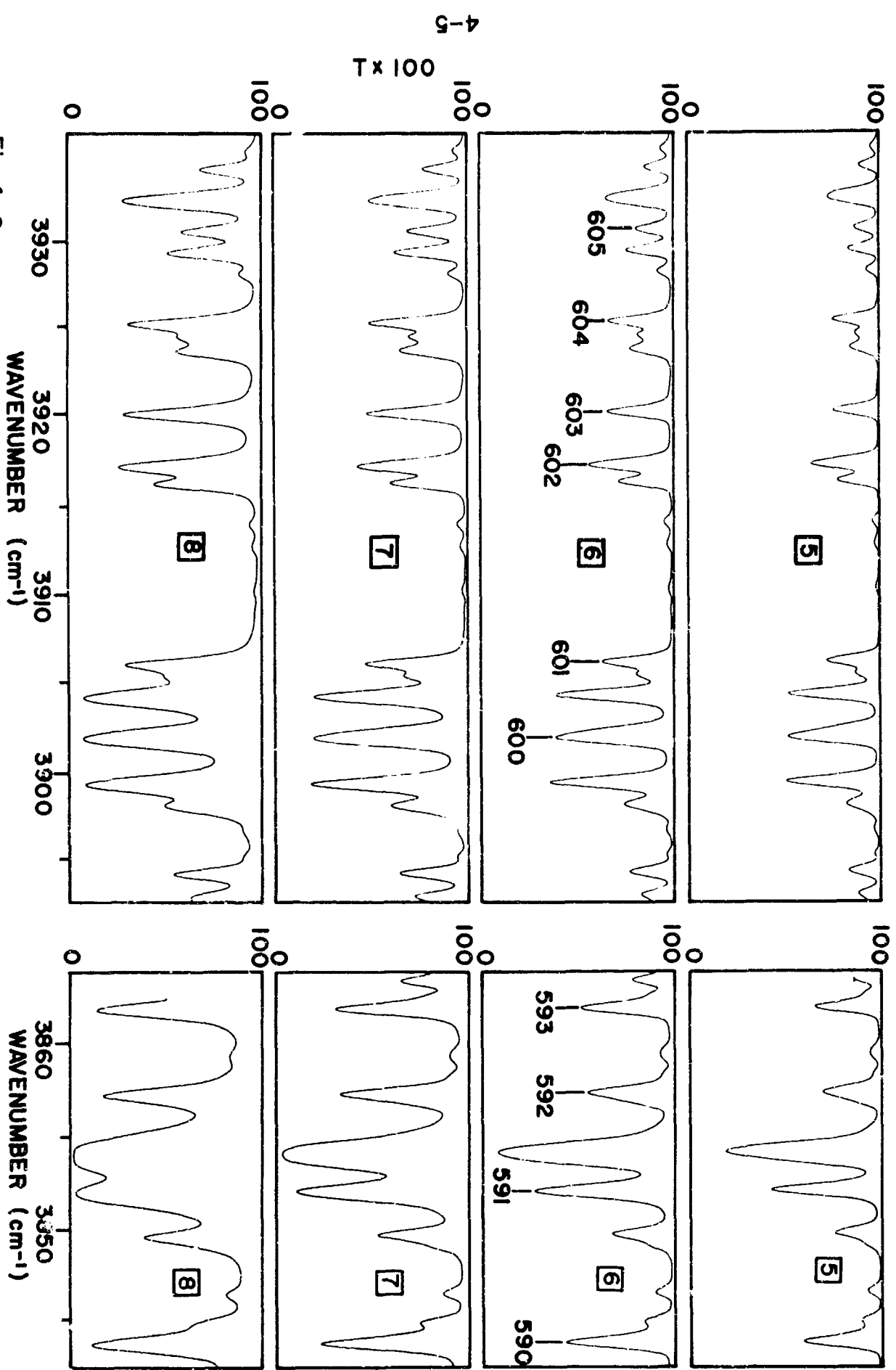


Fig.4-2

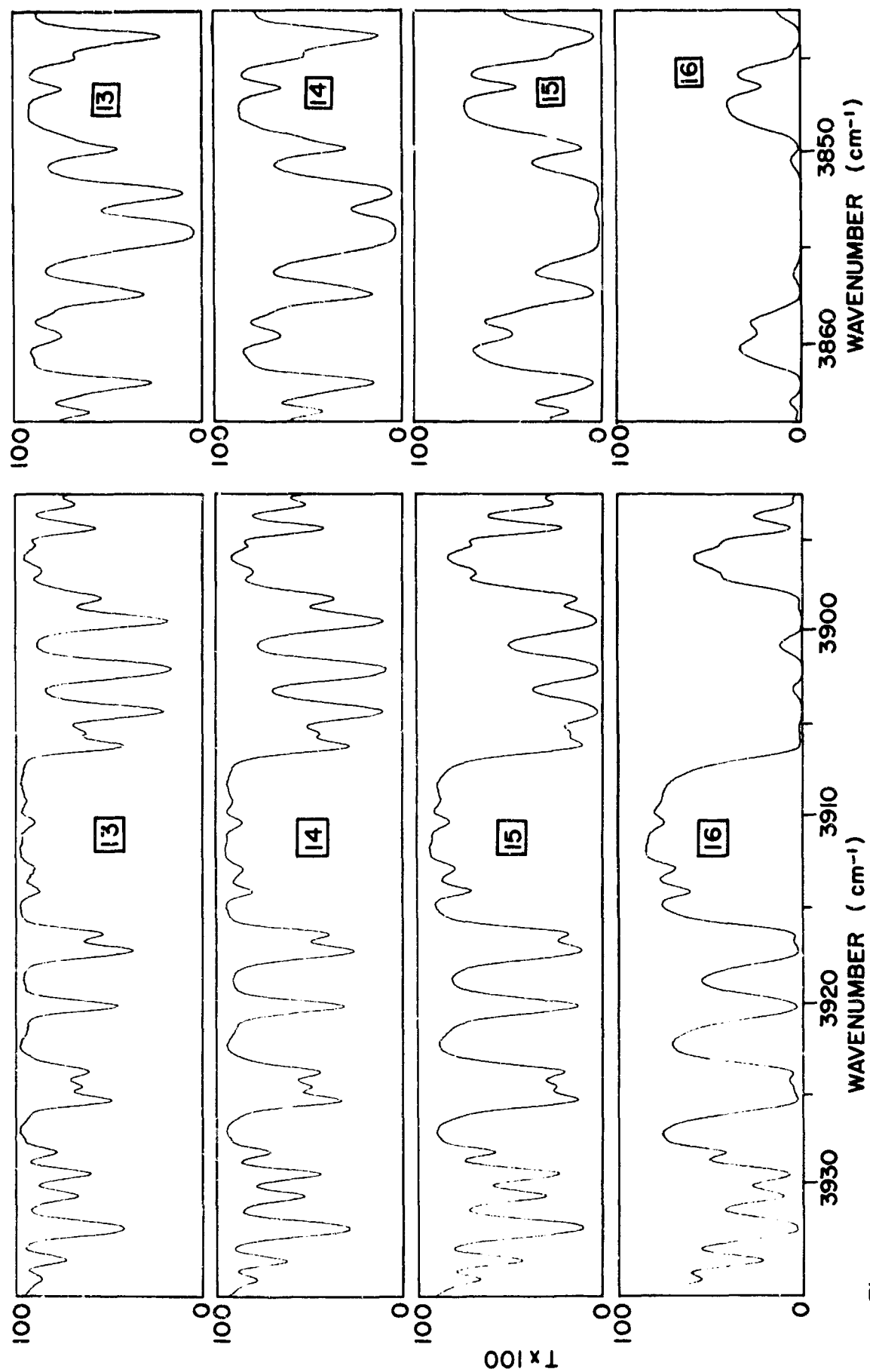


Fig. 4-4

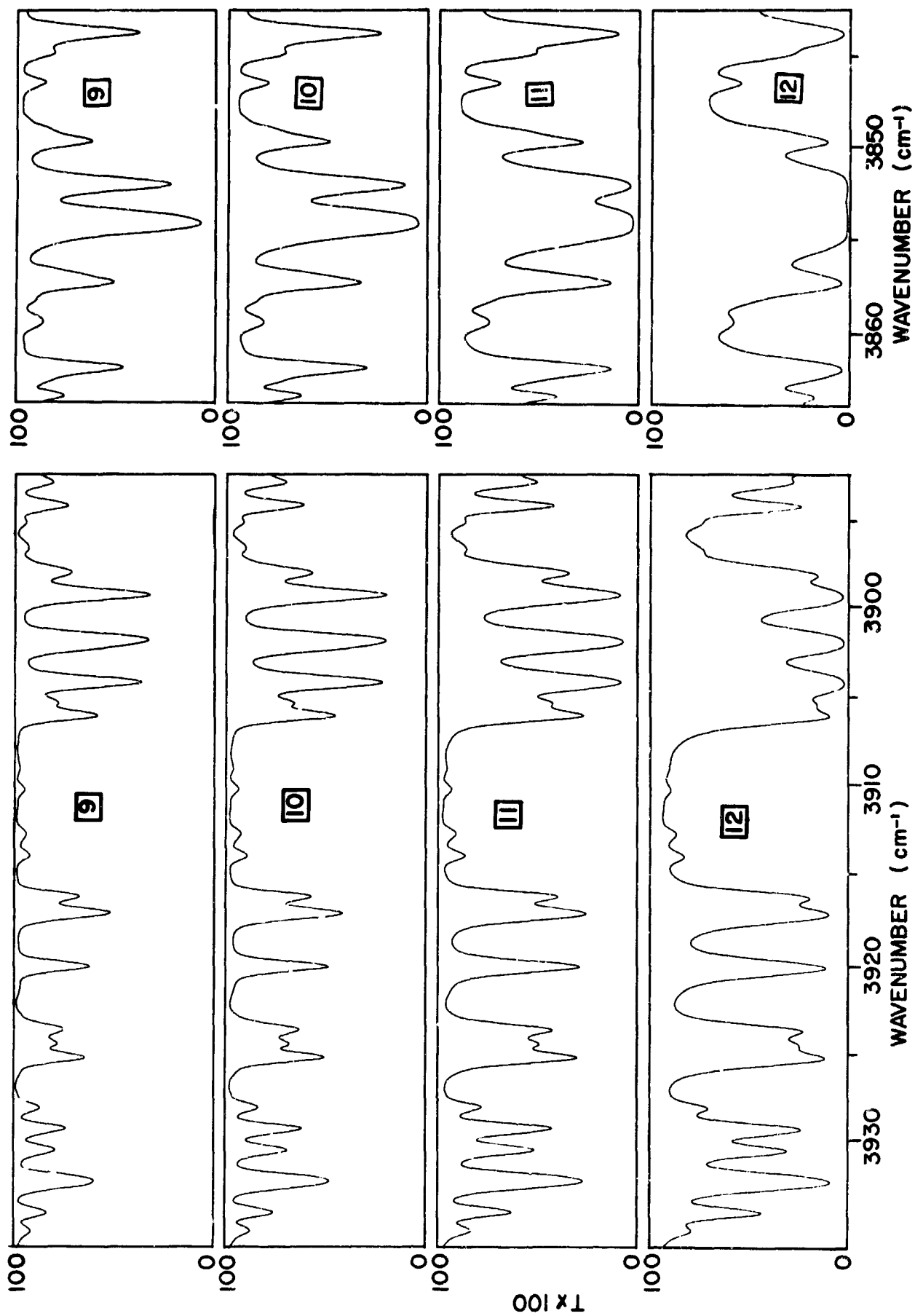


Fig. 4-3

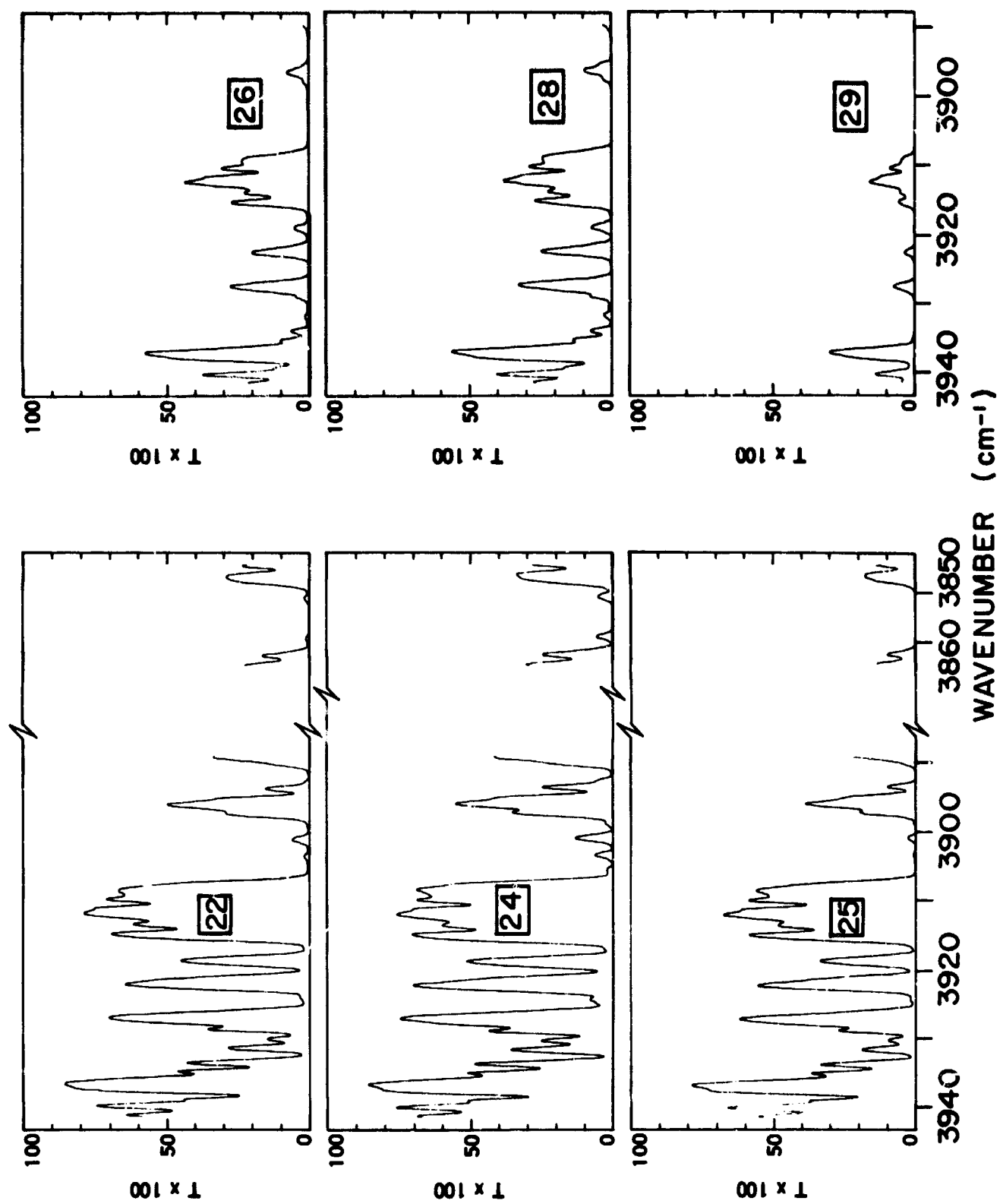


Fig. 4-6

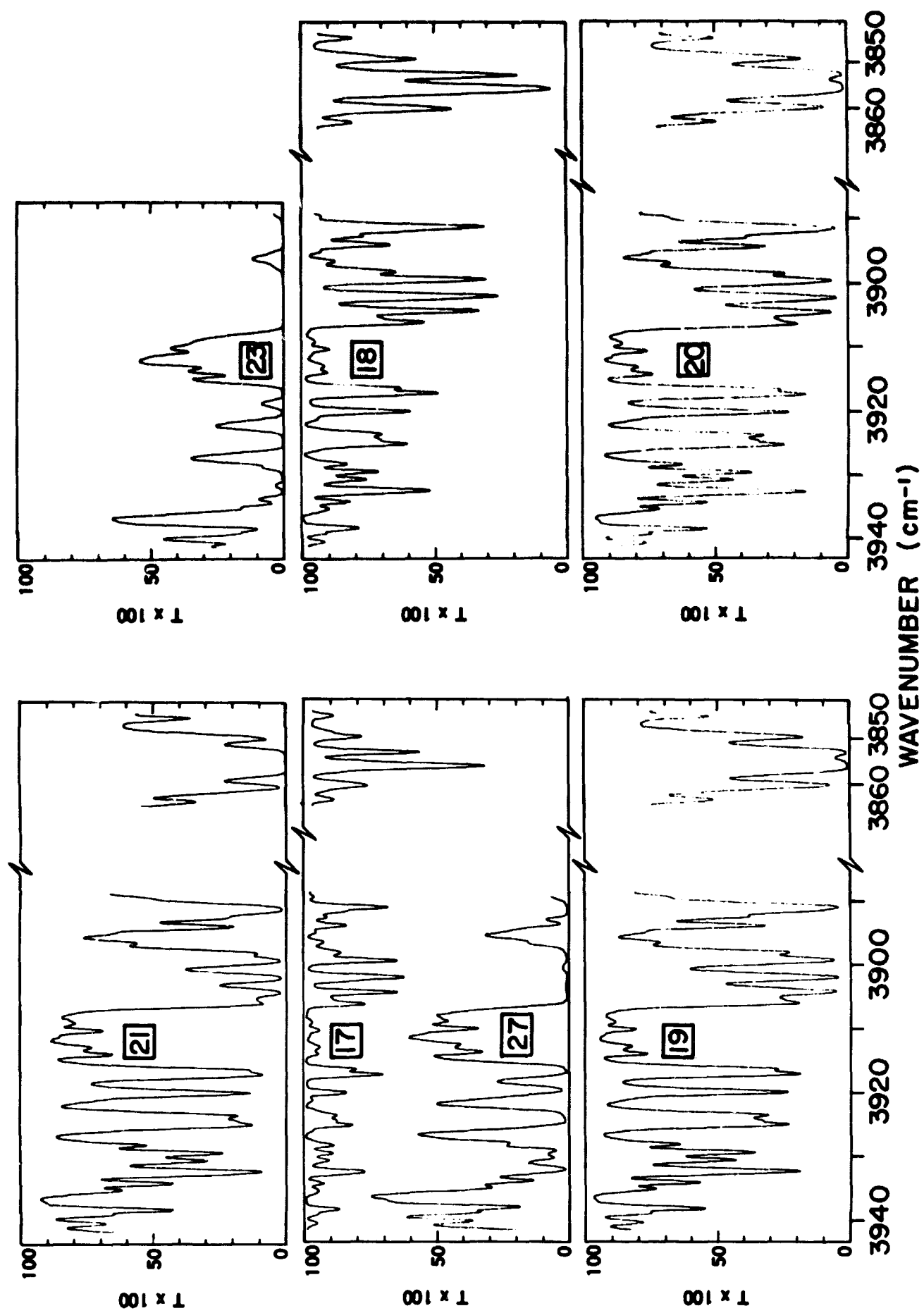


Fig. 4-5

Table 4-2

[illegible]

Table 4-3 $\int A(\nu) d\nu$

Sam. No.	1	2	3	4	5	6	7	8	9	10	11	12
$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}	5.26×10^{-3}	5.26×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}
$P_0(\text{atm})$	2.63×10^{-2}	7.37×10^{-2}	2.97×10^{-1}	1.001×10^0	4.21×10^{-2}	9.42×10^{-2}	2.97×10^{-1}	9.96×10^{-1}	4.21×10^{-2}	9.42×10^{-2}	2.97×10^{-1}	9.96×10^{-1}
$u(\text{gm/cm}^2)$	8.0×10^{-4}	8.0×10^{-4}	8.0×10^{-4}	8.0×10^{-4}	2.60×10^{-3}	2.60×10^{-3}	2.60×10^{-3}	2.60×10^{-3}	7.72×10^{-3}	7.72×10^{-3}	7.72×10^{-3}	7.72×10^{-3}
ν (cm^{-1})	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}
3847.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3847.5	0.002	0.006	0.013	0.022	0.005	0.011	0.020	0.055	0.025	0.027	0.056	0.149
3848.0	0.003	0.015	0.025	0.042	0.010	0.021	0.038	0.113	0.051	0.053	0.112	0.301
3848.5	0.006	0.023	0.038	0.065	0.020	0.039	0.063	0.187	0.089	0.091	0.186	0.482
3849.0	0.014	0.040	0.061	0.099	0.047	0.091	0.122	0.319	0.165	0.179	0.338	0.752
3849.5	0.057	0.085	0.119	0.170	0.116	0.203	0.263	0.568	0.306	0.351	0.610	1.141
3850.0	0.104	0.164	0.225	0.297	0.218	0.322	0.460	0.825	0.466	0.560	0.922	1.559
3850.5	0.119	0.197	0.276	0.382	0.249	0.360	0.547	0.996	0.530	0.653	1.101	1.907
3851.0	0.123	0.211	0.307	0.449	0.262	0.393	0.619	1.208	0.582	0.730	1.290	2.287
3851.5	0.134	0.238	0.361	0.569	0.300	0.491	0.776	1.559	0.704	0.898	1.612	2.742
3852.0	0.217	0.360	0.545	0.852	0.482	0.779	1.133	2.022	1.022	1.267	2.067	3.229
3852.5	0.324	0.568	0.853	1.257	0.698	1.022	1.522	2.482	1.315	1.642	2.529	3.720
3853.0	0.345	0.637	0.996	1.542	0.758	1.128	1.765	2.897	1.451	1.871	2.932	4.208
3853.5	0.394	0.720	1.142	1.802	0.875	1.351	2.057	3.350	1.693	2.182	3.366	4.699
3854.0	0.567	0.981	1.483	2.212	1.189	1.761	2.504	3.834	2.118	2.638	3.849	5.191
3854.5	0.783	1.337	1.917	2.680	1.557	2.152	2.976	4.317	2.542	3.097	4.335	5.683
3855.0	0.856	1.517	2.196	3.062	1.713	2.331	3.354	4.743	2.769	3.420	4.789	6.170
3855.5	0.871	1.559	2.291	3.272	1.758	2.394	3.547	5.040	2.869	3.578	5.127	6.620
3856.0	0.876	1.578	2.332	3.374	1.776	2.426	3.643	5.240	2.921	3.657	5.340	7.003
3856.5	0.884	1.594	2.363	3.445	1.799	2.452	3.720	5.434	2.991	3.677	5.516	7.365
3857.0	0.919	1.643	2.428	3.543	1.884	2.629	3.892	5.752	3.157	3.981	5.809	7.795
3857.5	0.983	1.755	2.594	3.756	2.020	2.814	4.186	6.112	3.383	4.278	6.216	8.256
3858.0	1.012	1.821	2.705	3.913	2.080	2.885	4.339	6.291	3.492	4.429	6.503	8.607
3858.5	1.018	1.837	2.733	3.963	2.101	2.913	4.393	6.388	3.548	4.495	6.641	8.843
3859.0	1.022	1.848	2.750	3.992	2.115	2.936	4.431	6.467	3.591	4.543	6.731	9.034
3859.5	1.031	1.862	2.769	4.020	2.143	2.970	4.480	6.547	3.664	4.619	6.843	9.230
3860.0	1.035	1.873	2.786	4.046	2.162	2.992	4.517	6.617	3.717	4.676	6.942	9.405

Sam. No.	13	14	15	16	17	18	19	20	21	22	24	25
$p(\text{atm})$	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	6.3×10^{-4}	2.6×10^{-3}	5.0×10^{-3}	9.87×10^{-3}	9.89×10^{-3}	9.67×10^{-3}	9.87×10^{-3}	9.83×10^{-3}
$P_0(\text{atm})$	4.21×10^{-2}	9.42×10^{-2}	2.97×10^{-1}	9.96×10^{-1}	3.16×10^{-3}	1.23×10^{-2}	9.30×10^{-2}	4.93×10^{-2}	9.07×10^{-2}	2.91×10^{-1}	4.93×10^{-2}	9.03×10^{-2}
$u(\text{gm/cm}^2)$	2.05×10^{-2}	2.05×10^{-2}	2.05×10^{-2}	2.05×10^{-2}	2.19×10^{-2}	4.30×10^{-2}	4.48×10^{-2}	8.83×10^{-2}	8.87×10^{-2}	8.67×10^{-2}	3.43×10^{-1}	3.41×10^{-1}
ν (cm^{-1})	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}
3847.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3847.5	0.046	0.079	0.135	0.298	0.018	0.032	0.112	0.136	0.200	0.360	0.334	0.414
3848.0	0.088	0.151	0.270	0.603	0.033	0.067	0.224	0.274	0.399	0.724	0.673	0.831
3848.5	0.148	0.235	0.444	0.946	0.055	0.112	0.385	0.453	0.637	1.124	1.046	1.270
3849.0	0.264	0.383	0.723	1.363	0.098	0.215	0.639	0.726	0.949	1.585	1.482	1.746
3849.5	0.460	0.630	1.119	1.839	0.169	0.379	0.799	1.092	1.392	2.077	1.966	2.239
3850.0	0.700	0.953	1.534	2.324	0.266	0.574	1.189	1.684	1.842	2.573	2.454	2.738
3850.5	0.822	1.171	1.861	2.795	0.310	0.675	1.686	1.769	2.243	3.067	2.930	3.238
3851.0	0.925	1.343	2.213	3.277	0.331	0.754	1.991	2.102	2.649	3.562	3.410	3.738
3851.5	1.124	1.604	2.657	3.771	0.376	0.898	2.392	2.510	3.118	4.060	3.904	4.238
3852.0	1.514	2.025	3.143	4.267	0.524	1.216	2.872	2.987	3.612	4.560	4.403	4.738
3852.5	1.910	2.488	3.633	4.764	0.694	1.588	3.363	3.473	4.110	5.060	4.903	5.238
3853.0	2.168	2.880	4.117	5.260	0.749	1.827	3.441	3.546	4.607	5.560	5.403	5.738
3853.5	2.498	3.284	4.607	5.756	0.834	2.073	4.323	4.420	5.104	6.060	5.903	6.238
3854.0	2.959	3.759	5.099	6.254	1.037	2.463	4.817	4.909	5.603	6.560	6.403	6.738
3854.5	3.423	4.244	5.592	6.751	1.358	2.929	5.312	5.399	6.101	7.060	6.903	7.238
3855.0	3.768	4.689	6.081	7.247	1.580	3.345	5.802	5.885	6.599	7.560	7.403	7.738
3855.5	3.960	5.007	6.535	7.743	1.651	3.590	6.238	6.329	7.082	8.060	7.903	8.238
3856.0	4.062	5.201	6.910	8.227	1.678	3.689	6.567	6.662	7.513	8.559	8.403	8.738
3856.5	4.180	5.382	7.239	8.705	1.703	3.766	6.854	6.948	7.933	9.054	8.899	9.238
3857.0	4.427	5.687	7.636	9.196	1.775	3.930	7.228	7.319	8.335	9.551	9.394	9.738
3857.5	4.744	6.083	8.104	9.689	1.884	4.189	7.676	7.764	8.815	10.048	9.890	10.237
3858.0	4.912	6.357	8.521	10.152	1.968	4.414	8.050	8.132	9.251	10.539	10.370	10.732
3858.5	5.001	6.508	8.810	10.555	2.008	4.507	8.354	8.434	9.555	10.994	10.752	11.208
3859.0	5.068	6.615	9.016	10.916	2.034	4.560	8.449	8.543	9.690	11.423	11.155	11.662
3859.5	5.181	6.770	9.247	11.283	2.082	4.643	8.680	8.785	10.165	11.869	11.549	12.133
3860.0	5.262	6.906	9.477	11.625	2.120	4.713	8.854	8.970	10.434	12.281	11.935	12.582

2-35300-0	2-35301-0	2-35302-0	2-35303-0	2-35304-0	2-35305-0	2-35306-0	2-35307-0	2-35308-0	2-35309-0	2-35310-0	2-35311-0	2-35312-0	2-35313-0	2-35314-0	2-35315-0	2-35316-0	2-35317-0	2-35318-0	2-35319-0	2-35320-0	2-35321-0	2-35322-0	2-35323-0	2-35324-0	2-35325-0	2-35326-0	2-35327-0	2-35328-0	2-35329-0	2-35330-0	2-35331-0	2-35332-0	2-35333-0	2-35334-0	2-35335-0	2-35336-0	2-35337-0	2-35338-0	2-35339-0	2-35340-0	2-35341-0	2-35342-0	2-35343-0	2-35344-0	2-35345-0	2-35346-0	2-35347-0	2-35348-0	2-35349-0	2-35350-0	2-35351-0	2-35352-0	2-35353-0	2-35354-0	2-35355-0	2-35356-0	2-35357-0	2-35358-0	2-35359-0	2-35360-0	2-35361-0	2-35362-0	2-35363-0	2-35364-0	2-35365-0	2-35366-0	2-35367-0	2-35368-0	2-35369-0	2-35370-0	2-35371-0	2-35372-0	2-35373-0	2-35374-0	2-35375-0	2-35376-0	2-35377-0	2-35378-0	2-35379-0	2-35380-0	2-35381-0	2-35382-0	2-35383-0	2-35384-0	2-35385-0	2-35386-0	2-35387-0	2-35388-0	2-35389-0	2-35390-0	2-35391-0	2-35392-0	2-35393-0	2-35394-0	2-35395-0	2-35396-0	2-35397-0	2-35398-0	2-35399-0	2-35400-0	2-35401-0	2-35402-0	2-35403-0	2-35404-0	2-35405-0	2-35406-0	2-35407-0	2-35408-0	2-35409-0	2-35410-0	2-35411-0	2-35412-0	2-35413-0	2-35414-0	2-35415-0	2-35416-0	2-35417-0	2-35418-0	2-35419-0	2-35420-0	2-35421-0	2-35422-0	2-35423-0	2-35424-0	2-35425-0	2-35426-0	2-35427-0	2-35428-0	2-35429-0	2-35430-0	2-35431-0	2-35432-0	2-35433-0	2-35434-0	2-35435-0	2-35436-0	2-35437-0	2-35438-0	2-35439-0	2-35440-0	2-35441-0	2-35442-0	2-35443-0	2-35444-0	2-35445-0	2-35446-0	2-35447-0	2-35448-0	2-35449-0	2-35450-0	2-35451-0	2-35452-0	2-35453-0	2-35454-0	2-35455-0	2-35456-0	2-35457-0	2-35458-0	2-35459-0	2-35460-0	2-35461-0	2-35462-0	2-35463-0	2-35464-0	2-35465-0	2-35466-0	2-35467-0	2-35468-0	2-35469-0	2-35470-0	2-35471-0	2-35472-0	2-35473-0	2-35474-0	2-35475-0	2-35476-0	2-35477-0	2-35478-0	2-35479-0	2-35480-0	2-35481-0	2-35482-0	2-35483-0	2-35484-0	2-35485-0	2-35486-0	2-35487-0	2-35488-0	2-35489-0	2-35490-0	2-35491-0	2-35492-0	2-35493-0	2-35494-0	2-35495-0	2-35496-0	2-35497-0	2-35498-0	2-35499-0	2-35500-0	2-35501-0	2-35502-0	2-35503-0	2-35504-0	2-35505-0	2-35506-0	2-35507-0	2-35508-0	2-35509-0	2-35510-0	2-35511-0	2-35512-0	2-35513-0	2-35514-0	2-35515-0	2-35516-0	2-35517-0	2-35518-0	2-35519-0	2-35520-0	2-35521-0	2-35522-0	2-35523-0	2-35524-0	2-35525-0	2-35526-0	2-35527-0	2-35528-0	2-35529-0	2-35530-0	2-35531-0	2-35532-0	2-35533-0	2-35534-0	2-35535-0	2-35536-0	2-35537-0	2-35538-0	2-35539-0	2-35540-0	2-35541-0	2-35542-0	2-35543-0	2-35544-0	2-35545-0	2-35546-0	2-35547-0	2-35548-0	2-35549-0	2-35550-0	2-35551-0	2-35552-0	2-35553-0	2-35554-0	2-35555-0	2-35556-0	2-35557-0	2-35558-0	2-35559-0	2-35560-0	2-35561-0	2-35562-0	2-35563-0	2-35564-0	2-35565-0	2-35566-0	2-35567-0	2-35568-0	2-35569-0	2-35570-0	2-35571-0	2-35572-0	2-35573-0	2-35574-0	2-35575-0	2-35576-0	2-35577-0	2-35578-0	2-35579-0	2-35580-0	2-35581-0	2-35582-0	2-35583-0	2-35584-0	2-35585-0	2-35586-0	2-35587-0	2-35588-0	2-35589-0	2-35590-0	2-35591-0	2-
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Table 4-4

[illegible]

Table 4-5 $\int_0^{\infty} A(\nu) d\nu$

Den. No	1	2	3	4	5	6	7	8	9	10	11	12	13	14
$\rho(\text{cm})$	5.26 $\times 10^{-2}$	5.26 $\times 10^{-2}$	5.26 $\times 10^{-2}$	5.26 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$
$P_0(\text{cm})$	2.63 $\times 10^{-2}$	2.63 $\times 10^{-2}$	2.63 $\times 10^{-2}$	2.63 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$
$\alpha(\text{cm}/\text{cm}^2)$	8.0 $\times 10^{-2}$	8.0 $\times 10^{-2}$	8.0 $\times 10^{-2}$	8.0 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$
ν (cm^{-1})	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}
3005.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3005.5	0.001	0.012	0.011	0.019	0.011	0.013	0.025	0.042	0.025	0.037	0.060	0.111	0.046	0.076
3006.0	0.000	0.021	0.019	0.033	0.016	0.020	0.041	0.079	0.036	0.060	0.113	0.196	0.074	0.127
3006.5	0.000	0.030	0.027	0.048	0.021	0.031	0.060	0.118	0.061	0.091	0.135	0.247	0.124	0.191
3007.0	0.002	0.042	0.038	0.056	0.036	0.047	0.088	0.169	0.093	0.136	0.221	0.347	0.152	0.282
3007.5	0.007	0.057	0.053	0.069	0.051	0.070	0.129	0.254	0.133	0.187	0.305	0.480	0.204	0.362
3008.0	0.030	0.097	0.090	0.107	0.109	0.140	0.292	0.446	0.234	0.327	0.512	0.757	0.432	0.586
3008.5	0.064	0.160	0.150	0.244	0.182	0.259	0.426	0.687	0.363	0.512	0.813	1.207	0.630	0.881
3009.0	0.092	0.214	0.207	0.366	0.259	0.380	0.686	0.991	0.502	0.731	1.114	1.808	0.866	1.266
3009.5	0.106	0.279	0.482	0.456	0.461	0.647	0.961	1.423	0.803	1.146	1.939	2.727	1.219	1.973
3010.0	0.240	0.515	0.697	0.953	0.978	0.793	1.194	1.751	0.980	1.504	1.980	2.723	1.466	1.939
3010.5	0.233	0.541	0.769	1.061	0.994	0.821	1.265	1.916	1.319	1.666	2.443	3.064	1.566	2.117
3011.0	0.232	0.559	0.770	1.113	0.903	0.840	1.317	2.065	1.666	1.633	2.163	3.331	1.603	2.232
3011.5	0.268	0.582	0.811	1.192	0.842	0.910	1.459	2.269	1.127	1.539	2.451	3.711	1.767	2.407
3012.0	0.332	0.716	0.993	1.438	0.832	1.154	1.810	2.711	1.466	1.850	2.826	4.184	2.164	2.774
3012.5	0.440	0.877	1.235	1.763	1.008	1.375	2.114	3.111	1.675	2.197	3.232	4.652	2.461	3.208
3013.0	0.466	0.937	1.334	1.922	1.063	1.450	2.229	3.335	1.773	2.379	3.450	5.031	2.616	3.466
3013.5	0.471	0.955	1.367	1.997	1.070	1.483	2.311	3.534	1.813	2.439	3.633	5.309	2.703	3.667
3014.0	0.500	1.010	1.451	2.131	1.144	1.600	2.529	3.803	1.936	2.607	3.970	5.651	2.919	3.909
3014.5	0.607	1.193	1.702	2.485	1.362	1.767	2.882	4.317	2.213	2.967	4.403	6.332	3.274	4.323
3015.0	0.664	1.278	1.861	2.706	1.616	1.951	3.064	4.617	2.336	3.155	4.709	6.765	3.476	4.654
3015.5	0.660	1.323	1.909	2.815	1.669	2.031	3.209	4.805	2.423	3.303	4.980	7.182	3.653	4.911
3016.0	0.709	1.395	2.012	2.935	1.555	2.130	3.405	5.170	2.579	3.497	5.294	7.615	3.876	5.199
3016.5	0.751	1.474	2.133	3.119	1.631	2.273	3.595	5.424	2.725	3.701	5.572	8.061	4.075	5.496
3017.0	0.755	1.490	2.163	3.171	1.664	2.294	3.677	5.566	2.752	3.757	5.664	8.260	4.120	5.615
3017.5	0.756	1.498	2.174	3.181	1.665	2.299	3.681	5.567	2.761	3.775	5.702	8.291	4.139	5.644
3018.0	0.756	1.504	2.183	3.204	1.666	2.302	3.689	5.573	2.767	3.788	5.727	8.315	4.153	5.669
3018.5	0.756	1.509	2.191	3.215	1.667	2.305	3.685	5.575	2.776	3.801	5.749	8.367	4.169	5.702
3019.0	0.757	1.515	2.198	3.225	1.669	2.310	3.672	5.565	2.785	3.816	5.770	8.416	4.184	5.738
3019.5	0.756	1.521	2.206	3.235	1.671	2.316	3.679	5.604	2.797	3.832	5.791	8.459	4.216	5.800
3020.0	0.768	1.527	2.216	3.245	1.673	2.323	3.685	5.633	2.800	3.847	5.811	8.501	4.238	5.864
3020.5	0.763	1.534	2.225	3.255	1.680	2.333	3.695	5.673	2.805	3.857	5.824	8.547	4.282	5.926
3021.0	0.764	1.540	2.233	3.266	1.683	2.337	3.700	5.690	2.809	3.869	5.840	8.591	4.303	5.964
3021.5	0.765	1.545	2.241	3.272	1.686	2.341	3.704	5.705	2.813	3.881	5.856	8.631	4.317	5.972
3022.0	0.766	1.551	2.248	3.280	1.690	2.344	3.708	5.720	2.816	3.893	5.869	8.669	4.329	5.995
3022.5	0.769	1.557	2.256	3.287	1.696	2.350	3.715	5.740	2.822	3.907	5.887	8.706	4.353	6.028
3023.0	0.773	1.564	2.267	3.300	1.710	2.360	3.724	5.765	2.827	3.922	5.904	8.746	4.387	6.080
3023.5	0.776	1.574	2.276	3.312	1.718	2.367	3.739	5.786	2.831	3.937	5.921	8.789	4.430	6.153
3024.0	0.781	1.583	2.285	3.321	1.733	2.381	3.756	5.816	2.832	3.953	5.936	8.826	4.476	6.227
3024.5	0.785	1.593	2.294	3.333	1.743	2.392	3.774	5.842	2.832	3.968	5.951	8.861	4.511	6.277
3025.0	0.786	1.598	2.297	3.343	1.745	2.394	3.781	5.845	2.834	3.971	5.955	8.865	4.522	6.287
3025.5	0.789	1.605	2.302	3.351	1.747	2.398	3.788	5.850	2.836	3.974	5.959	8.869	4.535	6.296
3026.0	0.803	1.624	2.316	3.367	1.760	2.404	3.825	5.881	2.837	3.989	5.974	8.890	4.602	6.315
3026.5	0.806	1.634	2.326	3.376	1.763	2.407	3.830	5.887	2.837	3.992	5.978	8.894	4.605	6.322
3027.0	0.806	1.639	2.329	3.379	1.764	2.408	3.831	5.888	2.838	3.993	5.979	8.895	4.606	6.323
3027.5	0.807	1.640	2.330	3.380	1.765	2.409	3.832	5.889	2.838	3.994	5.980	8.896	4.607	6.324
3028.0	0.808	1.641	2.331	3.381	1.766	2.410	3.833	5.890	2.839	3.995	5.981	8.897	4.608	6.325
3028.5	0.809	1.642	2.332	3.382	1.767	2.411	3.834	5.891	2.839	3.996	5.982	8.898	4.609	6.326
3029.0	0.810	1.643	2.333	3.383	1.768	2.412	3.835	5.892	2.840	3.997	5.983	8.899	4.610	6.327
3029.5	0.811	1.644	2.334	3.384	1.769	2.413	3.836	5.893	2.840	3.998	5.984	8.900	4.611	6.328
3030.0	0.812	1.645	2.335	3.385	1.770	2.414	3.837	5.894	2.841	3.999	5.985	8.901	4.612	6.329
3030.5	0.813	1.646	2.336	3.386	1.771	2.415	3.838	5.895	2.842	4.000	5.986	8.902	4.613	6.330
3031.0	0.814	1.647	2.337	3.387	1.772	2.416	3.839	5.896	2.843	4.001	5.987	8.903	4.614	6.331
3031.5	0.815	1.648	2.338	3.388	1.773	2.417	3.840	5.897	2.844	4.002	5.988	8.904	4.615	6.332
3032.0	0.816	1.649	2.339	3.389	1.774	2.418	3.841	5.898	2.845	4.003	5.989	8.905	4.616	6.333
3032.5	0.817	1.650	2.340	3.390	1.775	2.419	3.842	5.899	2.846	4.004	5.990	8.906	4.617	6.334
3033.0	0.818	1.651	2.341	3.391	1.776	2.420	3.843	5.900	2.847	4.005	5.991	8.907	4.618	6.335
3033.5	0.819	1.652	2.342	3.392	1.777	2.421	3.844	5.901	2.848	4.006	5.992	8.908	4.619	6.336
3034.0	0.820	1.653	2.343	3.393	1.778	2.422	3.845	5.902	2.849	4.007	5.993	8.909	4.620	6.337
3034.5	0.821	1.654	2.344	3.394	1.779	2.423	3.846	5.903	2.850	4.008	5.994	8.910	4.621	6.338
3035.0	0.822	1.655	2.345	3.395	1.780	2.424	3.847	5.904	2.851	4.009	5.995	8.911	4.622	6.339
3035.5	0.823	1.656	2.346	3.396	1.781	2.425	3.848	5.905	2.852	4.010	5.996	8.912	4.623	6.340
3036.0	0.824	1.657	2.347	3.397	1.782	2.426	3.849	5.906	2.853	4.011	5.997	8.913	4.624	6.341
3036.5	0.825	1.658	2.348	3.398	1.783	2.427	3.850	5.907	2.854	4.012	5.998	8.914	4.625	6.342
3037.0	0.826	1.659	2.349	3.399	1.784	2.428	3.851	5.908	2.855	4.013	5.999	8.915	4.626	6.343
3037.5	0.827	1.660	2.350	3.400	1.785	2.429	3.852	5.909	2.856	4.014	5.999	8.916	4.627	6.344
3038.0	0.828	1.661	2.351	3.401	1.786	2.430	3.853	5.910	2.857	4.015	5.999	8.917	4.628	6.345
3038.5	0.829	1.662	2.352	3.402	1.787	2.431	3.854	5.911	2.858	4.016	5.999	8.918	4.629	6.346
3039.0	0.830	1.663	2.353	3.403	1.788	2.432	3.855	5.912	2.859	4.017	5.999	8.919	4.630	6.347
3039.5	0.831	1.664	2.354	3.404	1.789	2								

Table 4-5 $\int A(\nu) d\nu$ (cont'd)

Sam. No.	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
$p(\text{atm})$	8.42 $\times 10^{-3}$	8.42 $\times 10^{-3}$	8.3 $\times 10^{-3}$	7.6 $\times 10^{-3}$	5.0 $\times 10^{-3}$	9.87 $\times 10^{-3}$	9.89 $\times 10^{-3}$	9.67 $\times 10^{-3}$	9.67 $\times 10^{-3}$	9.87 $\times 10^{-3}$	9.81 $\times 10^{-3}$	9.81 $\times 10^{-3}$	9.49 $\times 10^{-3}$	7.01 $\times 10^{-3}$	2.01 $\times 10^{-3}$
$P_0(\text{atm})$	2.97 $\times 10^{-1}$	9.96 $\times 10^{-1}$	1.16 $\times 10^{-1}$	1.23 $\times 10^{-1}$	9.50 $\times 10^{-2}$	4.93 $\times 10^{-2}$	9.07 $\times 10^{-2}$	2.91 $\times 10^{-1}$	9.09 $\times 10^{-1}$	4.93 $\times 10^{-2}$	9.03 $\times 10^{-2}$	2.92 $\times 10^{-1}$	4.93 $\times 10^{-2}$	1.006 $\times 10^{-1}$	2.08 $\times 10^0$
$\nu(\text{cm}^{-1})$	2.05 $\times 10^{-2}$	2.05 $\times 10^{-2}$	2.19 $\times 10^{-2}$	4.50 $\times 10^{-2}$	4.48 $\times 10^{-2}$	8.85 $\times 10^{-2}$	8.87 $\times 10^{-2}$	8.1 $\times 10^{-2}$	8.87 $\times 10^{-2}$	1.43 $\times 10^{-1}$	3.41 $\times 10^{-1}$	3.41 $\times 10^{-1}$	6.86 $\times 10^{-1}$	6.99 $\times 10^{-1}$	6.97 $\times 10^{-1}$
ν (cm^{-1})	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}	$\nu^{\circ}-1895$ cm^{-1}
3895.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3895.5	0.164	0.269	0.019	0.129	0.294	0.104	0.150	0.289	0.454	0.254	0.319	0.475	0.374	0.460	0.400
3896.0	0.244	0.454	0.030	0.051	0.162	0.192	0.293	0.549	0.307	0.442	0.655	0.340	0.725	0.512	0.770
3896.5	0.169	0.687	0.054	0.130	0.291	0.333	0.476	0.465	1.167	0.794	1.167	1.167	1.116	1.144	1.500
3897.0	0.498	0.962	0.091	0.165	0.629	0.497	0.549	1.221	1.041	1.110	1.430	1.906	1.533	1.872	2.370
3897.5	0.674	1.304	0.110	0.235	0.614	0.677	0.949	1.610	2.319	1.446	1.491	2.199	1.946	2.362	2.900
3898.0	1.091	1.754	0.172	0.379	0.941	0.475	1.131	2.079	2.937	1.911	2.162	2.495	2.462	2.554	3.070
3898.5	1.415	2.239	0.239	0.564	1.321	1.347	1.772	2.575	3.336	2.394	2.637	3.145	2.459	3.156	3.500
3899.0	1.816	2.729	0.303	0.730	1.727	1.736	2.222	3.067	3.616	2.682	3.334	3.494	3.455	3.858	4.100
3899.5	2.115	3.223	0.447	1.074	2.193	2.192	2.712	3.565	4.336	3.376	3.632	4.333	3.451	4.194	4.500
3900.0	2.412	3.712	0.569	1.336	2.567	2.606	3.152	4.059	4.835	3.867	4.324	4.491	4.450	4.894	5.100
3900.5	2.710	4.170	0.698	1.367	2.796	2.668	3.511	4.538	5.136	4.312	4.619	5.110	4.462	5.356	5.500
3901.0	3.010	4.611	0.594	1.479	3.327	3.096	3.437	5.011	5.436	4.753	5.376	5.484	5.432	5.458	5.900
3901.5	3.264	5.084	0.648	1.603	3.374	3.436	4.252	5.500	5.436	5.224	5.921	5.184	5.824	6.154	5.900
3902.0	4.159	5.579	0.806	1.939	3.841	3.992	4.734	5.795	5.836	5.722	5.799	5.444	6.474	6.454	7.270
3902.5	4.594	6.073	0.961	2.243	4.274	4.344	5.214	6.493	7.336	6.214	6.736	7.344	6.402	7.354	7.900
3903.0	4.344	6.555	1.029	2.165	4.571	4.675	5.124	6.997	7.836	6.693	7.242	7.294	7.614	7.456	8.100
3903.5	5.294	7.037	1.072	2.456	4.871	4.361	6.117	7.479	9.336	7.155	7.747	8.344	7.916	8.366	8.500
3904.0	5.126	7.523	1.094	2.647	5.274	5.345	6.456	7.975	9.836	7.654	8.244	8.444	8.412	8.556	9.100
3904.5	5.273	8.014	1.234	2.962	5.738	5.802	6.951	8.472	9.336	8.144	8.741	9.344	8.744	9.354	9.500
3905.0	6.024	8.511	1.354	3.170	6.144	6.205	7.422	9.344	9.836	8.642	9.274	9.444	9.476	9.974	10.100
3905.5	7.333	9.004	1.414	3.122	6.518	6.570	7.449	9.466	10.336	9.130	9.776	10.344	9.404	10.156	10.500
3906.0	7.453	9.444	1.479	3.513	6.304	6.953	8.114	10.362	10.836	9.614	10.272	10.444	10.444	10.444	10.500
3906.5	7.470	9.963	1.561	3.770	7.270	7.323	8.743	10.447	11.336	10.748	11.152	11.152	10.444	11.152	10.500
3907.0	7.493	10.481	1.631	3.765	7.627	7.444	9.055	10.877	11.831	10.444	11.177	11.444	11.327	11.636	10.700
3907.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3908.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3908.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3909.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3909.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3910.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3910.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3911.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3911.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3912.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3912.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3913.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3913.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3914.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3914.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3915.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3915.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3916.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3916.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3917.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3917.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3918.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3918.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3919.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3919.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3920.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3920.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3921.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3921.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3922.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3922.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3923.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3923.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3924.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3924.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3925.0	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3925.5	8.144	10.488	1.533	3.804	7.490	7.575	9.142	11.176	12.324	10.444	11.444	11.444	11.444	12.287	10.500
3926.0	8.144	10.488	1.533	3.804	7.490	7.575									

4.3 CURVES OF GROWTH OF THE $3847\text{-}3860\text{ cm}^{-1}$ REGION

Figure 4-7 shows a plot of $\int A(\nu) d\nu$ versus uP_e for the $3847\text{-}3860\text{ cm}^{-1}$ region. Each curve is drawn through a set of points which represent samples having approximately the same P_e . The parameter uP_e is convenient to use for samples in which most of the absorption lines satisfy the conditions for the well-known strong-line approximation. This occurs when the widely used quantity $Su/2\pi\alpha \gg 1$ for each line. The sample is then opaque within a few half-widths of each line center, and the only change in absorption with increasing u or P_e occurs in the wings of the lines where the absorption is a function of the parameter uP_e .

If all the lines within the interval satisfied the strong-line condition in every sample, all the curves in Fig. 4-7 would be coincident. The curves are seen to not be coincident; instead, they occur in the order of increasing P_e from top to bottom. This systematic deviation from the single curve results from several weak lines which do not satisfy the strong-line conditions and their contribution is more strongly dependent on u than on P_e .

The curves asymptotically approach a maximum value of 13 cm^{-1} , corresponding to complete absorption [$A(\nu) = 1$] over the entire interval. Most of the transmission through a sample in which $\int A(\nu) d\nu$ is only slightly less than 13 cm^{-1} occurs at wavenumbers in the wings of the lines; thus, the absorptance is nearly a function of uP_e , and there is only a small deviation from the strong-line approximation.

The integrated absorptance of a single strong line with the Lorentz shape is proportional to $(uP_e)^{0.5}$. If all the lines in an interval were strong and there were no overlapping, the integrated absorptance of the interval would also have this proportional relationship, and "curves of growth" such as those in Fig. 4-7 would be coincident and have a slope of 0.5. The slopes of all the curves in the figure are seen to be less than 0.5, a result which undoubtedly is due to overlapping, even at low pressures.

Although the curves are not coincident, they are sufficiently close that it is possible to interpolate between them to determine $\int A(\nu) d\nu$ for a wide variety of samples with pressures different from those shown. Care must be exercised in extrapolating the curves to smaller uP_e , since they will diverge more rapidly, and the slopes will increase to a maximum of one as $Su/2\pi\alpha$ decreases.

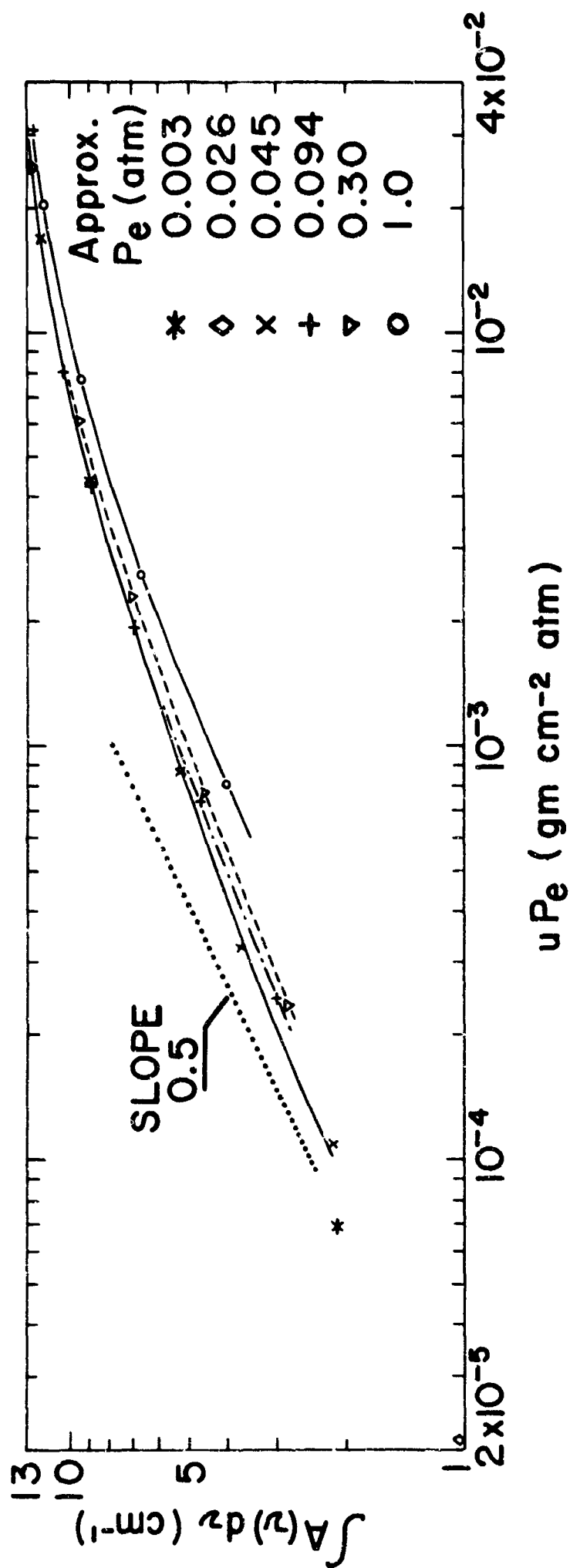


FIG. 4-7

$\int A(v)dv$ VERSUS uP_e FOR THE 3847-3860 cm^{-1} REGION.

Each curve corresponds to the approximate equivalent pressure indicated. No curves are drawn through the points representing samples at 0.003 and 0.026 atm. The dotted curve with a slope of 0.5 is drawn for comparison.

SECTION 5

SAMPLES FOR LINE STRENGTH DETERMINATION

5.1 LINE STRENGTH AND DISCUSSION

The strength of a single absorption line is given by

$$S = \int_0^{\infty} k(\nu) d\nu. \quad (5-1)$$

The absorption coefficient $k(\nu)$ is related to the true transmittance $T'(\nu)$ that would be observed with infinite resolution by

$$T'(\nu) = \exp [-uk(\nu)], \text{ or } -\ln T'(\nu) = uk(\nu). \quad (5-2)$$

By combining these two equations we can relate the line strength to $T'(\nu)$ by

$$S = \frac{1}{u} \int_0^{\infty} -\ln T'(\nu) d\nu. \quad (5-3)$$

As P_e is increased until α is as large or larger than the spectral slitwidth of the spectrometer, the observed transmittance $T(\nu)$ becomes approximately equal to the true transmittance $T'(\nu)$. Under this condition we see that the line strength can be determined from the observable quantity $T(\nu)$ by

$$S = \frac{1}{u} \int_0^{\infty} -\ln T(\nu) d\nu. \quad (5-3a)$$

If $A'(\nu) \equiv 1 - T'(\nu) \ll 1$ for all values of ν being considered, Equation (5-3) can be rewritten as

$$S = \frac{1}{u} \int_0^{\infty} A'(\nu) d\nu. \quad (5-4)$$

It has been shown both theoretically¹⁴ and experimentally² that, under usual spectroscopic conditions,

$$\int A(\nu) d\nu = \int A'(\nu) d\nu, \quad (5-5)$$

provided the integration is carried out over all wavenumbers where there is significant absorption. $A'(\nu)$ and $A(\nu)$ are the true and observed absorptances, respectively. By combining Equations (5-4) and (5-5), we see that the line strength can be determined from $A(\nu)$ by

$$S = \frac{1}{u} \int_0^{\infty} A(\nu) d\nu. \quad (5-4a)$$

At points where several lines contribute to the absorption, the total absorption coefficient is the sum of the coefficients of each of the individual lines. When the conditions for the validity of Equations (5-3a) or (5-4a) are fulfilled, they can also be used to determine the strengths of entire bands by changing the limits of integration.

When the conditions for (5-4a) are satisfied, the absorption is in the so-called linear region. This equation is frequently used to determine the strengths of bands or individual lines; however, we see that it can only be used when $A'(\nu)$ is small. Thus, the accuracy of the measurement is usually limited by the uncertainty in the measurement of the small $A(\nu)$; small errors in the placement of the zero absorptance curve can cause large errors in the values of the strengths which are determined.

When the widths of the lines are sufficiently great that $T'(\nu) \approx T(\nu)$ and Equation (5-3a) is valid, strengths can be determined from spectra in which the absorptance is considerably larger, thus improving the accuracy. Of course, samples in which $T(\nu)$ may be too small must be avoided since $-\ln T(\nu)$ gets large, and small errors in the spectra can cause large errors in the determination of the strengths. Errors arising from the small difference between $T(\nu)$ and $T'(\nu)$ also increase as $T(\nu)$ approaches zero.

The spectra discussed correspond to samples at two different equivalent pressures, approximately 5 and 10 atm, which were used in order to satisfy the conditions for the validity of Equation (5-3a). Thus, the strength of many of the lines can be determined. The samples chosen for a given spectral region provide sufficient absorption that many of the weaker lines can be

observed, yet the absorption is not sufficient for the stronger to be opaque near the centers. Because of the great range in the strengths of the lines within a given region, it would be desirable to have spectra of several different samples covering a wide range of u . But the results here have been limited to one or two samples in a given spectral region because of the large amount of time and effort involved in obtaining and reducing the data. The parameters of the samples discussed in this section are presented in Table 5-1.

The lines in the samples at approximately 10 atm are sufficiently wide that Equation (5-3a) is probably valid for $T(\nu)$ greater than about 0.2 or 0.3. But the lines in the samples at 5 atm are only half as wide, and Equation (5-3a) is probably only valid for $T(\nu)$ greater than approximately 0.7. However, the spectra of the 5 atm samples have the advantage of less overlapping so that many of the weaker lines can still be observed and their strengths estimated. The 10 atm spectra are useful in determining strengths of the stronger lines or of groups of lines; then the 5 atm spectra can be used to determine the contribution of the different lines within the group. It is probable that even 5 atm is too high a pressure for some of the weaker lines adjacent to strong lines; strengths of these lines can be determined more accurately from results at 1 atm which are presented in Section 6.

In the determination of line strengths, it should be borne in mind that much of the structure in the spectra which appears to be composed of a single line actually consists of two or more individual lines which have not been resolved. The positions and approximate strengths of the lines can be obtained from Gates et al.¹

The results are presented in four different groups, each corresponding to a different spectral region with a small amount of overlapping of the four regions. Photographs of the original spectra are shown with the sample number indicated. Following the spectra for each region are tables of transmittance and integrated absorptance which are similar to those presented in Section 4.

Also shown is a table of the quantity $\frac{1}{u} \int_{\nu'}^{\nu} -\ln T(\nu) d\nu$. We see from

Equation (5-2) that this quantity is equivalent to an integrated absorption coefficient $\int K(\nu) d\nu$, where $K(\nu)$ is the sum of the absorption coefficients of all the lines. The lower limit of integration ν' is indicated at the top of the column, and the values are tabulated at intervals of 0.5 cm^{-1} . It is apparent from Equation (5-3a), that the strength of individual lines or groups of lines can be determined from this table by taking the difference between the tabulated values of the integral at the points corresponding to the limits of the region involved.

Since $-\ln T(\nu) \rightarrow \infty$ as $T(\nu) \rightarrow 0$, we wrote the computer program so that values of $-\ln T(\nu) > 10$ are never used in the calculation of the integral. The correct value is used as the integrand if $-\ln T(\nu) \leq 10$; but 10 is used for $-\ln T(\nu) > 10$ ($T(\nu) < 0.0005$). Since $T(\nu) = 0.001$ is the smallest value tabulated, the upper limit of 10 is only applicable at points where $T(\nu)$ is tabulated as 0.000. As pointed out above, a small error in $T(\nu)$ causes a large error in $-\ln T(\nu)$ when $T(\nu)$ is small. Therefore, regions where $T(\nu)$ is small should be avoided when dealing with the tables of $\frac{1}{u} \int -\ln T(\nu) d\nu$. Thus, the limiting of $-\ln T(\nu)$ to values less than or equal to 10 does not effect the usefulness of the table since the places where $-\ln T(\nu)$ is large should not be used anyway. Values were calculated through a few such regions in order to make the table continuous; but it should be emphasized that the tables should not be used over regions where $T(\nu)$ is small.

The greatest source of error in the spectra and tables probably arises from the misplacement of the zero absorptance curve. This is particularly true for the spectral region considered here since the band absorbs over such a wide region. The accuracy depends to a large extent on the distance from a "tie point" where the absorptance is known to be zero, or so small as to be negligible. The error in $A(\nu)$ due to misplacement of the background is probably less than 0.01 at most wavenumbers; although it may be somewhat higher below 3300 cm^{-1} , where the recorder deflection was small and the nearest tie point was a few hundred cm^{-1} away.

5.2 BAND STRENGTHS

Without determining the strengths of the individual absorption lines, we can obtain quite a lot of information about the strengths of the bands in this region from the tables of $\frac{1}{u} \int -\ln T(\nu) d\nu$. The ν_1 and ν_3 bands overlap so much that the contributions of each cannot be determined without considering the absorption by individual lines within each of the bands. We will not do this, but we will determine the combined strengths of the two bands.

Since nearly all the absorption below 3385 cm^{-1} is due to the $2\nu_2$ band, we will consider only the region from 3385 to 4130 cm^{-1} . Values of $\frac{1}{u} \int -\ln T(\nu) d\nu$ were taken from Sample 31 for the 3385 - 3455 cm^{-1} region, Sample 32 for 3455 - 3555 cm^{-1} , Sample 34 for 3555 - 3960 cm^{-1} , and Sample 36 for 3960 - 4130 cm^{-1} . By summing all the values, we obtained $27.4 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$. Approximately 99% of this occurs in the 3555 - 3960 cm^{-1} interval for which Sample 34 was used. We see from the spectrum of this sample that there are places where $T(\nu)$ is as small as approximately 0.10. As

pointed out above, when $T(\nu)$ is this small, $\int -\ln T(\nu)$ will be slightly less than $\int -\ln T'(\nu)$ when the widths of the lines are not several times as great as the spectrometer slitwidth. Thus, we must consider the error which might be introduced, since the half-width of the lines is probably about 1 cm^{-1} and the spectral slitwidth is approximately 0.7 cm^{-1} .

We can get some idea of the error by comparing the values obtained from Samples 33 and 34; both of these samples have the same value of u , and their equivalent pressures are 5 and 10 atm, respectively. We see that $\frac{1}{u} \int -\ln T(\nu) d\nu$ increased by about 7 percent (2.48×10^4 to 2.65×10^4) when the pressure was doubled; most of this increase is probably due to a decrease in the systematic error described in the previous paragraph. Since the value increased by only 7 percent in going from 5 to 10 atm, it is probable that not more than 1 or 2 percent increase would be observed if the pressure were increased further until the structure were smoothed out.

Thus, if we assume a 2 percent increase, we obtain $28 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$ for the combined strengths of the ν_1 and ν_3 bands. The estimated uncertainty is $\pm 1.5 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$. Gates et al¹ used strengths of 2.7×10^4 for ν_1 and 26.3×10^4 for ν_3 in their calculations of line strengths. Their total, 29.0×10^4 , is in good agreement with our results. The value for ν_3 used by Gates et al is based on a measurement of a single line by Jaffe and Benedict.¹⁵

From the results between 2990 and 3385 cm^{-1} , we determined a strength of $3.5 \pm 0.7 \times 10^3 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$ for the $2\nu_2$ band. The relatively large uncertainty is due to the overlapping of the wings of the ν_1 and ν_3 bands and to the possible misplacement of the zero absorbance curve. Our value is considerably larger than 2.2×10^3 , which was used by Gates et al.

5.3 RESULTS

TABLE 5-1
SAMPLE PARAMETERS

Sam. No.	p torr	P torr	P _e [*] torr	p atm	P atm	P _e [*] atm	L Path m	u gm/cm ²
30	6.4	3800	3825	0.00842	5.00	5.03	32.9	0.0205
31	6.4	7600	7625	0.00842	10.00	10.03	32.9	0.0205
32	6.3	7600	7625	0.00829	10.00	10.03	4.16	0.00256
33	4.0	3800	3816	0.00526	5.00	5.02	2.10	0.00080
34	4.0	7600	7616	0.00526	10.00	10.02	2.10	0.00080
35	6.4	3800	3825	0.00842	5.00	5.03	32.9	0.0205
36	6.4	7600	7625	0.00842	10.00	10.03	32.9	0.0205

*P_e = P + 4p in accordance with Equation (3-8) and the results of Section 3. All samples were at room temperature, 296°K.

The regions covered by each sample are as follows:

30 and 31, 2990 - 3580 cm⁻¹
 32, 3430 - 3635 cm⁻¹
 33 and 34, 3540 - 3960 cm⁻¹
 35 and 36, 3935 - 4130 cm⁻¹.

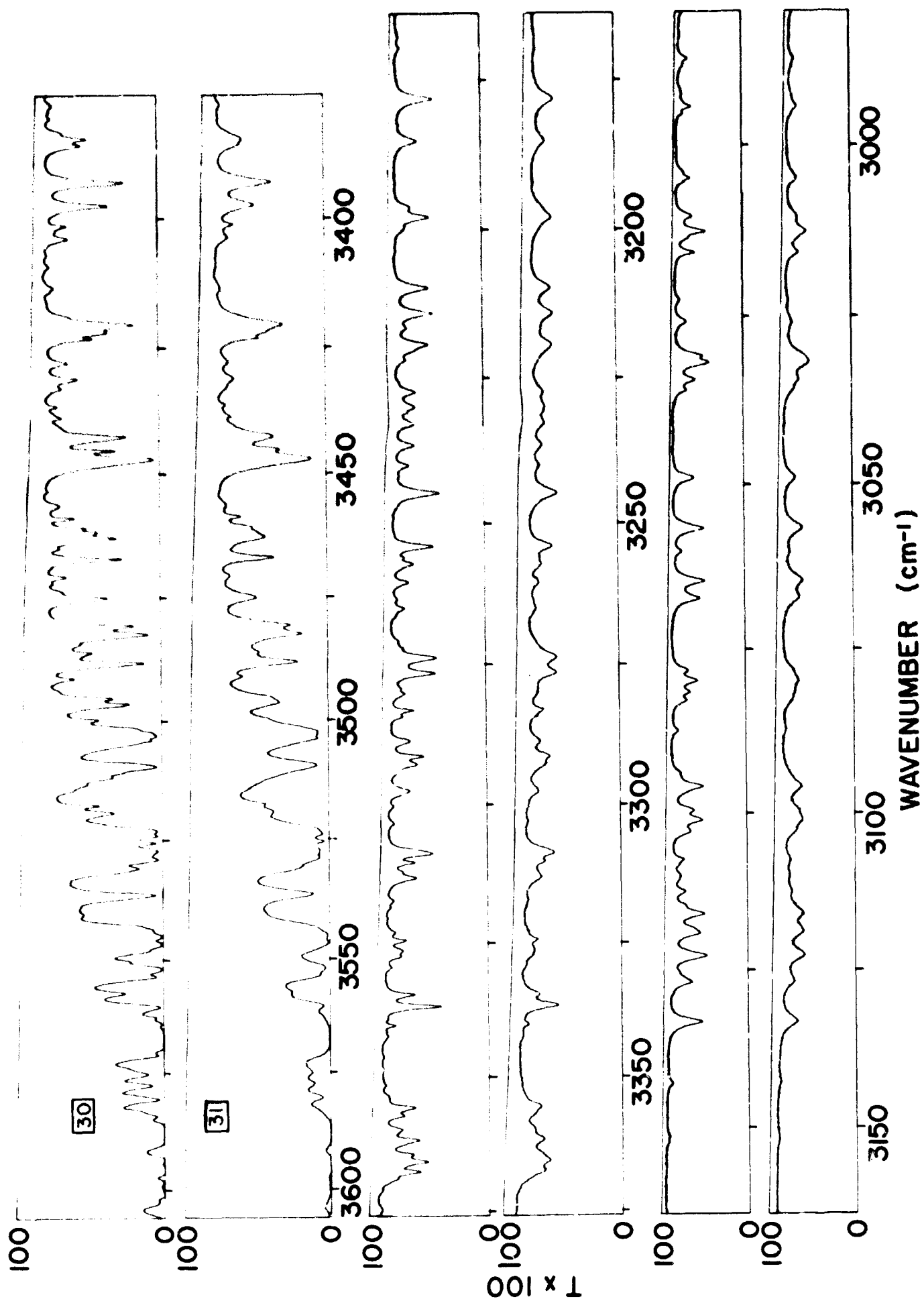


Fig.5-1

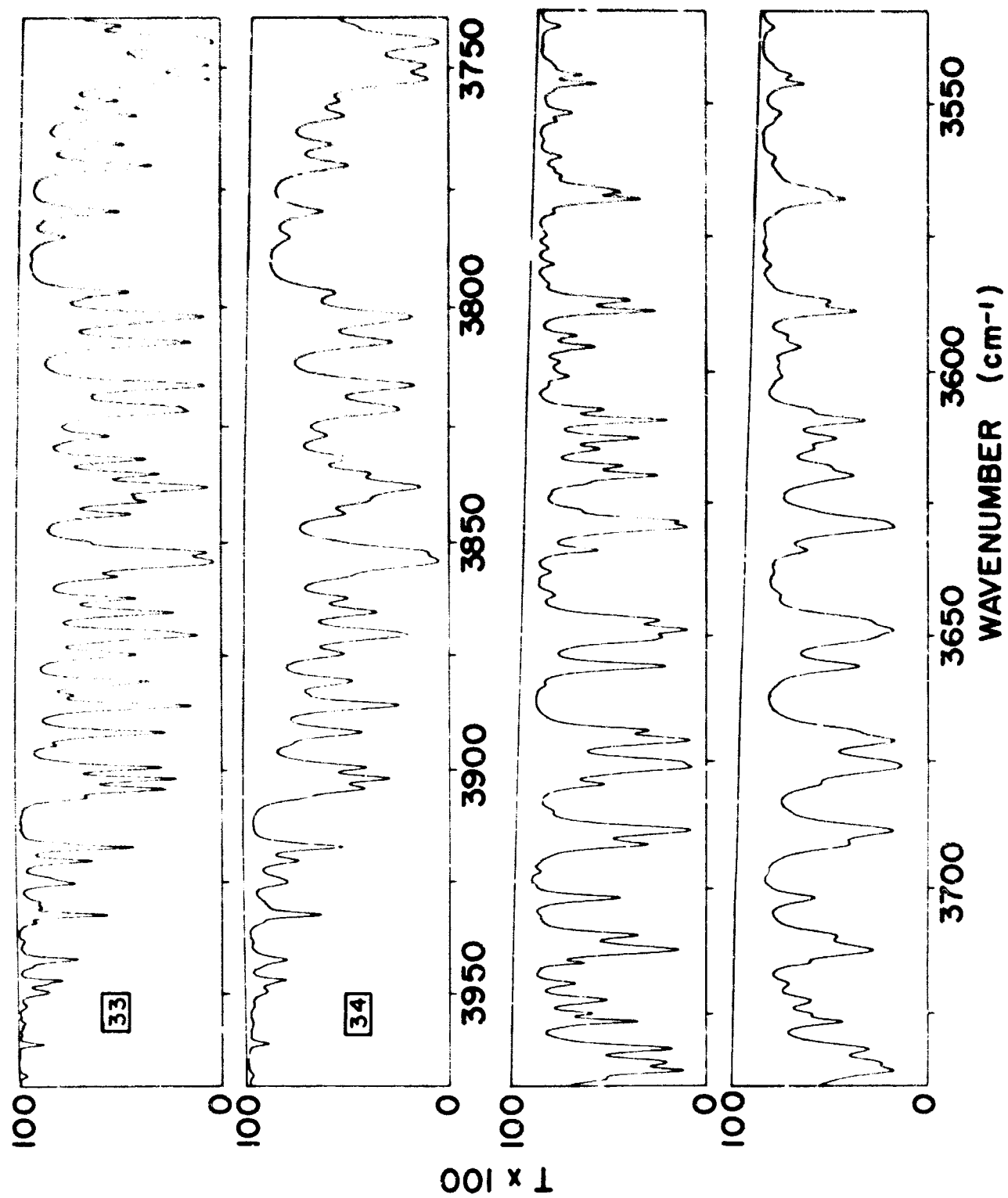


Fig. 5-3

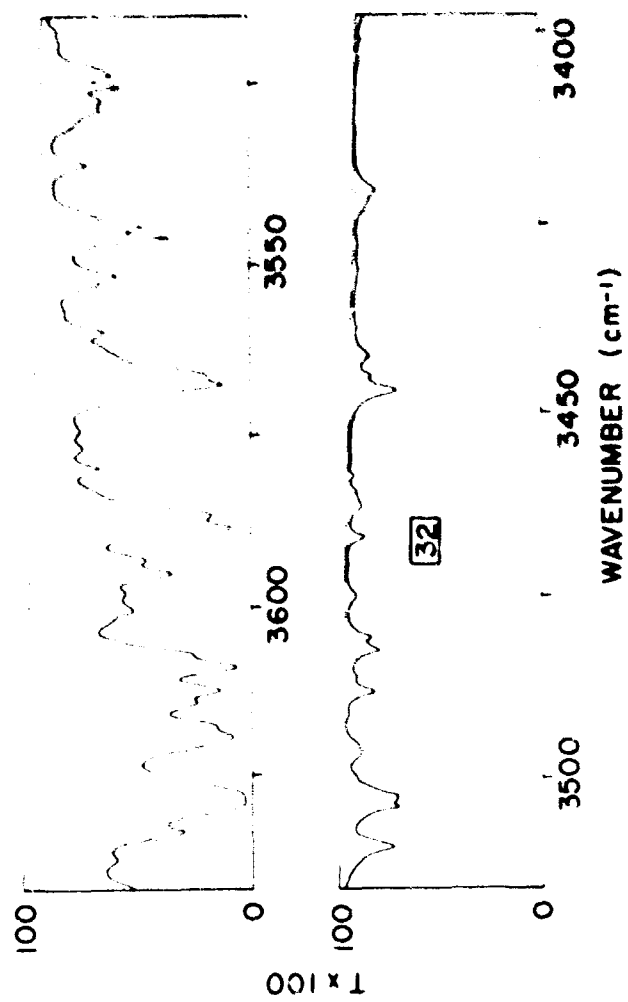


Fig 5-2

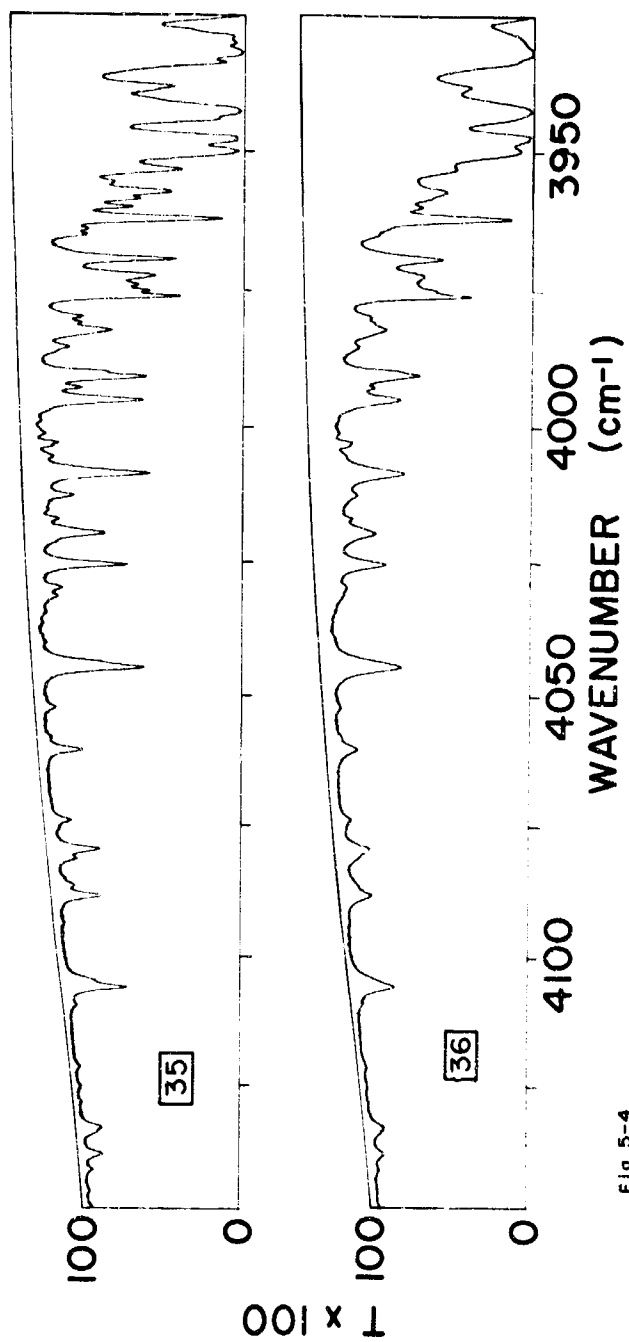


Fig. 5-4

Table 5-2

[illegible]

Table 5-2 (Cont'd)

Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	
3110.0	3.11943	80.7	80.5	3134.0	3.19041	78.1	78.6	3158.0	3.16556	95.3	91.5	3182.0	3.14258	97.1	85.7	3206.0	3.11915	91.7
3110.2	3.11937	81.0	81.1	3134.2	3.19043	78.4	80.3	3158.2	3.16558	95.6	91.1	3182.2	3.14259	97.1	85.7	3206.2	3.11916	91.7
3110.4	3.11930	81.3	81.1	3134.4	3.19043	78.7	80.3	3158.4	3.16560	95.2	91.5	3182.4	3.14260	97.1	85.7	3206.4	3.11917	91.7
3110.6	3.11923	81.6	80.9	3134.6	3.19037	79.0	82.1	3158.6	3.16562	95.0	91.3	3182.6	3.14261	97.1	85.7	3206.6	3.11918	91.7
3110.8	3.11916	81.9	80.2	3134.8	3.19030	79.3	81.7	3158.8	3.16564	94.9	91.2	3182.8	3.14262	97.1	85.7	3206.8	3.11919	91.7
3111.0	3.11909	82.2	79.7	3135.0	3.18979	79.6	85.1	3159.0	3.16566	94.8	91.2	3183.0	3.14263	97.1	85.7	3207.0	3.11920	91.7
3111.2	3.11902	82.5	79.9	3135.2	3.18981	79.8	84.7	3159.2	3.16568	94.7	91.9	3183.2	3.14264	97.1	85.7	3207.2	3.11921	91.7
3111.4	3.11895	82.8	80.6	3135.4	3.18983	80.0	87.0	3159.4	3.16570	94.5	91.7	3183.4	3.14265	97.1	85.7	3207.4	3.11922	91.7
3111.6	3.11888	83.1	79.5	3135.6	3.18985	80.2	87.0	3159.6	3.16572	94.3	91.6	3183.6	3.14266	97.1	85.7	3207.6	3.11923	91.7
3111.8	3.11881	83.4	78.5	3135.8	3.18987	80.4	86.3	3159.8	3.16574	94.1	91.5	3183.8	3.14267	97.1	85.7	3207.8	3.11924	91.7
3112.0	3.11874	83.7	78.0	3136.0	3.18989	80.6	85.3	3160.0	3.16576	94.0	91.3	3184.0	3.14268	97.1	85.7	3208.0	3.11925	91.7
3112.2	3.11867	84.0	78.4	3136.2	3.18991	80.8	84.6	3160.2	3.16578	93.8	91.5	3184.2	3.14269	97.1	85.7	3208.2	3.11926	91.7
3112.4	3.11860	84.3	77.4	3136.4	3.18993	81.0	84.1	3160.4	3.16580	93.6	91.6	3184.4	3.14270	97.1	85.7	3208.4	3.11927	91.7
3112.6	3.11853	84.6	77.4	3136.6	3.18995	81.2	83.6	3160.6	3.16582	93.4	91.6	3184.6	3.14271	97.1	85.7	3208.6	3.11928	91.7
3112.8	3.11846	84.9	76.3	3136.8	3.18997	81.4	83.1	3160.8	3.16584	93.2	91.4	3184.8	3.14272	97.1	85.7	3208.8	3.11929	91.7
3113.0	3.11839	85.2	76.1	3137.0	3.18999	81.6	82.2	3161.0	3.16586	93.0	91.4	3185.0	3.14273	97.1	85.7	3209.0	3.11930	91.7
3113.2	3.11832	85.5	76.1	3137.2	3.19001	81.8	81.7	3161.2	3.16588	92.8	91.7	3185.2	3.14274	97.1	85.7	3209.2	3.11931	91.7
3113.4	3.11825	85.8	76.1	3137.4	3.19003	82.0	81.2	3161.4	3.16590	92.6	91.7	3185.4	3.14275	97.1	85.7	3209.4	3.11932	91.7
3113.6	3.11818	86.1	77.7	3137.6	3.19005	82.2	80.7	3161.6	3.16592	92.4	91.0	3185.6	3.14276	97.1	85.7	3209.6	3.11933	91.7
3113.8	3.11811	86.4	77.7	3137.8	3.19007	82.4	80.2	3161.8	3.16594	92.2	90.9	3185.8	3.14277	97.1	85.7	3209.8	3.11934	91.7
3114.0	3.11804	86.7	76.5	3138.0	3.19009	82.6	80.2	3162.0	3.16596	92.0	90.5	3186.0	3.14278	97.1	85.7	3210.0	3.11935	91.7
3114.2	3.11797	87.0	75.6	3138.2	3.19011	82.8	79.9	3162.2	3.16598	91.8	90.7	3186.2	3.14279	97.1	85.7	3210.2	3.11936	91.7
3114.4	3.11790	87.3	75.6	3138.4	3.19013	83.0	79.4	3162.4	3.16600	91.6	90.7	3186.4	3.14280	97.1	85.7	3210.4	3.11937	91.7
3114.6	3.11783	87.6	75.6	3138.6	3.19015	83.2	78.9	3162.6	3.16602	91.4	90.8	3186.6	3.14281	97.1	85.7	3210.6	3.11938	91.7
3114.8	3.11776	87.9	70.7	3138.8	3.19017	83.4	78.4	3162.8	3.16604	91.2	90.8	3186.8	3.14282	97.1	85.7	3210.8	3.11939	91.7
3115.0	3.11769	88.2	69.6	3139.0	3.19019	83.6	77.9	3163.0	3.16606	91.0	90.8	3187.0	3.14283	97.1	85.7	3211.0	3.11940	91.7
3115.2	3.11762	88.5	67.5	3139.2	3.19021	83.8	77.4	3163.2	3.16608	90.8	90.9	3187.2	3.14284	97.1	85.7	3211.2	3.11941	91.7
3115.4	3.11755	88.8	67.5	3139.4	3.19023	84.0	76.9	3163.4	3.16610	90.6	90.9	3187.4	3.14285	97.1	85.7	3211.4	3.11942	91.7
3115.6	3.11748	89.1	67.5	3139.6	3.19025	84.2	76.4	3163.6	3.16612	90.4	90.8	3187.6	3.14286	97.1	85.7	3211.6	3.11943	91.7
3115.8	3.11741	89.4	67.5	3139.8	3.19027	84.4	75.9	3163.8	3.16614	90.2	90.8	3187.8	3.14287	97.1	85.7	3211.8	3.11944	91.7
3116.0	3.11734	89.7	67.5	3140.0	3.19029	84.6	75.4	3164.0	3.16616	90.0	90.9	3188.0	3.14288	97.1	85.7	3212.0	3.11945	91.7
3116.2	3.11727	90.0	67.5	3140.2	3.19031	84.8	74.9	3164.2	3.16618	89.8	90.8	3188.2	3.14289	97.1	85.7	3212.2	3.11946	91.7
3116.4	3.11720	90.3	67.5	3140.4	3.19033	85.0	74.4	3164.4	3.16620	89.6	90.8	3188.4	3.14290	97.1	85.7	3212.4	3.11947	91.7
3116.6	3.11713	90.6	67.5	3140.6	3.19035	85.2	73.9	3164.6	3.16622	89.4	90.7	3188.6	3.14291	97.1	85.7	3212.6	3.11948	91.7
3116.8	3.11706	90.9	67.5	3140.8	3.19037	85.4	73.4	3164.8	3.16624	89.2	90.7	3188.8	3.14292	97.1	85.7	3212.8	3.11949	91.7
3117.0	3.11699	91.2	67.5	3141.0	3.19039	85.6	72.9	3165.0	3.16626	89.0	90.7	3189.0	3.14293	97.1	85.7	3213.0	3.11950	91.7
3117.2	3.11692	91.5	67.5	3141.2	3.19041	85.8	72.4	3165.2	3.16628	88.8	90.7	3189.2	3.14294	97.1	85.7	3213.2	3.11951	91.7
3117.4	3.11685	91.8	67.5	3141.4	3.19043	86.0	71.9	3165.4	3.16630	88.6	90.7	3189.4	3.14295	97.1	85.7	3213.4	3.11952	91.7
3117.6	3.11678	92.1	67.5	3141.6	3.19045	86.2	71.4	3165.6	3.16632	88.4	90.7	3189.6	3.14296	97.1	85.7	3213.6	3.11953	91.7
3117.8	3.11671	92.4	67.5	3141.8	3.19047	86.4	70.9	3165.8	3.16634	88.2	90.7	3189.8	3.14297	97.1	85.7	3213.8	3.11954	91.7
3118.0	3.11664	92.7	67.5	3142.0	3.19049	86.6	70.4	3166.0	3.16636	88.0	90.7	3190.0	3.14298	97.1	85.7	3214.0	3.11955	91.7
3118.2	3.11657	93.0	67.5	3142.2	3.19051	86.8	69.9	3166.2	3.16638	87.8	90.7	3190.2	3.14299	97.1	85.7	3214.2	3.11956	91.7
3118.4	3.11650	93.3	67.5	3142.4	3.19053	87.0	69.4	3166.4	3.16640	87.6	90.7	3190.4	3.14300	97.1	85.7	3214.4	3.11957	91.7
3118.6	3.11643	93.6	67.5	3142.6	3.19055	87.2	68.9	3166.6	3.16642	87.4	90.7	3190.6	3.14301	97.1	85.7	3214.6	3.11958	91.7
3118.8	3.11636	93.9	67.5	3142.8	3.19057	87.4	68.4	3166.8	3.16644	87.2	90.7	3190.8	3.14302	97.1	85.7	3214.8	3.11959	91.7
3119.0	3.11629	94.2	67.5	3143.0	3.19059	87.6	67.9	3167.0	3.16646	87.0	90.7	3191.0	3.14303	97.1	85.7	3215.0	3.11960	91.7
3119.2	3.11622	94.5	67.5	3143.2	3.19061	87.8	67.4	3167.2	3.16648	86.8	90.7	3191.2	3.14304	97.1	85.7	3215.2	3.11961	91.7
3119.4	3.11615	94.8	67.5	3143.4	3.19063	88.0	66.9	3167.4	3.16650	86.6	90.7	3191.4	3.14305	97.1	85.7	3215.4	3.11962	91.7
3119.6	3.11608	95.1	67.5	3143.6	3.19065	88.2	66.4	3167.6	3.16652	86.4	90.7	3191.6	3.14306	97.1	85.7	3215.6	3.11963	91.7
3119.8	3.11601	95.4	67.5	3143.8	3.19067	88.4	65.9	3167.8	3.16654	86.2	90.7	3191.8	3.14307	97.1	85.7	3215.8	3.11964	91.7
3120.0	3.11594	95.7	67.5	3144.0	3.19069	88.6	65.4	3168.0	3.16656	86.0	90.7	3192.0	3.14308	97.1	85.7	3216.0	3.11965	91.7
3120.2	3.11587	96.0	67.5	3144.2	3.19071	88.8	64.9	3168.2	3.16658	85.8	90.7	3192.2	3.14309	97.1	85.7	3216.2	3.11966	91.7
3120.4	3.11580	96.3	67.5	3144.4	3.19073	89.0	64.4	3168.4	3.16660	85.6	90.7	3192.4	3.14310	97.1	85.7	3216.4	3.11967	91.7
3120.6	3.11573	96.6	67.5	3144.6	3.19075	89.2	63.9	3168.6	3.16662	85.4	90.7	3192.6	3.14311	97.1	85.7	3216.6	3.11968	91.7
3120.8	3.11566	96.9	67.5	3144.8	3.19077	89.4	63.4	3168.8	3.16664	85.2	90.7	3192.8	3.14312	97.1	85.7	3216.8	3.11969	91.7
3121.0	3.11559	97.2	67.5	3145.0	3.19079	89.6	62.9	3169.0	3.16666	85.0	90.7	3193.0	3.14313	97.1	85.7	3217.0	3.11970	91.7
3121.2	3.11552	97.5	67.5	3145.2	3.19081	89.8	62.4	3169.2	3.16668	84.8	90.7	3193.2	3.14314	97.1	85.7	3217.2	3.11971	91.7
3121.4	3.11545	97.8	67.5	3145.4	3.19083	90.0	61.9	3169.4	3.16670	84.6	90.7	3193.4	3.14315	97.1	85.7	3217.4	3.11972	91.7
3121.6	3.11538	98.1	67.5	3145.6	3.19085	90.2	61.4	3169.6	3.16672	84.4	90.7	3193.6	3.14316	97.1	85.7	3217.6	3.11973	91.7
3121.8	3.11531	98.4	67.5	3145.8	3.19087	90.4	60.9	3169.8	3.16674	84.2	90.7	3193.8	3.14317	97.1	85.7	3217.8	3.11974	91.7

Table 5-2 (Cont'd)

[illegible]

Table 5-2 (Cont'd)

Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Group Velocity (10 ¹⁰ cm/sec)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Group Velocity (10 ¹⁰ cm/sec)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Group Velocity (10 ¹⁰ cm/sec)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Group Velocity (10 ¹⁰ cm/sec)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Group Velocity (10 ¹⁰ cm/sec)
3350.0	2.98507	89.3	87.4	3370.0	2.96818	89.3	87.4	3390.0	2.95291	88.3	86.9	3410.0	2.93827	87.2	85.7	3430.0	2.92427	86.1	84.7
3350.2	2.98497	89.3	87.4	3370.2	2.96807	89.3	87.4	3390.2	2.95280	88.3	86.9	3410.2	2.93820	87.2	85.7	3430.2	2.92420	86.1	84.7
3350.4	2.98487	89.3	87.4	3370.4	2.96797	89.3	87.4	3390.4	2.95270	88.3	86.9	3410.4	2.93810	87.2	85.7	3430.4	2.92410	86.1	84.7
3350.6	2.98477	89.3	87.4	3370.6	2.96787	89.3	87.4	3390.6	2.95260	88.3	86.9	3410.6	2.93800	87.2	85.7	3430.6	2.92400	86.1	84.7
3350.8	2.98467	89.3	87.4	3370.8	2.96777	89.3	87.4	3390.8	2.95250	88.3	86.9	3410.8	2.93790	87.2	85.7	3430.8	2.92390	86.1	84.7
3351.0	2.98457	89.3	87.4	3371.0	2.96767	89.3	87.4	3391.0	2.95240	88.3	86.9	3411.0	2.93780	87.2	85.7	3431.0	2.92380	86.1	84.7
3351.2	2.98447	89.3	87.4	3371.2	2.96757	89.3	87.4	3391.2	2.95230	88.3	86.9	3411.2	2.93770	87.2	85.7	3431.2	2.92370	86.1	84.7
3351.4	2.98437	89.3	87.4	3371.4	2.96747	89.3	87.4	3391.4	2.95220	88.3	86.9	3411.4	2.93760	87.2	85.7	3431.4	2.92360	86.1	84.7
3351.6	2.98427	89.3	87.4	3371.6	2.96737	89.3	87.4	3391.6	2.95210	88.3	86.9	3411.6	2.93750	87.2	85.7	3431.6	2.92350	86.1	84.7
3351.8	2.98417	89.3	87.4	3371.8	2.96727	89.3	87.4	3391.8	2.95200	88.3	86.9	3411.8	2.93740	87.2	85.7	3431.8	2.92340	86.1	84.7
3352.0	2.98407	89.3	87.4	3372.0	2.96717	89.3	87.4	3392.0	2.95190	88.3	86.9	3412.0	2.93730	87.2	85.7	3432.0	2.92330	86.1	84.7
3352.2	2.98397	89.3	87.4	3372.2	2.96707	89.3	87.4	3392.2	2.95180	88.3	86.9	3412.2	2.93720	87.2	85.7	3432.2	2.92320	86.1	84.7
3352.4	2.98387	89.3	87.4	3372.4	2.96697	89.3	87.4	3392.4	2.95170	88.3	86.9	3412.4	2.93710	87.2	85.7	3432.4	2.92310	86.1	84.7
3352.6	2.98377	89.3	87.4	3372.6	2.96687	89.3	87.4	3392.6	2.95160	88.3	86.9	3412.6	2.93700	87.2	85.7	3432.6	2.92300	86.1	84.7
3352.8	2.98367	89.3	87.4	3372.8	2.96677	89.3	87.4	3392.8	2.95150	88.3	86.9	3412.8	2.93690	87.2	85.7	3432.8	2.92290	86.1	84.7
3353.0	2.98357	89.3	87.4	3373.0	2.96667	89.3	87.4	3393.0	2.95140	88.3	86.9	3413.0	2.93680	87.2	85.7	3433.0	2.92280	86.1	84.7
3353.2	2.98347	89.3	87.4	3373.2	2.96657	89.3	87.4	3393.2	2.95130	88.3	86.9	3413.2	2.93670	87.2	85.7	3433.2	2.92270	86.1	84.7
3353.4	2.98337	89.3	87.4	3373.4	2.96647	89.3	87.4	3393.4	2.95120	88.3	86.9	3413.4	2.93660	87.2	85.7	3433.4	2.92260	86.1	84.7
3353.6	2.98327	89.3	87.4	3373.6	2.96637	89.3	87.4	3393.6	2.95110	88.3	86.9	3413.6	2.93650	87.2	85.7	3433.6	2.92250	86.1	84.7
3353.8	2.98317	89.3	87.4	3373.8	2.96627	89.3	87.4	3393.8	2.95100	88.3	86.9	3413.8	2.93640	87.2	85.7	3433.8	2.92240	86.1	84.7
3354.0	2.98307	89.3	87.4	3374.0	2.96617	89.3	87.4	3394.0	2.95090	88.3	86.9	3414.0	2.93630	87.2	85.7	3434.0	2.92230	86.1	84.7
3354.2	2.98297	89.3	87.4	3374.2	2.96607	89.3	87.4	3394.2	2.95080	88.3	86.9	3414.2	2.93620	87.2	85.7	3434.2	2.92220	86.1	84.7
3354.4	2.98287	89.3	87.4	3374.4	2.96597	89.3	87.4	3394.4	2.95070	88.3	86.9	3414.4	2.93610	87.2	85.7	3434.4	2.92210	86.1	84.7
3354.6	2.98277	89.3	87.4	3374.6	2.96587	89.3	87.4	3394.6	2.95060	88.3	86.9	3414.6	2.93600	87.2	85.7	3434.6	2.92200	86.1	84.7
3354.8	2.98267	89.3	87.4	3374.8	2.96577	89.3	87.4	3394.8	2.95050	88.3	86.9	3414.8	2.93590	87.2	85.7	3434.8	2.92190	86.1	84.7
3355.0	2.98257	89.3	87.4	3375.0	2.96567	89.3	87.4	3395.0	2.95040	88.3	86.9	3415.0	2.93580	87.2	85.7	3435.0	2.92180	86.1	84.7
3355.2	2.98247	89.3	87.4	3375.2	2.96557	89.3	87.4	3395.2	2.95030	88.3	86.9	3415.2	2.93570	87.2	85.7	3435.2	2.92170	86.1	84.7
3355.4	2.98237	89.3	87.4	3375.4	2.96547	89.3	87.4	3395.4	2.95020	88.3	86.9	3415.4	2.93560	87.2	85.7	3435.4	2.92160	86.1	84.7
3355.6	2.98227	89.3	87.4	3375.6	2.96537	89.3	87.4	3395.6	2.95010	88.3	86.9	3415.6	2.93550	87.2	85.7	3435.6	2.92150	86.1	84.7
3355.8	2.98217	89.3	87.4	3375.8	2.96527	89.3	87.4	3395.8	2.95000	88.3	86.9	3415.8	2.93540	87.2	85.7	3435.8	2.92140	86.1	84.7
3356.0	2.98207	89.3	87.4	3376.0	2.96517	89.3	87.4	3396.0	2.94990	88.3	86.9	3416.0	2.93530	87.2	85.7	3436.0	2.92130	86.1	84.7
3356.2	2.98197	89.3	87.4	3376.2	2.96507	89.3	87.4	3396.2	2.94980	88.3	86.9	3416.2	2.93520	87.2	85.7	3436.2	2.92120	86.1	84.7
3356.4	2.98187	89.3	87.4	3376.4	2.96497	89.3	87.4	3396.4	2.94970	88.3	86.9	3416.4	2.93510	87.2	85.7	3436.4	2.92110	86.1	84.7
3356.6	2.98177	89.3	87.4	3376.6	2.96487	89.3	87.4	3396.6	2.94960	88.3	86.9	3416.6	2.93500	87.2	85.7	3436.6	2.92100	86.1	84.7
3356.8	2.98167	89.3	87.4	3376.8	2.96477	89.3	87.4	3396.8	2.94950	88.3	86.9	3416.8	2.93490	87.2	85.7	3436.8	2.92090	86.1	84.7
3357.0	2.98157	89.3	87.4	3377.0	2.96467	89.3	87.4	3397.0	2.94940	88.3	86.9	3417.0	2.93480	87.2	85.7	3437.0	2.92080	86.1	84.7
3357.2	2.98147	89.3	87.4	3377.2	2.96457	89.3	87.4	3397.2	2.94930	88.3	86.9	3417.2	2.93470	87.2	85.7	3437.2	2.92070	86.1	84.7
3357.4	2.98137	89.3	87.4	3377.4	2.96447	89.3	87.4	3397.4	2.94920	88.3	86.9	3417.4	2.93460	87.2	85.7	3437.4	2.92060	86.1	84.7
3357.6	2.98127	89.3	87.4	3377.6	2.96437	89.3	87.4	3397.6	2.94910	88.3	86.9	3417.6	2.93450	87.2	85.7	3437.6	2.92050	86.1	84.7
3357.8	2.98117	89.3	87.4	3377.8	2.96427	89.3	87.4	3397.8	2.94900	88.3	86.9	3417.8	2.93440	87.2	85.7	3437.8	2.92040	86.1	84.7
3358.0	2.98107	89.3	87.4	3378.0	2.96417	89.3	87.4	3398.0	2.94890	88.3	86.9	3418.0	2.93430	87.2	85.7	3438.0	2.92030	86.1	84.7
3358.2	2.98097	89.3	87.4	3378.2	2.96407	89.3	87.4	3398.2	2.94880	88.3	86.9	3418.2	2.93420	87.2	85.7	3438.2	2.92020	86.1	84.7
3358.4	2.98087	89.3	87.4	3378.4	2.96397	89.3	87.4	3398.4	2.94870	88.3	86.9	3418.4	2.93410	87.2	85.7	3438.4	2.92010	86.1	84.7
3358.6	2.98077	89.3	87.4	3378.6	2.96387	89.3	87.4	3398.6	2.94860	88.3	86.9	3418.6	2.93400	87.2	85.7	3438.6	2.92000	86.1	84.7
3358.8	2.98067	89.3	87.4	3378.8	2.96377	89.3	87.4	3398.8	2.94850	88.3	86.9	3418.8	2.93390	87.2	85.7	3438.8	2.91990	86.1	84.7
3359.0	2.98057	89.3	87.4	3379.0	2.96367	89.3	87.4	3399.0	2.94840	88.3	86.9	3419.0	2.93380	87.2	85.7	3439.0	2.91980	86.1	84.7
3359.2	2.98047	89.3	87.4	3379.2	2.96357	89.3	87.4	3399.2	2.94830	88.3	86.9	3419.2	2.93370	87.2	85.7	3439.2	2.91970	86.1	84.7
3359.4	2.98037	89.3	87.4	3379.4	2.96347	89.3	87.4	3399.4	2.94820	88.3	86.9	3419.4	2.93360	87.2	85.7	3439.4	2.91960	86.1	84.7
3359.6	2.98027	89.3	87.4	3379.6	2.96337	89.3	87.4	3399.6	2.94810	88.3	86.9	3419.6	2.93350	87.2	85.7	3439.6	2.91950	86.1	84.7
3359.8	2.98017	89.3	87.4	3379.8	2.96327	89.3	87.4	3399.8	2.94800	88.3	86.9	3419.8	2.93340	87.2	85.7	3439.8	2.91940	86.1	84.7
3360.0	2.98007	89.3	87.4	3380.0	2.96317	89.3	87.4	3400.0	2.94790	88.3	86.9	3420.0	2.93330	87.2	85.7	3440.0	2.91930	86.1	84.7
3360.2	2.97997	89.3	87.4	3380.2	2.96307	89.3	87.4	3400.2	2.94780	88.3	86.9	3420.2	2.93320	87.2	85.7	3440.2	2.91920	86.1	84.7
3360.4	2.97987	89.3	87.4	3380.4	2.96297	89.3	87.4	3400.4	2.94770	88.3	86.9	3420.4	2.93310	87.2	85.7	3440.4	2.91910	86.1	84.7
3360.6	2.97977	89.3	87.4	3380.6	2.96287	89.3	87.4	3400.6	2.94760	88.3	86.9	3420.6	2.93300	87.2	85.7	3440.6	2.91900	86.1	84.7
3360.8	2.97967	89.3	87.4	3380.8	2.96277	89.3	87.4	3400.8	2.94750	88.3	86.9	3420.8	2.93290	87.2	85.7	3440.8	2.91890	86.1	84.7
3361.0	2.97957	89.3	87.4	3381.0	2.96267	89.3	87.4	3401.0	2.94740	88.3	86.9	3421.0	2.93280	87.2	85.7	3441.0	2.91880	86.1	84.7
3361.2	2.97947	89.3	87.4	3381.2	2.96257	89.3	87.4	3401.2	2.94730	88.3	86.9	3421.2	2.93270	87.2	85.7	3441.2	2.91870	86.1	84.7
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Table 5-2 (Cont'd)

[illegible]

Table 5-3 $\int A(\nu) d\nu$

Wm. No.	30	31	Wm. No.	30	31	Wm. No.	30	31	Wm. No.	30	31	Wm. No.	30	31
$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$
$\rho_e(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_e(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_e(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_e(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_e(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$
$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$
ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$
2700.0	0.000	0.000	3050.0	7.607	7.972	3110.0	19.930	19.967	3170.0	26.316	26.327	3230.0	36.236	36.243
2700.5	0.001	0.000	3050.5	7.609	8.035	3110.5	19.934	19.957	3170.5	26.360	26.367	3230.5	36.164	36.227
2701.0	0.000	0.000	3051.0	7.701	8.089	3111.0	19.946	19.955	3171.0	26.398	26.396	3231.0	36.267	36.237
2701.5	0.000	0.000	3051.5	7.771	8.140	3111.5	19.939	19.955	3171.5	26.431	26.407	3231.5	36.255	36.238
2702.0	0.000	0.000	3052.0	7.770	8.191	3112.0	19.931	19.961	3172.0	26.442	26.417	3232.0	36.433	36.255
2702.5	0.000	0.000	3052.5	7.802	8.239	3112.5	19.930	19.971	3172.5	26.493	26.490	3232.5	36.533	36.241
2703.0	0.000	0.000	3053.0	7.834	8.286	3113.0	19.931	19.981	3173.0	26.543	26.544	3233.0	36.600	36.258
2703.5	0.000	0.000	3053.5	7.866	8.338	3113.5	19.934	19.989	3173.5	26.593	26.598	3233.5	36.781	36.265
2704.0	0.000	0.000	3054.0	7.898	8.390	3114.0	19.937	19.998	3174.0	26.643	26.601	3234.0	36.859	36.258
2704.5	0.000	0.000	3054.5	7.930	8.437	3114.5	19.938	20.006	3174.5	26.694	26.617	3234.5	36.923	36.263
2705.0	0.000	0.000	3055.0	7.992	8.535	3115.0	19.975	20.010	3175.0	26.675	26.676	3235.0	36.967	36.272
2705.5	0.000	0.000	3055.5	8.070	8.634	3115.5	19.975	20.016	3175.5	26.718	26.718	3235.5	37.055	36.277
2706.0	0.000	0.000	3056.0	8.204	8.735	3116.0	19.975	20.021	3176.0	26.760	26.760	3236.0	37.122	36.281
2706.5	0.000	0.000	3056.5	8.418	8.829	3116.5	19.977	20.026	3176.5	26.822	26.822	3236.5	37.236	36.287
2707.0	0.000	0.000	3057.0	8.604	8.974	3117.0	19.977	20.030	3177.0	26.892	26.892	3237.0	37.379	36.286
2707.5	0.000	0.000	3057.5	8.718	9.103	3117.5	19.980	20.038	3177.5	27.000	27.000	3237.5	37.484	36.292
2708.0	0.000	0.000	3058.0	8.790	9.287	3118.0	19.978	20.038	3178.0	27.180	27.180	3238.0	37.558	36.291
2708.5	0.000	0.000	3058.5	8.847	9.367	3118.5	20.000	20.030	3178.5	27.408	27.408	3238.5	37.623	36.290
2709.0	0.000	0.000	3059.0	8.901	9.438	3119.0	20.035	20.030	3179.0	27.574	27.574	3239.0	37.683	36.289
2709.5	0.000	0.000	3059.5	8.960	9.516	3119.5	20.050	20.030	3179.5	27.678	27.678	3239.5	37.752	36.285
3000.0	0.000	0.000	3060.0	9.047	9.596	3120.0	20.089	20.030	3180.0	27.753	27.753	3240.0	37.850	36.280
3000.5	0.000	0.000	3060.5	9.115	9.676	3120.5	20.083	20.030	3180.5	27.811	27.811	3240.5	37.967	36.279
3001.0	0.000	0.000	3061.0	9.169	9.751	3121.0	20.077	20.030	3181.0	27.860	27.860	3241.0	38.051	36.278
3001.5	0.000	0.000	3061.5	9.218	9.821	3121.5	20.076	20.030	3181.5	27.909	27.909	3241.5	38.124	36.277
3002.0	0.000	0.000	3062.0	9.263	9.891	3122.0	20.122	20.030	3182.0	27.958	27.958	3242.0	38.198	36.276
3002.5	0.000	0.000	3062.5	9.313	9.970	3122.5	20.133	20.030	3182.5	28.009	28.009	3242.5	38.271	36.275
3003.0	0.000	0.000	3063.0	9.373	10.062	3123.0	20.158	20.030	3183.0	28.062	28.062	3243.0	38.343	36.274
3003.5	0.000	0.000	3063.5	9.438	10.170	3123.5	20.157	20.030	3183.5	28.116	28.116	3243.5	38.425	36.273
3004.0	0.000	0.000	3064.0	9.503	10.284	3124.0	20.156	20.030	3184.0	28.170	28.170	3244.0	38.507	36.272
3004.5	0.000	0.000	3064.5	9.569	10.404	3124.5	20.156	20.030	3184.5	28.224	28.224	3244.5	38.589	36.271
3005.0	0.000	0.000	3065.0	9.635	10.529	3125.0	20.156	20.030	3185.0	28.278	28.278	3245.0	38.671	36.270
3005.5	0.000	0.000	3065.5	9.701	10.658	3125.5	20.156	20.030	3185.5	28.332	28.332	3245.5	38.753	36.269
3006.0	0.000	0.000	3066.0	9.767	10.787	3126.0	20.156	20.030	3186.0	28.386	28.386	3246.0	38.835	36.268
3006.5	0.000	0.000	3066.5	9.833	10.916	3126.5	20.156	20.030	3186.5	28.440	28.440	3246.5	38.917	36.267
3007.0	0.000	0.000	3067.0	9.899	11.045	3127.0	20.156	20.030	3187.0	28.494	28.494	3247.0	38.999	36.266
3007.5	0.000	0.000	3067.5	9.965	11.174	3127.5	20.156	20.030	3187.5	28.548	28.548	3247.5	39.081	36.265
3008.0	0.000	0.000	3068.0	10.031	11.303	3128.0	20.156	20.030	3188.0	28.602	28.602	3248.0	39.163	36.264
3008.5	0.000	0.000	3068.5	10.097	11.432	3128.5	20.156	20.030	3188.5	28.656	28.656	3248.5	39.245	36.263
3009.0	0.000	0.000	3069.0	10.163	11.561	3129.0	20.156	20.030	3189.0	28.710	28.710	3249.0	39.327	36.262
3009.5	0.000	0.000	3069.5	10.229	11.690	3129.5	20.156	20.030	3189.5	28.764	28.764	3249.5	39.409	36.261
3010.0	0.000	0.000	3070.0	10.295	11.819	3130.0	20.156	20.030	3190.0	28.818	28.818	3250.0	39.491	36.260
3010.5	0.000	0.000	3070.5	10.361	11.948	3130.5	20.156	20.030	3190.5	28.872	28.872	3250.5	39.573	36.259
3011.0	0.000	0.000	3071.0	10.427	12.077	3131.0	20.156	20.030	3191.0	28.926	28.926	3251.0	39.655	36.258
3011.5	0.000	0.000	3071.5	10.493	12.206	3131.5	20.156	20.030	3191.5	28.980	28.980	3251.5	39.737	36.257
3012.0	0.000	0.000	3072.0	10.559	12.335	3132.0	20.156	20.030	3192.0	29.034	29.034	3252.0	39.819	36.256
3012.5	0.000	0.000	3072.5	10.625	12.464	3132.5	20.156	20.030	3192.5	29.088	29.088	3252.5	39.901	36.255
3013.0	0.000	0.000	3073.0	10.691	12.593	3133.0	20.156	20.030	3193.0	29.142	29.142	3253.0	39.983	36.254
3013.5	0.000	0.000	3073.5	10.757	12.722	3133.5	20.156	20.030	3193.5	29.196	29.196	3253.5	40.065	36.253
3014.0	0.000	0.000	3074.0	10.823	12.851	3134.0	20.156	20.030	3194.0	29.250	29.250	3254.0	40.147	36.252
3014.5	0.000	0.000	3074.5	10.889	12.980	3134.5	20.156	20.030	3194.5	29.304	29.304	3254.5	40.229	36.251
3015.0	0.000	0.000	3075.0	10.955	13.109	3135.0	20.156	20.030	3195.0	29.358	29.358	3255.0	40.311	36.250
3015.5	0.000	0.000	3075.5	11.021	13.238	3135.5	20.156	20.030	3195.5	29.412	29.412	3255.5	40.393	36.249
3016.0	0.000	0.000	3076.0	11.087	13.367	3136.0	20.156	20.030	3196.0	29.466	29.466	3256.0	40.475	36.248
3016.5	0.000	0.000	3076.5	11.153	13.496	3136.5	20.156	20.030	3196.5	29.520	29.520	3256.5	40.557	36.247
3017.0	0.000	0.000	3077.0	11.219	13.625	3137.0	20.156	20.030	3197.0	29.574	29.574	3257.0	40.639	36.246
3017.5	0.000	0.000	3077.5	11.285	13.754	3137.5	20.156	20.030	3197.5	29.628	29.628	3257.5	40.721	36.245
3018.0	0.000	0.000	3078.0	11.351	13.883	3138.0	20.156	20.030	3198.0	29.682	29.682	3258.0	40.803	36.244
3018.5	0.000	0.000	3078.5	11.417	14.012	3138.5	20.156	20.030	3198.5	29.736	29.736	3258.5	40.885	36.243
3019.0	0.000	0.000	3079.0	11.483	14.141	3139.0	20.156	20.030	3199.0	29.790	29.790	3259.0	40.967	36.242
3019.5	0.000	0.000	3079.5	11.549	14.270	3139.5	20.156	20.030	3199.5	29.844	29.844	3259.5	41.049	36.241
3020.0	0.000	0.000	3080.0	11.615	14.399	3140.0	20.156	20.030	3200.0	29.898	29.898	3260.0	41.131	36.240
3020.5	0.000	0.000	3080.5	11.681	14.528	3140.5	20.156	20.030	3200.5	29.952	29.952	3260.5	41.213	36.239
3021.0	0.000	0.000	3081.0	11.747	14.657	3141.0	20.156	20.030	3201.0	30.006	30.006	3261.0	41.295	36.238
3021.5	0.000	0.000	3081.5	11.813	14.786	3141.5	20.156	20.030	3201.5	30.060	30.060	3261.5	41.377	36.237
3022.0	0.000	0.000	3082.0	11.879	14.915	3142.0	20.156	20.030	3202.0	30.114	30.114	3262.0	41.459	36.236
3022.5	0.000	0.000	3082.5	11.945	15.044	3142.5	20.156	20.030	3202.5	30.168				

Table 5-3 $\int A(\nu) d\nu$ (cont'd)

ν	2990	2980	2970	2960	2950	2940	2930	2920	2910	2900	2890	2880	2870	2860	2850	2840	2830	2820	2810	2800
3290.0	47.221	51.073	55.025	59.087	63.267	67.563	71.974	76.499	81.137	85.887	90.749	95.723	100.810	105.910	111.022	116.246	121.582	127.030	132.589	138.260
3290.5	47.225	51.077	55.029	59.091	63.271	67.567	71.978	76.503	81.141	85.891	90.753	95.727	100.814	105.914	111.026	116.250	121.586	127.034	132.593	138.264
3291.0	47.229	51.081	55.033	59.093	63.273	67.569	71.980	76.505	81.143	85.893	90.755	95.729	100.816	105.916	111.028	116.252	121.588	127.036	132.595	138.266
3291.5	47.233	51.085	55.037	59.097	63.277	67.573	71.984	76.509	81.147	85.897	90.759	95.733	100.820	105.920	111.032	116.256	121.592	127.040	132.599	138.270
3292.0	47.237	51.089	55.041	59.101	63.281	67.577	71.988	76.513	81.151	85.901	90.763	95.737	100.824	105.924	111.036	116.260	121.596	127.044	132.603	138.274
3292.5	47.241	51.093	55.045	59.105	63.285	67.581	71.992	76.517	81.155	85.905	90.767	95.741	100.828	105.928	111.040	116.264	121.600	127.048	132.607	138.278
3293.0	47.245	51.097	55.049	59.109	63.289	67.585	71.996	76.521	81.159	85.909	90.771	95.745	100.832	105.932	111.044	116.268	121.604	127.052	132.611	138.282
3293.5	47.249	51.101	55.053	59.113	63.293	67.589	71.999	76.525	81.163	85.913	90.775	95.749	100.836	105.936	111.048	116.272	121.608	127.056	132.615	138.286
3294.0	47.253	51.105	55.057	59.117	63.297	67.593	72.003	76.529	81.167	85.917	90.779	95.753	100.840	105.940	111.052	116.276	121.612	127.060	132.619	138.290
3294.5	47.257	51.109	55.061	59.121	63.301	67.597	72.007	76.533	81.171	85.921	90.783	95.757	100.844	105.944	111.056	116.280	121.616	127.064	132.623	138.294
3295.0	47.261	51.113	55.065	59.125	63.305	67.601	72.011	76.537	81.175	85.925	90.787	95.761	100.848	105.948	111.060	116.284	121.620	127.068	132.627	138.298
3295.5	47.265	51.117	55.069	59.129	63.309	67.605	72.015	76.541	81.179	85.929	90.791	95.765	100.852	105.952	111.064	116.288	121.624	127.072	132.631	138.302
3296.0	47.269	51.121	55.073	59.133	63.313	67.609	72.019	76.545	81.183	85.933	90.795	95.769	100.856	105.956	111.068	116.292	121.628	127.076	132.635	138.306
3296.5	47.273	51.125	55.077	59.137	63.317	67.613	72.023	76.549	81.187	85.937	90.799	95.773	100.860	105.960	111.072	116.296	121.632	127.080	132.639	138.310
3297.0	47.277	51.129	55.081	59.141	63.321	67.617	72.027	76.553	81.191	85.941	90.803	95.777	100.864	105.964	111.076	116.300	121.636	127.084	132.643	138.314
3297.5	47.281	51.133	55.085	59.145	63.325	67.621	72.031	76.557	81.195	85.945	90.807	95.781	100.868	105.968	111.080	116.304	121.640	127.088	132.647	138.318
3298.0	47.285	51.137	55.089	59.149	63.329	67.625	72.035	76.561	81.199	85.949	90.811	95.785	100.872	105.972	111.084	116.308	121.644	127.092	132.651	138.322
3298.5	47.289	51.141	55.093	59.153	63.333	67.629	72.039	76.565	81.203	85.953	90.815	95.789	100.876	105.976	111.088	116.312	121.648	127.096	132.655	138.326
3299.0	47.293	51.145	55.097	59.157	63.337	67.633	72.043	76.569	81.207	85.957	90.819	95.793	100.880	105.980	111.092	116.316	121.652	127.100	132.659	138.330
3299.5	47.297	51.149	55.101	59.161	63.341	67.637	72.047	76.573	81.211	85.961	90.823	95.797	100.884	105.984	111.096	116.320	121.656	127.104	132.663	138.334
3300.0	47.301	51.153	55.105	59.165	63.345	67.641	72.051	76.577	81.215	85.965	90.827	95.801	100.888	105.988	111.100	116.324	121.660	127.108	132.667	138.338
3300.5	47.305	51.157	55.109	59.169	63.349	67.645	72.055	76.581	81.219	85.969	90.831	95.805	100.892	105.992	111.104	116.328	121.664	127.112	132.671	138.342
3301.0	47.309	51.161	55.113	59.173	63.353	67.649	72.059	76.585	81.223	85.973	90.835	95.809	100.896	105.996	111.108	116.332	121.668	127.116	132.675	138.346
3301.5	47.313	51.165	55.117	59.177	63.357	67.653	72.063	76.589	81.227	85.977	90.839	95.813	100.900	106.000	111.112	116.336	121.672	127.120	132.679	138.350
3302.0	47.317	51.169	55.121	59.181	63.361	67.657	72.067	76.593	81.231	85.981	90.843	95.817	100.904	106.004	111.116	116.340	121.676	127.124	132.683	138.354
3302.5	47.321	51.173	55.125	59.185	63.365	67.661	72.071	76.597	81.235	85.985	90.847	95.821	100.908	106.008	111.120	116.344	121.680	127.128	132.687	138.358
3303.0	47.325	51.177	55.129	59.189	63.369	67.665	72.075	76.601	81.239	85.989	90.851	95.825	100.912	106.012	111.124	116.348	121.684	127.132	132.691	138.362
3303.5	47.329	51.181	55.133	59.193	63.373	67.669	72.079	76.605	81.243	85.993	90.855	95.829	100.916	106.016	111.128	116.352	121.688	127.136	132.695	138.366
3304.0	47.333	51.185	55.137	59.197	63.377	67.673	72.083	76.609	81.247	85.997	90.859	95.833	100.920	106.020	111.132	116.356	121.692	127.140	132.699	138.370
3304.5	47.337	51.189	55.141	59.201	63.381	67.677	72.087	76.613	81.251	86.001	90.863	95.837	100.924	106.024	111.136	116.360	121.696	127.144	132.703	138.374
3305.0	47.341	51.193	55.145	59.205	63.385	67.681	72.091	76.617	81.255	86.005	90.867	95.841	100.928	106.028	111.140	116.364	121.700	127.148	132.707	138.378
3305.5	47.345	51.197	55.149	59.209	63.389	67.685	72.095	76.621	81.259	86.009	90.871	95.845	100.932	106.032	111.144	116.368	121.704	127.152	132.711	138.382
3306.0	47.349	51.201	55.153	59.213	63.393	67.689	72.099	76.625	81.263	86.013	90.875	95.849	100.936	106.036	111.148	116.372	121.708	127.156	132.715	138.386
3306.5	47.353	51.205	55.157	59.217	63.397	67.693	72.103	76.629	81.267	86.017	90.879	95.853	100.940	106.040	111.152	116.376	121.712	127.160	132.719	138.390
3307.0	47.357	51.209	55.161	59.221	63.401	67.697	72.107	76.633	81.271	86.021	90.883	95.857	100.944	106.044	111.156	116.380	121.716	127.164	132.723	138.394
3307.5	47.361	51.213	55.165	59.225	63.405	67.701	72.111	76.637	81.275	86.025	90.887	95.861	100.948	106.048	111.160	116.384	121.720	127.168	132.727	138.398
3308.0	47.365	51.217	55.169	59.229	63.409	67.705	72.115	76.641	81.279	86.029	90.891	95.865	100.952	106.052	111.164	116.388	121.724	127.172	132.731	138.402
3308.5	47.369	51.221	55.173	59.233	63.413	67.709	72.119	76.645	81.283	86.033	90.895	95.869	100.956	106.056	111.168	116.392	121.728	127.176	132.735	138.406
3309.0	47.373	51.225	55.177	59.237	63.417	67.713	72.123	76.649	81.287	86.037	90.899	95.873	100.960	106.060	111.172	116.396	121.732	127.180	132.739	138.410
3309.5	47.377	51.229	55.181	59.241	63.421	67.717	72.127	76.653	81.291	86.041	90.903	95.877	100.964	106.064	111.176	116.400	121.736	127.184	132.743	138.414
3310.0	47.381	51.233	55.185	59.245	63.425	67.721	72.131	76.657	81.295	86.045	90.907	95.881	100.968	106.068	111.180	116.404	121.740	127.188	132.747	138.418
3310.5	47.385	51.237	55.189	59.249	63.429	67.725	72.135	76.661	81.299	86.049	90.911	95.885	100.972	106.072	111.184	116.408	121.744	127.192	132.751	138.422
3311.0	47.389	51.241	55.193	59.253	63.433	67.729	72.139	76.665	81.303	86.053	90.915	95.889	100.976	106.076	111.188	116.412	121.748	127.196	132.755	138.426
3311.5	47.393	51.245	55.197	59.257	63.437	67.733	72.143	76.669	81.307	86.057	90.919	95.893	100.980	106.080	111.192	116.416	121.752	127.200	132.759	138.430
3312.0	47.397	51.249	55.201	59.261	63.441	67.737	72.147	76.673	81.311	86.061	90.923	95.897	100.984	106.084	111.196	116.420	121.756	127.204	132.763	138.434
3312.5	47.401	51.253	55.205	59.265	63.445	67.741	72.151	76.677	81.315	86.065	90.927	95.901	100.988	106.088	111.200	116.424	121.760	127.208	132.767	138.438
3313.0	47.405	51.257	55.209	59.269	63.449	67.745	72.155	76.681	81.319	86.069	90.931	95.905	100.992	106.092	111.204	116.428	121.764	127.212	132.771	138.442
3313.5	47.409	51.261	55.213	59.273	63.453	67.749	72.159	76.685	81.323	86.073	90.935	95.909	100.996	106.096	111.208	116.432	121.768	127.216	132.775	138.446
3314.0	47.413	51.265	55.217	59.277	63.457	67.753	72.163	76.689	81.327	86.077	90.939	95.913	101.000	106.100	111.212	116.436	121.772	127.220	132.779	138.450
3314.5	47.417	51.269	55.221	59.281	63.461	67.757	72.167	76.												

Table 5-4 $\frac{1}{u} \int_z^{\infty} \ln T(v) dv$

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000
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Table 5-4 $\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$ (cont'd)

γ	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$	$\frac{1}{\gamma} \int_0^{\gamma} \ln T(u) dz$		
3190.0	1.6127011+003	1.7168166+003	3240.0	2.1052702+003	2.2566752+003	3290.0	2.3615767+003	2.6265555+003	3340.0	3.1108889+003	3.3321777+003
3190.5	1.6126999+003	1.7168154+003	3240.5	2.1052692+003	2.2566742+003	3290.5	2.3615757+003	2.6265545+003	3340.5	3.1108877+003	3.3321765+003
3191.0	1.6126987+003	1.7168142+003	3241.0	2.1052682+003	2.2566732+003	3291.0	2.3615747+003	2.6265535+003	3341.0	3.1108865+003	3.3321753+003
3191.5	1.6126975+003	1.7168130+003	3241.5	2.1052672+003	2.2566722+003	3291.5	2.3615737+003	2.6265525+003	3341.5	3.1108853+003	3.3321741+003
3192.0	1.6126963+003	1.7168118+003	3242.0	2.1052662+003	2.2566712+003	3292.0	2.3615727+003	2.6265515+003	3342.0	3.1108841+003	3.3321729+003
3192.5	1.6217673+003	1.7519497+003	3242.5	2.11277305+003	2.2787134+003	3292.5	2.3615717+003	2.6265505+003	3342.5	3.1276452+003	3.3508683+003
3193.0	1.6236102+003	1.7576714+003	3243.0	2.1131542+003	2.2835961+003	3293.0	2.3615707+003	2.6265495+003	3343.0	3.1306677+003	3.3561081+003
3193.5	1.6254712+003	1.7576714+003	3243.5	2.1135924+003	2.2891677+003	3293.5	2.3615697+003	2.6265485+003	3343.5	3.1327681+003	3.3571694+003
3194.0	1.6273378+003	1.7602636+003	3244.0	2.1141314+003	2.2957814+003	3294.0	2.3615687+003	2.6265475+003	3344.0	3.1348451+003	3.3578661+003
3194.5	1.6292011+003	1.7639255+003	3244.5	2.1147777+003	2.3041306+003	3294.5	2.3615677+003	2.6265465+003	3344.5	3.1368935+003	3.3582087+003
3195.0	1.6321381+003	1.7677074+003	3245.0	2.1161116+003	2.3135314+003	3295.0	2.3615667+003	2.6265455+003	3345.0	3.1389186+003	3.3581243+003
3195.5	1.6354322+003	1.7722017+003	3245.5	2.1183787+003	2.3245169+003	3295.5	2.3615657+003	2.6265445+003	3345.5	3.1408216+003	3.3577964+003
3196.0	1.6404197+003	1.7772132+003	3246.0	2.1234350+003	2.3362570+003	3296.0	2.3615647+003	2.6265435+003	3346.0	3.1426008+003	3.3572660+003
3196.5	1.6464915+003	1.7830058+003	3246.5	2.1205497+003	2.3482571+003	3296.5	2.3615637+003	2.6265425+003	3346.5	3.1442525+003	3.3565275+003
3197.0	1.6531776+003	1.7896607+003	3247.0	2.1206834+003	2.3628073+003	3297.0	2.3615627+003	2.6265415+003	3347.0	3.1457935+003	3.3555957+003
3197.5	1.6616213+003	1.7977991+003	3247.5	2.1206822+003	2.3733010+003	3297.5	2.3615617+003	2.6265405+003	3347.5	3.1469672+003	3.3544891+003
3198.0	1.6716916+003	1.8081499+003	3248.0	2.1211958+003	2.3857169+003	3298.0	2.3615607+003	2.6265395+003	3348.0	3.1478555+003	3.3531670+003
3198.5	1.6835258+003	1.8215411+003	3248.5	2.1214678+003	2.3987130+003	3298.5	2.3615597+003	2.6265385+003	3348.5	3.1484955+003	3.3516800+003
3199.0	1.6972237+003	1.8373380+003	3249.0	2.1217155+003	2.4132674+003	3299.0	2.3615587+003	2.6265375+003	3349.0	3.1488986+003	3.3500261+003
3199.5	1.6971727+003	1.8270108+003	3249.5	2.1219573+003	2.4286729+003	3299.5	2.3615577+003	2.6265365+003	3349.5	3.1490726+003	3.3492489+003
3200.0	1.7017744+003	1.8319335+003	3250.0	2.2219705+003	2.3703680+003	3300.0	2.3615567+003	2.6265355+003	3350.0	3.1617948+003	3.3630143+003
3200.5	1.7056664+003	1.8362572+003	3250.5	2.2262863+003	2.3735054+003	3300.5	2.3615557+003	2.6265345+003	3350.5	3.1636720+003	3.3639271+003
3201.0	1.7085751+003	1.8402131+003	3251.0	2.2266284+003	2.3767774+003	3301.0	2.3615547+003	2.6265335+003	3351.0	3.1656256+003	3.3649646+003
3201.5	1.7108476+003	1.8438176+003	3251.5	2.2291104+003	2.3801270+003	3301.5	2.3615537+003	2.6265325+003	3351.5	3.1676516+003	3.3661260+003
3202.0	1.7130145+003	1.8466767+003	3252.0	2.2311854+003	2.3835829+003	3302.0	2.3615527+003	2.6265315+003	3352.0	3.1697406+003	3.3674090+003
3202.5	1.7151977+003	1.8498540+003	3252.5	2.2340408+003	2.3873118+003	3302.5	2.3615517+003	2.6265305+003	3352.5	3.1718976+003	3.3688120+003
3203.0	1.7172631+003	1.8528933+003	3253.0	2.2382742+003	2.3920727+003	3303.0	2.3615507+003	2.6265295+003	3353.0	3.1739303+003	3.3699990+003
3203.5	1.7193022+003	1.8558822+003	3253.5	2.2436364+003	2.3989137+003	3303.5	2.3615497+003	2.6265285+003	3353.5	3.1758406+003	3.3710401+003
3204.0	1.7212625+003	1.8588130+003	3254.0	2.2494432+003	2.4086499+003	3304.0	2.3615487+003	2.6265275+003	3354.0	3.1776286+003	3.3719400+003
3204.5	1.7231504+003	1.8616404+003	3254.5	2.2567619+003	2.4218194+003	3304.5	2.3615477+003	2.6265265+003	3354.5	3.1792987+003	3.3727069+003
3205.0	1.7252011+003	1.8662658+003	3255.0	2.2657403+003	2.4376104+003	3305.0	2.3615467+003	2.6265255+003	3355.0	3.1808627+003	3.3733370+003
3205.5	1.7271781+003	1.8671355+003	3255.5	2.2768740+003	2.4562865+003	3305.5	2.3615457+003	2.6265245+003	3355.5	3.1822364+003	3.3738300+003
3206.0	1.7292115+003	1.8670761+003	3256.0	2.2888681+003	2.4780494+003	3306.0	2.3615447+003	2.6265235+003	3356.0	3.1834227+003	3.3741900+003
3206.5	1.7313040+003	1.8670574+003	3256.5	2.2996632+003	2.5040480+003	3306.5	2.3615437+003	2.6265225+003	3356.5	3.1844267+003	3.3744200+003
3207.0	1.7335780+003	1.8676348+003	3257.0	2.3005184+003	2.5351861+003	3307.0	2.3615427+003	2.6265215+003	3357.0	3.1852526+003	3.3745300+003
3207.5	1.7360455+003	1.8677337+003	3257.5	2.3086640+003	2.5706336+003	3307.5	2.3615417+003	2.6265205+003	3357.5	3.1859042+003	3.3745300+003
3208.0	1.7386788+003	1.8686664+003	3258.0	2.3156103+003	2.6122567+003	3308.0	2.3615407+003	2.6265195+003	3358.0	3.1863877+003	3.3744200+003
3208.5	1.7413773+003	1.8694360+003	3258.5	2.3194863+003	2.6617881+003	3308.5	2.3615397+003	2.6265185+003	3358.5	3.1867021+003	3.3741900+003
3209.0	1.7441449+003	1.8699494+003	3259.0	2.3226881+003	2.7191672+003	3309.0	2.3615387+003	2.6265175+003	3359.0	3.1868566+003	3.3738300+003
3209.5	1.7469871+003	1.8702659+003	3259.5	2.3260803+003	2.7857556+003	3309.5	2.3615377+003	2.6265165+003	3359.5	3.1868566+003	3.3733300+003
3210.0	1.7499181+003	1.8703666+003	3260.0	2.3297084+003	2.8620330+003	3310.0	2.3615367+003	2.6265155+003	3360.0	3.1867021+003	3.3727069+003
3210.5	1.7529212+003	1.8702659+003	3260.5	2.3336140+003	2.9486200+003	3310.5	2.3615357+003	2.6265145+003	3360.5	3.1864000+003	3.3719400+003
3211.0	1.7559944+003	1.8700784+003	3261.0	2.3378403+003	3.0469674+003	3311.0	2.3615347+003	2.6265135+003	3361.0	3.1859576+003	3.3710400+003
3211.5	1.7591361+003	1.8698050+003	3261.5	2.3424240+003	3.1580494+003	3311.5	2.3615337+003	2.6265125+003	3361.5	3.1853771+003	3.3700000+003
3212.0	1.7623409+003	1.8694574+003	3262.0	2.3474093+003	3.2837361+003	3312.0	2.3615327+003	2.6265115+003	3362.0	3.1846576+003	3.3688120+003
3212.5	1.7656070+003	1.8690316+003	3262.5	2.3528492+003	3.4250410+003	3312.5	2.3615317+003	2.6265105+003	3362.5	3.1837955+003	3.3674200+003
3213.0	1.7689341+003	1.8685370+003	3263.0	2.3587040+003	3.5839760+003	3313.0	2.3615307+003	2.6265095+003	3363.0	3.1827955+003	3.3658800+003
3213.5	1.7723211+003	1.8679744+003	3263.5	2.3649303+003	3.7627270+003	3313.5	2.3615297+003	2.6265085+003	3363.5	3.1816621+003	3.3641900+003
3214.0	1.7757681+003	1.8673450+003	3264.0	2.3715840+003	3.9635170+003	3314.0	2.3615287+003	2.6265075+003	3364.0	3.1803996+003	3.3623600+003
3214.5	1.7792741+003	1.8666594+003	3264.5	2.3786140+003	4.1885670+003	3314.5	2.3615277+003	2.6265065+003	3364.5	3.1789121+003	3.3603900+003
3215.0	1.7828391+003	1.8659174+003	3265.0	2.3860740+003	4.4500000+003	3315.0	2.3615267+003	2.6265055+003	3365.0	3.1772046+003	3.3582800+003
3215.5	1.7864641+003	1.8651294+003	3265.5	2.3939140+003	4.7500000+003	3315.5	2.3615257+003	2.6265045+003	3365.5	3.1752821+003	3.3559300+003
3216.0	1.7901491+003	1.8642954+003	3266.0	2.4021840+003	5.0900000+003	3316.0	2.3615247+003	2.6265035+003	3366.0	3.1731496+003	3.3533400+003
3216.5	1.7938941+003	1.8634154+003	3266.5	2.4108440+003	5.4700000+003	3316.5	2.3615237+003	2.6265025+003	3366.5	3.1708021+003	3.3505100+003
3217.0	1.7977091+003	1.8624894+003	3267.0	2.4199440+003	5.8900000+003	3317.0	2.3615227+003	2.6265015+003	3367.0	3.1682446+003	3.3474400+003
3217.5	1.8015941+003	1.8615174+003	3267.5	2.4294440+003	6.3500000+003	3317.5	2.3615217+003	2.6265005+003	3367.5	3.1654821+003	3.3441400+003
3218.0	1.8055491+003	1.8605004+003	3268.0	2.4393240+003	6.8500000+003	3318.0	2.3615207+003	2.6264995+003	3368.0	3.1625146+003	3.3406100+003
3218.5	1.8095741+003	1.8594374+003	3268.5	2.4496440+003	7.3900000+003	3318.5	2.3615197+003	2.6264985+003	3368.5	3.1593471+003	3.3368400+003
3219.0	1.8136691+003	1.8583294+003	3269.0	2.4603840+003	7.9700000+003	3319.0	2.3615187+003	2.6264975+003	3369.0	3.1559846+003	3.3328400+003
3219.5	1.8178341+003	1.8571754+003	3269.5	2.4715040+003	8.5900000+003	3319.5	2.3615177+003	2.6264965+003	3369.5	3.1524271+003	3.3286100+003
3220.0	1.8220691+003	1.8560754+003	3270.0	2.4829840+003	9.2500000+003	3320.0	2.3615167+003	2.6264955+003	3370.0	3.1486746+003	3.3241400+003
3220.5	1.8263741+003	1.8549294+003	3270.5	2.4948040+003	9.9500000+003	3320.5	2.3615157+003	2.6264945+003	3370.5	3.1447	

Table 5-4 $\frac{1}{v} \int_{-\infty}^{\infty} \ln T(v) dv$ (cont'd)

Sam. No.	30	31	Sam. No.	30	31	Sam. No.	30	31	Sam. No.	30	31
p(atm)	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	p(atm)	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	p(atm)	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	p(atm)	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$
P ₀ (atm)	1.03 $\times 10^0$	1.003 $\times 10^0$	P ₀ (atm)	1.03 $\times 10^0$	1.00 $\times 10^0$	P ₀ (atm)	1.03 $\times 10^0$	1.003 $\times 10^0$	P ₀ (atm)	1.03 $\times 10^0$	1.003 $\times 10^0$
v(gm/cm ²)	2.05 $\times 10^{-2}$	2.05 $\times 10^{-2}$	v(gm/cm ²)	2.05 $\times 10^{-2}$	2.05 $\times 10^{-2}$	v(gm/cm ²)	2.05 $\times 10^{-2}$	2.05 $\times 10^{-2}$	v(gm/cm ²)	2.05 $\times 10^{-2}$	2.05 $\times 10^{-2}$
v (cm ⁻¹)	v ⁻²⁹⁹⁰ cm ⁻¹	v ⁻²⁹⁹⁰ cm ⁻¹	v (cm ⁻¹)	v ⁻²⁹⁹⁰ cm ⁻¹	v ⁻²⁹⁹⁰ cm ⁻¹	v (cm ⁻¹)	v ⁻²⁹⁹⁰ cm ⁻¹	v ⁻²⁹⁹⁰ cm ⁻¹	v (cm ⁻¹)	v ⁻²⁹⁹⁰ cm ⁻¹	v ⁻²⁹⁹⁰ cm ⁻¹
3390.0	3.6522307+003	3.6495627+003	3400.0	4.319683+003	4.317767+003	3400.0	5.740948+003	6.037629+003	3540.0	8.763303+003	9.195089+003
3390.5	3.6522307+003	3.6495627+003	3400.5	4.3262453+003	4.324216+003	3400.5	5.7478572+003	6.0480145+003	3540.5	8.7677803+003	9.2150269+003
3391.0	3.6522307+003	3.6495627+003	3401.0	4.3333598+003	4.331330+003	3401.0	5.7566137+003	6.0580079+003	3541.0	8.8118116+003	9.235959+003
3391.5	3.6522307+003	3.6495627+003	3401.5	4.3419159+003	4.339886+003	3401.5	5.7672012+003	6.0689210+003	3541.5	8.879586+003	9.258327+003
3392.0	3.6522307+003	3.6495627+003	3402.0	4.3556687+003	4.353638+003	3402.0	5.7748715+003	6.0769007+003	3542.0	8.9428018+003	9.285147+003
3392.5	3.6545714+003	3.6899827+003	3402.5	4.381368+003	4.379338+003	3402.5	5.7812044+003	6.0887193+003	3542.5	8.9677789+003	9.320147+003
3393.0	3.6545714+003	3.6899827+003	3403.0	4.4111938+003	4.409164+003	3403.0	5.7871281+003	6.0977760+003	3543.0	8.9802260+003	9.3444081+003
3393.5	3.6545714+003	3.6899827+003	3403.5	4.4330820+003	4.431052+003	3403.5	5.7938052+003	6.1074766+003	3543.5	9.0608754+003	9.4197388+003
3394.0	3.6545714+003	3.6899827+003	3404.0	4.4566677+003	4.454637+003	3404.0	5.8014681+003	6.1182851+003	3544.0	9.0247503+003	9.4825602+003
3394.5	3.7048026+003	3.967767+003	3404.5	4.4552861+003	4.453256+003	3404.5	5.8106791+003	6.1114504+003	3544.5	9.0729865+003	9.5549590+003
3395.0	3.7094274+003	3.9539371+003	3405.0	4.4670137+003	4.464983+003	3405.0	5.8258436+003	6.1149113+003	3545.0	9.1824291+003	9.6409128+003
3395.5	3.7138020+003	3.9602946+003	3405.5	4.4886502+003	4.486620+003	3405.5	5.8499599+003	6.1206264+003	3545.5	9.2960081+003	9.7338861+003
3396.0	3.7189716+003	3.9674185+003	3406.0	4.5086933+003	4.506663+003	3406.0	5.8724662+003	6.1280927+003	3546.0	9.3883339+003	9.8241629+003
3396.5	3.7263138+003	3.9753178+003	3406.5	4.5305458+003	4.528516+003	3406.5	5.8998772+003	6.1368303+003	3546.5	9.4680542+003	9.9180597+003
3397.0	3.7400983+003	3.9883577+003	3407.0	4.5703325+003	4.568302+003	3407.0	5.9333187+003	6.1472403+003	3547.0	9.5701826+003	1.0018131+004
3397.5	3.7610740+003	4.0016738+003	3407.5	4.6365524+003	4.634522+003	3407.5	5.9533267+003	6.1628149+003	3547.5	9.6755293+003	1.0108632+004
3398.0	3.7746263+003	4.0123944+003	3408.0	4.6917388+003	4.689708+003	3408.0	5.9683374+003	6.1771863+003	3548.0	9.7470203+003	1.0178932+004
3398.5	3.7817518+003	4.020701+003	3408.5	4.7216922+003	4.719662+003	3408.5	5.9785350+003	6.2035900+003	3548.5	9.8047862+003	1.0236126+004
3399.0	3.7867479+003	4.0260535+003	3409.0	4.7399308+003	4.737900+003	3409.0	5.9883261+003	6.1081736+003	3549.0	9.8489161+003	1.0283364+004
3399.5	3.7907649+003	4.0311701+003	3409.5	4.7510710+003	4.749041+003	3409.5	6.0005944+003	6.1255499+003	3549.5	9.8794884+003	1.0324516+004
3400.0	3.7943700+003	4.0358201+003	3400.0	4.7585631+003	4.756533+003	3400.0	6.0187522+003	6.1457773+003	3550.0	9.9072758+003	1.0364254+004
3400.5	3.7982093+003	4.0409830+003	3400.5	4.7644590+003	4.762429+003	3400.5	6.0360736+003	6.1663548+003	3550.5	9.9403862+003	1.0406687+004
3401.0	3.8041144+003	4.0476557+003	3401.0	4.7692589+003	4.767229+003	3401.0	6.0556793+003	6.1894091+003	3551.0	9.9676191+003	1.0451376+004
3401.5	3.8100829+003	4.0540309+003	3401.5	4.7744337+003	4.772403+003	3401.5	6.0780582+003	6.1407469+003	3551.5	1.0021783+004	1.0512240+004
3402.0	3.8160491+003	4.0592772+003	3402.0	4.7773787+003	4.775348+003	3402.0	6.1018622+003	6.1562593+003	3552.0	1.0096275+004	1.0584433+004
3402.5	3.8208863+003	4.0642943+003	3402.5	4.7810848+003	4.779054+003	3402.5	6.1166632+003	6.1522061+003	3552.5	1.0206305+004	1.0666244+004
3403.0	3.8259349+003	4.0696860+003	3403.0	4.7868979+003	4.784868+003	3403.0	6.1258456+003	6.1594922+003	3553.0	1.0296205+004	1.0748187+004
3403.5	3.8300353+003	4.0752111+003	3403.5	4.7890033+003	4.786973+003	3403.5	6.1385341+003	6.1655822+003	3553.5	1.0358603+004	1.0809577+004
3404.0	3.8402714+003	4.0811029+003	3404.0	4.7925710+003	4.790541+003	3404.0	6.1055652+003	6.1757742+003	3554.0	1.0427885+004	1.0872895+004
3404.5	3.8451176+003	4.0859864+003	3404.5	4.7959866+003	4.793956+003	3404.5	6.1652791+003	6.1688951+003	3554.5	1.0479804+004	1.0923637+004
3405.0	3.8485363+003	4.0900118+003	3405.0	4.7996477+003	4.797617+003	3405.0	6.1097191+003	6.1608437+003	3555.0	1.0509048+004	1.0981561+004
3405.5	3.8514215+003	4.0935530+003	3405.5	4.8041485+003	4.802118+003	3405.5	6.1541496+003	6.1558472+003	3555.5	1.0530882+004	1.1039293+004
3406.0	3.8541319+003	4.0967627+003	3406.0	4.8103227+003	4.808292+003	3406.0	6.1647567+003	6.1663038+003	3556.0	1.0548553+004	1.1021843+004
3406.5	3.8570727+003	4.1000070+003	3406.5	4.8171655+003	4.815135+003	3406.5	6.1826071+003	6.1888970+003	3556.5	1.0568326+004	1.1050934+004
3407.0	3.8601130+003	4.1031641+003	3407.0	4.8231407+003	4.821110+003	3407.0	6.1975562+003	6.1909907+003	3557.0	1.0594389+004	1.1081913+004
3407.5	3.8628446+003	4.1062440+003	3407.5	4.8281626+003	4.826132+003	3407.5	6.1124077+003	6.1931014+003	3557.5	1.0625507+004	1.1114012+004
3408.0	3.8654952+003	4.1093137+003	3408.0	4.8315840+003	4.829554+003	3408.0	6.1257816+003	6.1954739+003	3558.0	1.0651462+004	1.1146249+004
3408.5	3.8683304+003	4.1123509+003	3408.5	4.8349048+003	4.832875+003	3408.5	6.1446376+003	6.1984477+003	3558.5	1.0673721+004	1.1178753+004
3409.0	3.8718806+003	4.1154776+003	3409.0	4.8449123+003	4.842882+003	3409.0	6.1683470+003	6.1727140+003	3559.0	1.0696487+004	1.1218179+004
3409.5	3.8759918+003	4.1186727+003	3409.5	4.8556593+003	4.853629+003	3409.5	6.1744525+003	6.1782267+003	3559.5	1.0732830+004	1.1266058+004
3410.0	3.8778411+003	4.1217538+003	3410.0	4.8612956+003	4.859266+003	3410.0	6.1882218+003	6.1385805+003	3560.0	1.0796459+004	1.1327791+004
3410.5	3.8803690+003	4.1247088+003	3410.5	4.8674441+003	4.865414+003	3410.5	6.10641238+003	6.1782578+003	3560.5	1.0876888+004	1.1396856+004
3411.0	3.8827439+003	4.1277398+003	3411.0	4.8833300+003	4.881299+003	3411.0	6.1894795+003	6.1716209+003	3561.0	1.0942604+004	1.1464968+004
3411.5	3.8852622+003	4.1308635+003	3411.5	4.8987377+003	4.896707+003	3411.5	6.1921023+003	6.1743840+003	3561.5	1.0993864+004	1.1526627+004
3412.0	3.8880764+003	4.1342238+003	3412.0	4.9166777+003	4.914647+003	3412.0	6.1945511+003	6.1767156+003	3562.0	1.1044201+004	1.1590520+004
3412.5	3.8910181+003	4.1378165+003	3412.5	4.9359433+003	4.933913+003	3412.5	6.1964036+003	6.1788602+003	3562.5	1.1111838+004	1.1662464+004
3413.0	3.8934933+003	4.1419026+003	3413.0	4.9610122+003	4.958982+003	3413.0	6.1798475+003	6.1306571+003	3563.0	1.1133200+004	1.1734939+004
3413.5	3.9001933+003	4.1461437+003	3413.5	4.9798246+003	4.977794+003	3413.5	6.1994557+003	6.1323620+003	3563.5	1.1268989+004	1.1824553+004
3414.0	3.9041433+003	4.1503808+003	3414.0	4.9895589+003	4.987528+003	3414.0	6.2006479+003	6.1318351+003	3564.0	1.1370308+004	1.1914482+004
3414.5	3.9074256+003	4.1541965+003	3414.5	4.9965963+003	4.994566+003	3414.5	6.2017853+003	6.1352098+003	3564.5	1.1465134+004	1.2009755+004
3415.0	3.9103168+003	4.1579370+003	3415.0	5.0034440+003	5.001414+003	3415.0	6.2065015+003	6.1364789+003	3565.0	1.1570571+004	1.2118269+004
3415.5	3.9134306+003	4.1618026+003	3415.5	5.0099177+003	5.007887+003	3415.5	6.2103161+003	6.1378512+003	3565.5	1.1714231+004	1.2228210+004
3416.0	3.9167346+003	4.1659488+003	3416.0	5.0162377+003	5.014207+003	3416.0	6.2141008+003	6.1392077+003	3566.0	1.1887584+004	1.2340433+004
3416.5	3.9200772+003	4.1703466+003	3416.5	5.0226281+003	5.020598+003	3416.5	6.2181003+003	6.1408360+003	3566.5	1.2064918+004	1.2453832+004
3417.0	3.9235459+003	4.1750745+003	3417.0	5.0542097+003	5.052179+003	3417.0	6.2582644+003	6.1459932+003	3567.0	1.2206890+004	1.2562561+004
3417.5	3.9274415+003	4.1800511+003	3417.5	5.0727697+003	5.070739+003	3417.5	6.2743736+003	6.1434708+003	3567.5	1.2357244+004	1.2678082+004
3418.0	3.9321687+003	4.1850254+003	3418.0	5.0807656+003	5.078735+003	3418.0	6.2916313+003	6.1454328+003	3568.0	1.2521433+004	1.2786788+004
3418.5	3.9369272+003	4.1900764+003	3418.5	5.0886947+003	5.086664+003	3418.5	6.2701646+003	6.1474341+003	3568.5	1.2706279+004	1.2905471+004
3419.0	3.9426687+003	4.1955517+003	3419.0	5.0961618+003	5.094131+003	3419.0	6.2185918+003	6.14			

Table 5-5

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32
$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}
$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1
$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}
λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)
3430.0	2.91345	97.9	3450.0	2.89859	96.9	3470.0	2.88384	96.9	3490.0	2.86933	97.0	3510.0	2.85500
3430.2	2.91329	97.9	3450.2	2.89843	96.9	3470.2	2.88368	96.9	3490.2	2.86917	97.0	3510.2	2.85484
3430.4	2.91311	97.9	3450.4	2.89825	97.1	3470.4	2.88351	97.1	3490.4	2.86900	97.1	3510.4	2.85466
3430.6	2.91293	97.9	3450.6	2.89807	97.1	3470.6	2.88334	97.1	3490.6	2.86883	97.1	3510.6	2.85448
3430.8	2.91277	97.2	3450.8	2.89789	97.3	3470.8	2.88318	97.3	3490.8	2.86867	97.2	3510.8	2.85431
3431.0	2.91260	96.9	3451.0	2.89771	97.8	3471.0	2.88301	98.6	3491.0	2.86851	97.0	3511.0	2.85415
3431.2	2.91243	96.7	3451.2	2.89754	98.1	3471.2	2.88285	98.9	3491.2	2.86834	96.7	3511.2	2.85398
3431.4	2.91226	96.9	3451.4	2.89737	98.1	3471.4	2.88268	98.8	3491.4	2.86818	97.1	3511.4	2.85381
3431.6	2.91209	97.1	3451.6	2.89721	98.4	3471.6	2.88252	98.3	3491.6	2.86802	97.1	3511.6	2.85364
3431.8	2.91192	97.0	3451.8	2.89704	98.6	3471.8	2.88235	98.9	3491.8	2.86785	97.5	3511.8	2.85348
3432.0	2.91175	97.2	3452.0	2.89687	98.7	3472.0	2.88218	99.1	3492.0	2.86769	97.4	3512.0	2.85331
3432.2	2.91158	97.5	3452.2	2.89670	98.9	3472.2	2.88202	99.1	3492.2	2.86752	98.1	3512.2	2.85315
3432.4	2.91141	97.4	3452.4	2.89653	98.8	3472.4	2.88185	99.1	3492.4	2.86736	98.2	3512.4	2.85298
3432.6	2.91124	97.4	3452.6	2.89637	98.9	3472.6	2.88169	99.1	3492.6	2.86720	98.2	3512.6	2.85281
3432.8	2.91107	97.7	3452.8	2.89620	98.9	3472.8	2.88152	98.7	3492.8	2.86703	98.1	3512.8	2.85265
3433.0	2.91090	97.7	3453.0	2.89603	98.9	3473.0	2.88136	98.6	3493.0	2.86687	98.1	3513.0	2.85248
3433.2	2.91073	98.0	3453.2	2.89586	98.9	3473.2	2.88119	98.2	3493.2	2.86670	98.1	3513.2	2.85232
3433.4	2.91056	98.0	3453.4	2.89569	98.9	3473.4	2.88103	98.3	3493.4	2.86653	97.8	3513.4	2.85215
3433.6	2.91039	98.0	3453.6	2.89552	99.0	3473.6	2.88086	97.9	3493.6	2.86637	97.7	3513.6	2.85198
3433.8	2.91022	98.2	3453.8	2.89535	98.9	3473.8	2.88069	97.7	3493.8	2.86620	97.5	3513.8	2.85182
3434.0	2.91005	98.1	3454.0	2.89519	99.0	3474.0	2.88053	97.1	3494.0	2.86603	97.0	3514.0	2.85165
3434.2	2.90988	98.4	3454.2	2.89502	99.1	3474.2	2.88036	96.7	3494.2	2.86587	96.7	3514.2	2.85148
3434.4	2.90971	98.4	3454.4	2.89485	99.1	3474.4	2.88020	96.0	3494.4	2.86570	96.2	3514.4	2.85132
3434.6	2.90954	98.6	3454.6	2.89468	99.0	3474.6	2.88003	95.4	3494.6	2.86553	95.3	3514.6	2.85115
3434.8	2.90937	98.7	3454.8	2.89452	99.0	3474.8	2.87986	94.7	3494.8	2.86537	94.4	3514.8	2.85098
3435.0	2.90920	98.6	3455.0	2.89435	99.0	3475.0	2.87970	94.3	3495.0	2.86520	93.5	3515.0	2.85082
3435.2	2.90903	98.7	3455.2	2.89418	99.0	3475.2	2.87953	94.2	3495.2	2.86503	92.6	3515.2	2.85065
3435.4	2.90886	98.5	3455.4	2.89402	98.8	3475.4	2.87937	94.7	3495.4	2.86487	91.8	3515.4	2.85048
3435.6	2.90869	98.6	3455.6	2.89385	98.5	3475.6	2.87920	95.4	3495.6	2.86470	91.5	3515.6	2.85032
3435.8	2.90852	98.6	3455.8	2.89369	98.5	3475.8	2.87903	96.0	3495.8	2.86453	91.3	3515.8	2.85015
3436.0	2.90835	98.1	3456.0	2.89352	98.3	3476.0	2.87887	96.5	3496.0	2.86437	91.3	3516.0	2.85000
3436.2	2.90818	98.1	3456.2	2.89335	98.5	3476.2	2.87870	97.1	3496.2	2.86420	90.8	3516.2	2.84983
3436.4	2.90801	98.0	3456.4	2.89318	98.6	3476.4	2.87854	97.4	3496.4	2.86403	90.5	3516.4	2.84967
3436.6	2.90784	97.8	3456.6	2.89302	98.5	3476.6	2.87837	97.8	3496.6	2.86387	90.3	3516.6	2.84950
3436.8	2.90767	98.0	3456.8	2.89285	98.7	3476.8	2.87821	97.9	3496.8	2.86370	90.2	3516.8	2.84934
3437.0	2.90750	98.2	3457.0	2.89268	98.6	3477.0	2.87804	98.3	3497.0	2.86353	90.7	3517.0	2.84917
3437.2	2.90733	98.3	3457.2	2.89251	98.6	3477.2	2.87788	98.2	3497.2	2.86337	90.6	3517.2	2.84901
3437.4	2.90716	98.1	3457.4	2.89235	98.7	3477.4	2.87771	97.2	3497.4	2.86320	92.5	3517.4	2.84884
3437.6	2.90699	98.1	3457.6	2.89218	98.9	3477.6	2.87755	98.3	3497.6	2.86303	93.5	3517.6	2.84868
3437.8	2.90682	98.1	3457.8	2.89201	99.0	3477.8	2.87738	98.2	3497.8	2.86287	94.1	3517.8	2.84851
3438.0	2.90665	97.9	3458.0	2.89184	98.8	3478.0	2.87722	97.9	3498.0	2.86270	94.7	3518.0	2.84834
3438.2	2.90648	97.8	3458.2	2.89168	98.6	3478.2	2.87705	97.8	3498.2	2.86253	95.2	3518.2	2.84818
3438.4	2.90631	97.5	3458.4	2.89151	97.8	3478.4	2.87689	97.0	3498.4	2.86237	95.3	3518.4	2.84801
3438.6	2.90614	97.3	3458.6	2.89134	97.7	3478.6	2.87672	97.7	3498.6	2.86220	95.5	3518.6	2.84785
3438.8	2.90597	97.3	3458.8	2.89118	96.8	3478.8	2.87655	97.3	3498.8	2.86203	95.4	3518.8	2.84768
3439.0	2.90580	97.4	3459.0	2.89101	97.3	3479.0	2.87639	97.0	3499.0	2.86187	95.3	3519.0	2.84752
3439.2	2.90563	97.7	3459.2	2.89084	97.8	3479.2	2.87622	96.0	3499.2	2.86170	94.9	3519.2	2.84735
3439.4	2.90546	97.7	3459.4	2.89067	98.2	3479.4	2.87606	95.7	3499.4	2.86153	94.1	3519.4	2.84719
3439.6	2.90529	97.6	3459.6	2.89051	98.3	3479.6	2.87589	94.7	3499.6	2.86137	93.5	3519.6	2.84702
3439.8	2.90512	97.6	3459.8	2.89034	98.0	3479.8	2.87573	93.8	3499.8	2.86120	92.9	3519.8	2.84686
3440.0	2.90495	97.5	3460.0	2.89017	97.9	3480.0	2.87556	92.7	3500.0	2.86103	92.6	3520.0	2.84669
3440.2	2.90478	97.3	3460.2	2.89000	97.3	3480.2	2.87540	90.8	3500.2	2.86087	92.7	3520.2	2.84652
3440.4	2.90461	96.9	3460.4	2.88984	96.6	3480.4	2.87523	88.5	3500.4	2.86070	91.8	3520.4	2.84636
3440.6	2.90444	96.9	3460.6	2.88967	95.5	3480.6	2.87507	87.0	3500.6	2.86053	91.2	3520.6	2.84619
3440.8	2.90427	96.6	3460.8	2.88951	95.0	3480.8	2.87490	86.6	3500.8	2.86037	90.1	3520.8	2.84602
3441.0	2.90410	96.4	3461.0	2.88934	95.3	3481.0	2.87474	87.3	3501.0	2.86020	88.7	3521.0	2.84586
3441.2	2.90393	95.7	3461.2	2.88917	95.0	3481.2	2.87457	88.4	3501.2	2.86003	87.2	3521.2	2.84569
3441.4	2.90376	95.3	3461.4	2.88900	94.9	3481.4	2.87441	88.3	3501.4	2.85987	85.3	3521.4	2.84552
3441.6	2.90359	94.6	3461.6	2.88884	94.5	3481.6	2.87424	88.1	3501.6	2.85970	83.5	3521.6	2.84536
3441.8	2.90342	93.6	3461.8	2.88867	94.2	3481.8	2.87408	86.7	3501.8	2.85953	81.7	3521.8	2.84519
3442.0	2.90325	92.4	3462.0	2.88850	94.0	3482.0	2.87391	85.4	3502.0	2.85937	79.5	3522.0	2.84502
3442.2	2.90308	91.8	3462.2	2.88834	93.6	3482.2	2.87375	83.4	3502.2	2.85920	78.4	3522.2	2.84486
3442.4	2.90291	90.9	3462.4	2.88817	93.3	3482.4	2.87358	81.9	3502.4	2.85903	77.5	3522.4	2.84469
3442.6	2.90274	90.5	3462.6	2.88800	92.8	3482.6	2.87342	80.2	3502.6	2.85887	76.2	3522.6	2.84452
3442.8	2.90257	90.4	3462.8	2.88784	92.7	3482.8	2.87325	78.3	3502.8	2.85870	72.1	3522.8	2.84436
3443.0	2.90240	91.2	3463.0	2.88767	93.1	3483.0	2.87309	88.6	3503.0	2.85853	72.2	3523.0	2.84419
3443.2	2.90223	91.9	3463.2	2.88750	93.1	3483.2	2.87292	87.2	3503.2	2.85837	70.5	3523.2	2.84402
3443.4	2.90206	92.7	3463.4	2.88734	94.7	3483.4	2.87276	91.9	3503.4	2.85820	71.7	3523.4	2.84386
3443.6	2.90189	93.4	3463.6	2.88717	95.1	3483.6	2.87259	92.7	3503.6	2.85803	73.3	3523.6	2.84369
3443.8	2.90172	93.9	3463.8	2.88700	96.5	3483.8	2.87243	93.7	3503.8	2.85787	73.5	3523.8	2.84352
3444.0	2.90155	94.0	3464.0	2.88684	96.9	3484.0	2.87226	94.1	3504.0	2.85770	72.0	3524.0	2.84336
3444.2	2.90138	94.3	3464.2	2.88667	97.5	3484							

Table 5-5 (Cont'd)

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32		
$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}		
$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1		
$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}		
λ (microns)	T n 100	λ (microns)	T n 100	λ (microns)	T n 100	λ (microns)	T n 100	λ (microns)	T n 100		
3550.0	2.81490	82.7	3570.0	2.80112	80.4	3590.0	2.78552	43.2	3610.0	2.77008	17.5
3550.2	2.81474	82.4	3570.2	2.80095	82.6	3590.2	2.78520	44.0	3610.2	2.76993	22.0
3550.4	2.81458	82.0	3570.4	2.80081	84.0	3590.4	2.78520	53.7	3610.4	2.76978	26.2
3550.6	2.81443	81.1	3570.6	2.80065	85.3	3590.6	2.78505	57.1	3610.6	2.76962	29.5
3550.8	2.81427	80.2	3570.8	2.80049	87.2	3590.8	2.78489	60.3	3610.8	2.76947	31.7
3551.0	2.81411	79.0	3571.0	2.80034	70.0	3591.0	2.78474	62.5	3611.0	2.76932	32.5
3551.2	2.81395	77.1	3571.2	2.80018	72.3	3591.2	2.78458	64.0	3611.2	2.76916	32.1
3551.4	2.81379	74.7	3571.4	2.80002	74.7	3591.4	2.78443	65.0	3611.4	2.76901	30.3
3551.6	2.81363	71.9	3571.6	2.79987	77.0	3591.6	2.78427	65.6	3611.6	2.76886	27.9
3551.8	2.81347	68.7	3571.8	2.79971	78.3	3591.8	2.78412	65.6	3611.8	2.76870	24.6
3552.0	2.81332	65.7	3572.0	2.79955	79.8	3592.0	2.78396	64.9	3612.0	2.76855	21.2
3552.2	2.81316	63.5	3572.2	2.79940	80.7	3592.2	2.78381	63.4	3612.2	2.76840	17.7
3552.4	2.81300	62.5	3572.4	2.79924	81.2	3592.4	2.78365	61.5	3612.4	2.76824	15.1
3552.6	2.81284	63.3	3572.6	2.79908	81.4	3592.6	2.78350	58.9	3612.6	2.76809	14.2
3552.8	2.81268	65.2	3572.8	2.79893	81.6	3592.8	2.78334	55.6	3612.8	2.76794	14.4
3553.0	2.81252	67.6	3573.0	2.79877	81.3	3593.0	2.78319	52.3	3613.0	2.76778	15.8
3553.2	2.81236	69.6	3573.2	2.79861	81.2	3593.2	2.78303	49.6	3613.2	2.76763	18.5
3553.4	2.81221	70.7	3573.4	2.79846	80.9	3593.4	2.78288	47.9	3613.4	2.76748	21.3
3553.6	2.81205	71.1	3573.6	2.79830	80.7	3593.6	2.78272	47.5	3613.6	2.76732	23.5
3553.8	2.81189	71.2	3573.8	2.79814	80.1	3593.8	2.78257	48.0	3613.8	2.76717	25.1
3554.0	2.81173	72.4	3574.0	2.79799	79.8	3594.0	2.78242	48.7	3614.0	2.76702	25.6
3554.2	2.81157	74.6	3574.2	2.79783	79.4	3594.2	2.78226	49.4	3614.2	2.76686	25.0
3554.4	2.81141	77.8	3574.4	2.79767	79.0	3594.4	2.78211	48.9	3614.4	2.76671	24.5
3554.6	2.81125	80.5	3574.6	2.79752	78.5	3594.6	2.78195	47.5	3614.6	2.76656	24.3
3554.8	2.81109	82.9	3574.8	2.79736	78.5	3594.8	2.78180	44.8	3614.8	2.76640	25.3
3555.0	2.81093	84.5	3575.0	2.79720	78.8	3595.0	2.78164	41.5	3615.0	2.76625	27.1
3555.2	2.81077	85.9	3575.2	2.79705	79.4	3595.2	2.78149	38.4	3615.2	2.76610	29.4
3555.4	2.81061	86.9	3575.4	2.79689	80.0	3595.4	2.78133	36.3	3615.4	2.76595	31.7
3555.6	2.81045	87.6	3575.6	2.79673	80.5	3595.6	2.78118	35.9	3615.6	2.76579	33.7
3555.8	2.81029	88.0	3575.8	2.79658	81.0	3595.8	2.78102	37.4	3615.8	2.76564	35.5
3556.0	2.81013	88.1	3576.0	2.79642	80.6	3596.0	2.78087	40.3	3616.0	2.76549	36.4
3556.2	2.81000	88.1	3576.2	2.79626	80.1	3596.2	2.78071	43.7	3616.2	2.76533	36.5
3556.4	2.80984	87.9	3576.4	2.79611	79.3	3596.4	2.78056	47.2	3616.4	2.76518	35.9
3556.6	2.80968	87.4	3576.6	2.79595	78.5	3596.6	2.78040	50.9	3616.6	2.76503	34.4
3556.8	2.80952	87.1	3576.8	2.79580	77.7	3596.8	2.78025	54.0	3616.8	2.76488	31.7
3557.0	2.80936	86.7	3577.0	2.79564	77.3	3597.0	2.78009	56.4	3617.0	2.76472	28.4
3557.2	2.80920	86.6	3577.2	2.79548	77.2	3597.2	2.77994	57.9	3617.2	2.76457	24.8
3557.4	2.80904	86.4	3577.4	2.79533	77.7	3597.4	2.77979	59.0	3617.4	2.76442	21.2
3557.6	2.80888	86.4	3577.6	2.79517	78.4	3597.6	2.77963	59.0	3617.6	2.76426	18.1
3557.8	2.80872	86.5	3577.8	2.79501	79.3	3597.8	2.77948	58.6	3617.8	2.76411	16.3
3558.0	2.80856	86.5	3578.0	2.79486	79.8	3598.0	2.77932	57.8	3618.0	2.76396	15.4
3558.2	2.80840	86.2	3578.2	2.79470	80.5	3598.2	2.77917	56.9	3618.2	2.76381	15.3
3558.4	2.80824	85.9	3578.4	2.79455	80.6	3598.4	2.77901	56.4	3618.4	2.76365	15.2
3558.6	2.80808	85.2	3578.6	2.79439	80.4	3598.6	2.77886	54.5	3618.6	2.76350	14.7
3558.8	2.80792	84.2	3578.8	2.79423	79.9	3598.8	2.77870	56.8	3618.8	2.76335	13.8
3559.0	2.80776	82.6	3579.0	2.79408	78.9	3599.0	2.77855	57.4	3619.0	2.76319	12.2
3559.2	2.80760	81.0	3579.2	2.79392	77.5	3599.2	2.77840	57.7	3619.2	2.76304	10.6
3559.4	2.80744	78.9	3579.4	2.79376	75.6	3599.4	2.77824	57.9	3619.4	2.76289	9.1
3559.6	2.80728	76.3	3579.6	2.79361	73.4	3599.6	2.77809	57.7	3619.6	2.76274	8.4
3559.8	2.80712	73.5	3579.8	2.79345	71.3	3599.8	2.77793	57.4	3619.8	2.76258	8.5
3560.0	2.80696	70.5	3580.0	2.79330	69.8	3600.0	2.77778	56.8	3620.0	2.76243	9.6
3560.2	2.80680	68.6	3580.2	2.79314	69.6	3600.2	2.77762	56.0	3620.2	2.76228	11.4
3560.4	2.80664	68.0	3580.4	2.79298	71.2	3600.4	2.77747	55.1	3620.4	2.76213	13.8
3560.6	2.80648	68.8	3580.6	2.79283	73.5	3600.6	2.77731	53.9	3620.6	2.76197	16.4
3560.8	2.80632	70.2	3580.8	2.79267	75.7	3600.8	2.77716	53.2	3620.8	2.76182	19.3
3561.0	2.80616	71.7	3581.0	2.79252	77.1	3601.0	2.77701	53.0	3621.0	2.76167	21.8
3561.2	2.80600	72.8	3581.2	2.79236	78.1	3601.2	2.77685	53.5	3621.2	2.76152	24.4
3561.4	2.80584	73.5	3581.4	2.79220	78.8	3601.4	2.77670	55.0	3621.4	2.76136	27.1
3561.6	2.80568	73.3	3581.6	2.79205	78.9	3601.6	2.77654	56.7	3621.6	2.76121	30.3
3561.8	2.80552	72.7	3581.8	2.79189	78.7	3601.8	2.77639	58.6	3621.8	2.76105	33.7
3562.0	2.80536	71.7	3582.0	2.79174	78.5	3602.0	2.77624	60.5	3622.0	2.76090	36.8
3562.2	2.80520	69.9	3582.2	2.79158	77.4	3602.2	2.77608	61.5	3622.2	2.76075	39.5
3562.4	2.80504	68.4	3582.4	2.79142	76.2	3602.4	2.77593	62.2	3622.4	2.76060	42.2
3562.6	2.80488	67.4	3582.6	2.79127	75.3	3602.6	2.77577	62.9	3622.6	2.76045	43.8
3562.8	2.80472	66.9	3582.8	2.79111	74.1	3602.8	2.77562	63.9	3622.8	2.76030	45.4
3563.0	2.80456	65.9	3583.0	2.79096	73.1	3603.0	2.77546	64.9	3623.0	2.76014	46.4
3563.2	2.80440	64.8	3583.2	2.79080	72.0	3603.2	2.77531	65.9	3623.2	2.76000	47.3
3563.4	2.80424	63.2	3583.4	2.79065	70.6	3603.4	2.77516	66.9	3623.4	2.75984	47.8
3563.6	2.80408	61.6	3583.6	2.79049	69.3	3603.6	2.77500	67.7	3623.6	2.75969	48.4
3563.8	2.80392	60.6	3583.8	2.79033	68.4	3603.8	2.77485	68.2	3623.8	2.75953	48.5
3564.0	2.80376	59.5	3584.0	2.79018	67.5	3604.0	2.77469	68.5	3624.0	2.75938	48.5
3564.2	2.80360	58.3	3584.2	2.79002	66.4	3604.2	2.77454	68.6	3624.2	2.75923	48.2
3564.4	2.80344	56.5	3584.4	2.78987	64.8	3604.4	2.77439	68.1	3624.4	2.75908	47.6
3564.6	2.80328	54.4	3584.6	2.78971	62.8	3604.6	2.77423	67.3	3624.6	2.75893	46.6
3564.8	2.80312	51.1	3584.8	2.78956	60.3	3604.8	2.77408	65.9	3624.8	2.75877	45.1
3565.0	2.80296	47.6	3585.0	2.78940	56.7	3605.0	2.77393	64.3	3625.0	2.75862	43.3
3565.2	2.80280	43.2	3585.2	2.78924	52.6	3605.2	2.77377	62.2	3625.2	2.75847	41.3
3565.4	2.80264	38.6	3585.4	2.78909	48.1	3605.4	2.77362	59.8	3625.4	2.75832	38.5
3565.6	2.80248	34.0	3585.6	2.78893	43.4	3605.6	2.77346	56.9	3625.6	2.75816	35.9
3565.8	2.80232	29.9	3585.8	2.78878	37.6	3605.8	2.77331	53.6	3625.8	2.75801	33.0
3566.0	2.80216	26.3	3586.0	2.78862	32.0	3606.0	2.77316	49.8	3626.0	2.75786	30.1
3566.2	2.80200	23.7	3586.2	2.78847	26.8	3606.2	2.77300	45.1	3626.2	2.75771	27.3
3566.4	2.80184	21.1	3586.4	2.78831	22.5	3606.4	2.77285	40.3	3626.4	2.75756	24.7
3566.6	2.80168	20.1	3586.6	2.78816	19.5	3606.6	2.77269	35.5	3626.6	2.75740	22.4
3566.8	2.80152	19.4	3586.8	2.78800	18.0	3606.8	2.77254	31.5	3626.8	2.75725	20.1
3567.0	2.80136	19.1	3587.0	2.78784	17.9	3607.0	2.77239	28.1	3627.0	2.75710	17.5
3567.2	2.80120	19.1	3587.2	2.78769	18.5	3607.2	2.77223				

Table 5-6 $\int A(\nu) d\nu$

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32
$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}
$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1
$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}
ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}
3430.0	0.	3465.0	1.566	3500.0	3.401	3535.0	8.768	3570.0	19.492	3605.0	33.499
3430.5	0.011	3465.5	1.574	3500.5	3.441	3535.5	8.822	3570.5	19.678	3605.5	33.691
3431.0	0.025	3466.0	1.587	3501.0	3.489	3536.0	8.903	3571.0	19.843	3606.0	33.919
3431.5	0.041	3466.5	1.610	3501.5	3.556	3536.5	9.012	3571.5	19.978	3606.5	34.200
3432.0	0.056	3467.0	1.653	3502.0	3.645	3537.0	9.113	3572.0	20.089	3607.0	34.537
3432.5	0.069	3467.5	1.687	3502.5	3.766	3537.5	9.188	3572.5	20.195	3607.5	34.904
3433.0	0.081	3468.0	1.703	3503.0	3.905	3538.0	9.242	3573.0	20.278	3608.0	35.281
3433.5	0.091	3468.5	1.711	3503.5	4.043	3538.5	9.285	3573.5	20.372	3608.5	35.666
3434.0	0.101	3469.0	1.716	3504.0	4.177	3539.0	9.322	3574.0	20.471	3609.0	36.134
3434.5	0.109	3469.5	1.720	3504.5	4.311	3539.5	9.359	3574.5	20.574	3609.5	36.599
3435.0	0.116	3470.0	1.724	3505.0	4.403	3540.0	9.396	3575.0	20.681	3610.0	37.037
3435.5	0.123	3470.5	1.732	3505.5	4.473	3540.5	9.434	3575.5	20.783	3610.5	37.422
3436.0	0.130	3471.0	1.739	3506.0	4.528	3541.0	9.473	3576.0	20.880	3611.0	37.768
3436.5	0.140	3471.5	1.745	3506.5	4.573	3541.5	9.517	3576.5	20.981	3611.5	38.111
3437.0	0.150	3472.0	1.750	3507.0	4.612	3542.0	9.568	3577.0	21.091	3612.0	38.485
3437.5	0.159	3472.5	1.754	3507.5	4.649	3542.5	9.636	3577.5	21.204	3612.5	38.898
3438.0	0.169	3473.0	1.760	3508.0	4.692	3543.0	9.725	3578.0	21.309	3613.0	39.325
3438.5	0.180	3473.5	1.769	3508.5	4.748	3543.5	9.837	3578.5	21.407	3613.5	39.729
3439.0	0.194	3474.0	1.780	3509.0	4.831	3544.0	9.971	3579.0	21.507	3614.0	40.107
3439.5	0.205	3474.5	1.798	3509.5	4.946	3544.5	10.126	3579.5	21.623	3614.5	40.482
3440.0	0.217	3475.0	1.823	3510.0	5.075	3545.0	10.325	3580.0	21.763	3615.0	40.855
3440.5	0.231	3475.5	1.851	3510.5	5.178	3545.5	10.564	3580.5	21.911	3615.5	41.206
3441.0	0.248	3476.0	1.872	3511.0	5.252	3546.0	10.789	3581.0	22.036	3616.0	41.531
3441.5	0.270	3476.5	1.886	3511.5	5.309	3546.5	11.012	3581.5	22.145	3616.5	41.851
3442.0	0.301	3477.0	1.897	3512.0	5.357	3547.0	11.301	3582.0	22.252	3617.0	42.190
3442.5	0.343	3477.5	1.906	3512.5	5.397	3547.5	11.561	3582.5	22.366	3617.5	42.570
3443.0	0.390	3478.0	1.915	3513.0	5.431	3548.0	11.738	3583.0	22.494	3618.0	42.985
3443.5	0.430	3478.5	1.926	3513.5	5.460	3548.5	11.872	3583.5	22.636	3618.5	43.409
3444.0	0.461	3479.0	1.939	3514.0	5.484	3549.0	11.980	3584.0	22.793	3619.0	43.840
3444.5	0.490	3479.5	1.958	3514.5	5.507	3549.5	12.071	3584.5	22.963	3619.5	44.288
3445.0	0.525	3480.0	1.989	3515.0	5.525	3550.0	12.157	3585.0	23.160	3620.0	44.745
3445.5	0.578	3480.5	2.038	3515.5	5.542	3550.5	12.245	3585.5	23.403	3620.5	45.184
3446.0	0.630	3481.0	2.103	3516.0	5.558	3551.0	12.343	3586.0	23.708	3621.0	45.592
3446.5	0.689	3481.5	2.162	3516.5	5.576	3551.5	12.461	3586.5	24.078	3621.5	45.966
3447.0	0.773	3482.0	2.227	3517.0	5.598	3552.0	12.614	3587.0	24.484	3622.0	46.302
3447.5	0.888	3482.5	2.311	3517.5	5.630	3552.5	12.796	3587.5	24.890	3622.5	46.602
3448.0	0.998	3483.0	2.383	3518.0	5.666	3553.0	12.971	3588.0	25.294	3623.0	46.877
3448.5	1.072	3483.5	2.430	3518.5	5.701	3553.5	13.123	3588.5	25.721	3623.5	47.140
3449.0	1.120	3484.0	2.463	3519.0	5.741	3554.0	13.266	3589.0	26.173	3624.0	47.398
3449.5	1.152	3484.5	2.490	3519.5	5.784	3554.5	13.389	3589.5	26.589	3624.5	47.658
3450.0	1.174	3485.0	2.515	3520.0	5.827	3555.0	13.478	3590.0	26.918	3625.0	47.931
3450.5	1.189	3485.5	2.540	3520.5	5.869	3555.5	13.547	3590.5	27.168	3625.5	48.229
3451.0	1.201	3486.0	2.570	3521.0	5.914	3556.0	13.608	3591.0	27.372	3626.0	48.560
3451.5	1.211	3486.5	2.600	3521.5	5.970	3556.5	13.668	3591.5	27.551	3626.5	48.927
3452.0	1.218	3487.0	2.631	3522.0	6.046	3557.0	13.733	3592.0	27.724	3627.0	49.324
3452.5	1.224	3487.5	2.671	3522.5	6.152	3557.5	13.800	3592.5	27.910	3627.5	49.755
3453.0	1.229	3488.0	2.733	3523.0	6.287	3558.0	13.868	3593.0	28.128	3628.0	50.218
3453.5	1.235	3488.5	2.807	3523.5	6.435	3558.5	13.937	3593.5	28.381	3628.5	50.697
3454.0	1.240	3489.0	2.857	3524.0	6.598	3559.0	14.015	3594.0	28.661	3629.0	51.180
3454.5	1.245	3489.5	2.886	3524.5	6.748	3559.5	14.114	3594.5	28.896	3629.5	51.665
3455.0	1.250	3490.0	2.904	3525.0	6.874	3560.0	14.243	3595.0	29.170	3630.0	52.148
3455.5	1.255	3490.5	2.918	3525.5	7.028	3560.5	14.399	3595.5	29.479	3630.5	52.617
3456.0	1.263	3491.0	2.932	3526.0	7.200	3561.0	14.550	3596.0	29.792	3631.0	53.050
3456.5	1.270	3491.5	2.947	3526.5	7.325	3561.5	14.685	3596.5	30.069	3631.5	53.438
3457.0	1.278	3492.0	2.960	3527.0	7.450	3562.0	14.822	3597.0	30.304	3632.0	53.784
3457.5	1.284	3492.5	2.970	3527.5	7.591	3562.5	14.974	3597.5	30.513	3632.5	54.105
3458.0	1.290	3493.0	2.979	3528.0	7.734	3563.0	15.139	3598.0	30.720	3633.0	54.422
3458.5	1.298	3493.5	2.989	3528.5	7.871	3563.5	15.317	3598.5	30.936	3633.5	54.755
3459.0	1.313	3494.0	3.002	3529.0	8.011	3564.0	15.513	3599.0	31.152	3634.0	55.105
3459.5	1.324	3494.5	3.019	3529.5	8.145	3564.5	15.724	3599.5	31.363	3634.5	55.432
3460.0	1.333	3495.0	3.046	3530.0	8.253	3565.0	15.965	3600.0	31.576	3635.0	55.712
3460.5	1.348	3495.5	3.084	3530.5	8.343	3565.5	16.255	3600.5	31.798		
3461.0	1.371	3496.0	3.127	3531.0	8.427	3566.0	16.600	3601.0	32.030		
3461.5	1.396	3496.5	3.173	3531.5	8.500	3566.5	16.984	3601.5	32.260		
3462.0	1.425	3497.0	3.221	3532.0	8.558	3567.0	17.386	3602.0	32.468		
3462.5	1.457	3497.5	3.262	3532.5	8.601	3567.5	17.793	3602.5	32.660		
3463.0	1.493	3498.0	3.292	3533.0	8.636	3568.0	18.221	3603.0	32.842		
3463.5	1.523	3498.5	3.317	3533.5	8.667	3568.5	18.638	3603.5	33.011		
3464.0	1.542	3499.0	3.340	3534.0	8.697	3569.0	18.993	3604.0	33.171		
3464.5	1.555	3499.5	3.366	3534.5	8.729	3569.5	19.272	3604.5	33.329		

Table 5-7 $\frac{1}{u} \int_{\nu}^{\nu} \ln T(\nu) d\nu$

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32
p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$
P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$
u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$
ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹
3430.0	0.	3480.0	8.126054e+002	3530.0	3.5416230e+003	3580.0	1.0764198e+004	3630.0	3.3377207e+004
3430.5	4.5145764e+000	3480.5	8.3278788e+002	3530.5	3.5805538e+003	3580.5	1.0832912e+004	3630.5	3.3923699e+004
3431.0	1.0034349e+001	3481.0	8.6004762e+002	3531.0	3.6161488e+003	3581.0	1.0899222e+004	3631.0	3.4322813e+004
3431.5	1.6344258e+001	3481.5	8.8468771e+002	3531.5	3.6471109e+003	3581.5	1.0937417e+004	3631.5	3.4616332e+004
3432.0	2.2147514e+001	3482.0	9.1194014e+002	3532.0	3.6711372e+003	3582.0	1.0984172e+004	3632.0	3.4847380e+004
3432.5	2.7266873e+001	3482.5	9.4779431e+002	3532.5	3.6890015e+003	3582.5	1.1035021e+004	3632.5	3.5048545e+004
3433.0	3.2076454e+001	3483.0	9.7861256e+002	3533.0	3.7029359e+003	3583.0	1.1092740e+004	3633.0	3.5244498e+004
3433.5	3.6199627e+001	3483.5	9.9790969e+002	3533.5	3.7154718e+003	3583.5	1.1158120e+004	3633.5	3.5459847e+004
3434.0	3.9967919e+001	3484.0	1.0113420e+003	3534.0	3.7276619e+003	3584.0	1.1231611e+004	3634.0	3.5694737e+004
3434.5	4.3179345e+001	3484.5	1.0220473e+003	3534.5	3.7406955e+003	3584.5	1.1313261e+004	3634.5	3.5903407e+004
3435.0	4.5924961e+001	3485.0	1.0320502e+003	3535.0	3.7565343e+003	3585.0	1.1411105e+004	3635.0	3.6064176e+004
3435.5	4.8703829e+001	3485.5	1.0421935e+003	3535.5	3.7747154e+003	3585.5	1.1514791e+004		
3436.0	5.1548174e+001	3486.0	1.0539653e+003	3536.0	3.8137456e+003	3586.0	1.1727183e+004		
3436.5	5.5339739e+001	3486.5	1.0661643e+003	3536.5	3.8614452e+003	3586.5	1.1952670e+004		
3437.0	5.9368943e+001	3487.0	1.0787259e+003	3537.0	3.9057630e+003	3587.0	1.2320541e+004		
3437.5	6.2918409e+001	3487.5	1.0951094e+003	3537.5	3.9374532e+003	3587.5	1.2647796e+004		
3438.0	6.6725726e+001	3488.0	1.1212299e+003	3538.0	3.9598834e+003	3588.0	1.2948815e+004		
3438.5	7.1295286e+001	3488.5	1.1522788e+003	3538.5	3.9774275e+003	3588.5	1.3349170e+004		
3439.0	7.6635557e+001	3489.0	1.1731209e+003	3539.0	3.9927432e+003	3589.0	1.3805557e+004		
3439.5	8.1236466e+001	3489.5	1.1847316e+003	3539.5	4.0076014e+003	3589.5	1.4144410e+004		
3440.0	8.6022136e+001	3490.0	1.1919565e+003	3540.0	4.0225163e+003	3590.0	1.4376624e+004		
3440.5	9.1012233e+001	3490.5	1.1973232e+003	3540.5	4.0379823e+003	3590.5	1.4513337e+004		
3441.0	9.6249801e+001	3491.0	1.2028101e+003	3541.0	4.0540860e+003	3591.0	1.4615431e+004		
3441.5	1.0703885e+002	3491.5	1.2089344e+003	3541.5	4.0719392e+003	3591.5	1.4702251e+004		
3442.0	1.1958222e+002	3492.0	1.2160852e+003	3542.0	4.0931561e+003	3592.0	1.4785263e+004		
3442.5	1.3685056e+002	3492.5	1.2179015e+003	3542.5	4.1217179e+003	3592.5	1.4876260e+004		
3443.0	1.5607319e+002	3493.0	1.2215843e+003	3543.0	4.1594801e+003	3593.0	1.4988432e+004		
3443.5	1.7210895e+002	3493.5	1.2256132e+003	3543.5	4.2097634e+003	3593.5	1.5126266e+004		
3444.0	1.8484784e+002	3494.0	1.2306327e+003	3544.0	4.2704632e+003	3594.0	1.5270009e+004		
3444.5	1.9655326e+002	3494.5	1.2375228e+003	3544.5	4.3431420e+003	3594.5	1.5409593e+004		
3445.0	2.1086260e+002	3495.0	1.2483060e+003	3545.0	4.4429332e+003	3595.0	1.5564805e+004		
3445.5	2.3251429e+002	3495.5	1.2636149e+003	3545.5	4.5701700e+003	3595.5	1.5753381e+004		
3446.0	2.5410374e+002	3496.0	1.2811954e+003	3546.0	4.6873604e+003	3596.0	1.5946022e+004		
3446.5	2.7843250e+002	3496.5	1.3001645e+003	3546.5	4.8025558e+003	3596.5	1.6104338e+004		
3447.0	3.1474079e+002	3497.0	1.3200614e+003	3547.0	4.9725726e+003	3597.0	1.6228527e+004		
3447.5	3.6598700e+002	3497.5	1.3361789e+003	3547.5	5.1172815e+003	3597.5	1.6334670e+004		
3448.0	4.1419851e+002	3498.0	1.3489820e+003	3548.0	5.2030790e+003	3598.0	1.6439364e+004		
3448.5	4.4572859e+002	3498.5	1.3586990e+003	3548.5	5.2640807e+003	3598.5	1.6549409e+004		
3449.0	4.6547761e+002	3499.0	1.3678571e+003	3549.0	5.3120012e+003	3599.0	1.6660177e+004		
3449.5	4.7841519e+002	3499.5	1.3768898e+003	3549.5	5.3513273e+003	3599.5	1.6767729e+004		
3450.0	4.8716719e+002	3500.0	1.3927051e+003	3550.0	5.3879167e+003	3600.0	1.6876209e+004		
3450.5	4.9320758e+002	3500.5	1.4088116e+003	3550.5	5.4261820e+003	3600.5	1.6990567e+004		
3451.0	4.9811863e+002	3501.0	1.4287241e+003	3551.0	5.4688863e+003	3601.0	1.7112811e+004		
3451.5	5.0197772e+002	3501.5	1.4567162e+003	3551.5	5.5215894e+003	3601.5	1.7230700e+004		
3452.0	5.0485624e+002	3502.0	1.4954125e+003	3552.0	5.5927995e+003	3602.0	1.7338980e+004		
3452.5	5.0712155e+002	3502.5	1.5497263e+003	3552.5	5.681386e+003	3602.5	1.7433567e+004		
3453.0	5.0923218e+002	3503.0	1.6133005e+003	3553.0	5.7859495e+003	3603.0	1.7521799e+004		
3453.5	5.1135307e+002	3503.5	1.6763032e+003	3553.5	5.8367228e+003	3603.5	1.7602663e+004		
3454.0	5.1337727e+002	3504.0	1.7376277e+003	3554.0	5.9026977e+003	3604.0	1.7678011e+004		
3454.5	5.1525521e+002	3504.5	1.7985051e+003	3554.5	5.9575738e+003	3604.5	1.7752462e+004		
3455.0	5.1721117e+002	3505.0	1.8383252e+003	3555.0	5.9961041e+003	3605.0	1.7833264e+004		
3455.5	5.1936827e+002	3505.5	1.8847713e+003	3555.5	6.0254257e+003	3605.5	1.7920293e+004		
3456.0	5.2135944e+002	3506.0	1.890754e+003	3556.0	6.0508193e+003	3606.0	1.8047951e+004		
3456.5	5.2531678e+002	3506.5	1.9090435e+003	3556.5	6.0798328e+003	3606.5	1.8209645e+004		
3457.0	5.2814320e+002	3507.0	1.9248427e+003	3557.0	6.1027313e+003	3607.0	1.8429377e+004		
3457.5	5.3080447e+002	3507.5	1.9401574e+003	3557.5	6.1309825e+003	3607.5	1.8689840e+004		
3458.0	5.3292358e+002	3508.0	1.9575000e+003	3558.0	6.1594556e+003	3608.0	1.8963454e+004		
3458.5	5.3634697e+002	3508.5	1.9809914e+003	3558.5	6.1886870e+003	3608.5	1.9290186e+004		
3459.0	5.4222701e+002	3509.0	2.0165710e+003	3559.0	6.2219735e+003	3609.0	1.9793314e+004		
3459.5	5.4639936e+002	3509.5	2.0676628e+003	3559.5	6.2647832e+003	3609.5	2.0257593e+004		
3460.0	5.5019745e+002	3510.0	2.1261159e+003	3560.0	6.3233865e+003	3610.0	2.0670834e+004		
3460.5	5.5597012e+002	3510.5	2.1708574e+003	3560.5	6.3964779e+003	3610.5	2.0960843e+004		
3461.0	5.6534944e+002	3511.0	2.2021955e+003	3561.0	6.4467094e+003	3611.0	2.1191475e+004		
3461.5	5.7533297e+002	3511.5	2.2262173e+003	3561.5	6.5286695e+003	3611.5	2.1418618e+004		
3462.0	5.8683945e+002	3512.0	2.2458203e+003	3562.0	6.5909504e+003	3612.0	2.1688040e+004		
3462.5	5.9943507e+002	3512.5	2.2621642e+003	3562.5	6.6618398e+003	3612.5	2.2032317e+004		
3463.0	6.1465712e+002	3513.0	2.2758144e+003	3563.0	6.7402601e+003	3613.0	2.2408344e+004		
3463.5	6.2654496e+002	3513.5	2.2874375e+003	3563.5	6.8266359e+003	3613.5	2.2732566e+004		
3464.0	6.3499418e+002	3514.0	2.2973148e+003	3564.0	6.9217108e+003	3614.0	2.3008218e+004		
3464.5	6.3934495e+002	3514.5	2.3062064e+003	3564.5	7.0312174e+003	3614.5	2.3279791e+004		
3465.0	6.4348913e+002	3515.0	2.3137448e+003	3565.0	7.1600142e+003	3615.0	2.3548718e+004		
3465.5	6.4698253e+002	3515.5	2.3202080e+003	3565.5	7.3033006e+003	3615.5	2.3784755e+004		
3466.0	6.5180154e+002	3516.0	2.3267168e+003	3566.0	7.5602598e+003	3616.0	2.3991036e+004		
3466.5	6.6134127e+002	3516.5	2.3338470e+003	3566.5	7.8464817e+003	3616.5	2.4189919e+004		
3467.0	6.7860264e+002	3517.0	2.3426907e+003	3567.0	8.1645851e+003	3617.0	2.4412195e+004		
3467.5	6.9258028e+002	3517.5	2.3552545e+003	3567.5	8.4939903e+003	3617.5	2.4693667e+004		
3468.0	7.0885721e+002	3518.0	2.3701749e+003	3568.0	8.8742957e+003	3618.0	2.5041070e+004		
3468.5	7.0207696e+002	3518.5	2.3844171e+003	3568.5	9.2295030e+003	3618.5	2.5408823e+004		
3469.0	7.0407855e+002	3519.0	2.4005382e+003	3569.0	9.4734170e+003	3619.0	2.5795484e+004		
3469.5	7.0561614e+002	3519.5	2.4182787e+003	3569.5	9.6347745e+003	3619.5	2.6241916e+004		
3470.0	7.0729705e+002	3520.0	2.4357751e+003	3570.0	9.7480214e+003	3620.0	2.6719370e+004		
3470.5	7.1017655e+002	3520.5	2.4528936e+003	3570.5	9.8391586e+003	3620.5	2.7133856e+004		
3471.0	7.1296990e+002	3521.0	2.4715806e+003	3571.0	9.9157244e+003	3621.0	2.7465266e+004		
3471.5	7.1532254e+002	3521.5	2.4948891e+003	3571.5	9.9793866e+003	3621.5	2.7736511e+004		
3472.0	7.1742212e+002								

Table 5-8

Sam. No.	33	34	Sam. No.	33	34	Sam. No.	33	34	Sam. No.	33	34
$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$	$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$	$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$	$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$
$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$	$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$	$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$	$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$
$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$
λ (μm)			λ (μm)			λ (μm)			λ (μm)		
T 100			T 100			T 100			T 100		
3540.0	2.82486	96.6	97.2	3564.0	2.80584	84.3	74.4	3588.0	2.78707	59.0	54.8
3540.2	2.82470	96.8	97.1	3564.2	2.80568	84.9	83.7	3588.2	2.78691	52.4	50.7
3540.4	2.82454	96.6	97.2	3564.4	2.80552	84.9	82.9	3588.4	2.78676	42.0	46.7
3540.6	2.82438	96.5	97.3	3564.6	2.80536	81.9	81.7	3588.6	2.78660	31.4	41.8
3540.8	2.82422	96.8	97.1	3564.8	2.80521	82.2	80.0	3588.8	2.78645	24.5	41.2
3541.0	2.82406	96.8	97.0	3565.0	2.80505	79.4	78.0	3589.0	2.78629	37.8	44.8
3541.2	2.82390	96.8	96.8	3565.2	2.80489	75.3	75.2	3589.2	2.78614	52.0	51.8
3541.4	2.82374	96.5	96.7	3565.4	2.80473	69.3	72.0	3589.4	2.78598	65.4	60.1
3541.6	2.82358	96.2	96.3	3565.6	2.80458	63.9	66.8	3589.6	2.78583	78.6	67.2
3541.8	2.82342	96.0	96.1	3565.8	2.80442	59.5	65.8	3589.8	2.78567	80.4	72.8
3542.0	2.82326	95.5	95.7	3566.0	2.80426	56.6	63.1	3590.0	2.78552	83.7	77.1
3542.2	2.82310	96.8	95.0	3566.2	2.80410	54.2	60.8	3590.2	2.78536	86.1	80.2
3542.4	2.82294	95.8	96.6	3566.4	2.80395	51.4	58.5	3590.4	2.78520	87.5	82.2
3542.6	2.82278	92.4	93.9	3566.6	2.80379	49.7	57.2	3590.6	2.78505	88.8	84.1
3542.8	2.82263	91.7	93.1	3566.8	2.80363	51.1	56.6	3590.8	2.78489	89.9	85.5
3543.0	2.82247	91.0	92.5	3567.0	2.80348	55.7	56.7	3591.0	2.78474	90.7	86.3
3543.2	2.82231	90.5	91.8	3567.2	2.80332	59.1	56.7	3591.2	2.78458	91.1	87.6
3543.4	2.82215	89.2	90.9	3567.4	2.80316	57.6	54.5	3591.4	2.78443	91.5	87.6
3543.6	2.82199	88.5	90.4	3567.6	2.80300	49.0	51.0	3591.6	2.78427	91.4	87.6
3543.8	2.82183	88.5	90.0	3567.8	2.80285	40.5	48.3	3591.8	2.78412	91.3	87.6
3544.0	2.82167	88.5	89.4	3568.0	2.80269	38.0	46.4	3592.0	2.78396	90.7	87.2
3544.2	2.82151	87.9	88.5	3568.2	2.80253	43.7	52.4	3592.2	2.78381	89.7	86.5
3544.4	2.82135	86.6	87.3	3568.4	2.80238	51.7	58.0	3592.4	2.78365	87.7	85.6
3544.6	2.82119	85.4	85.5	3568.6	2.80222	54.1	57.8	3592.6	2.78350	85.6	84.6
3544.8	2.82103	79.2	83.3	3568.8	2.80206	68.2	68.5	3592.8	2.78334	81.7	82.6
3545.0	2.82087	74.9	81.5	3569.0	2.80191	75.4	72.8	3593.0	2.78319	77.0	81.2
3545.2	2.82072	72.9	79.3	3569.2	2.80175	80.6	76.6	3593.2	2.78303	71.7	74.8
3545.4	2.82056	75.2	82.4	3569.4	2.80159	84.1	79.8	3593.4	2.78288	73.2	79.1
3545.6	2.82040	80.1	81.7	3569.6	2.80143	86.7	82.2	3593.6	2.78272	75.7	79.0
3545.8	2.82024	83.3	82.9	3569.8	2.80128	87.8	84.1	3593.8	2.78257	79.3	79.5
3546.0	2.82008	86.3	83.6	3570.0	2.80112	89.5	85.3	3594.0	2.78242	81.7	79.8
3546.2	2.81992	86.0	82.0	3570.2	2.80096	87.3	86.0	3594.2	2.78226	83.1	80.0
3546.4	2.81976	80.9	80.1	3570.4	2.80080	87.2	86.8	3594.4	2.78211	83.1	79.4
3546.6	2.81960	71.9	75.8	3570.6	2.80065	87.2	87.5	3594.6	2.78195	81.3	78.4
3546.8	2.81944	66.9	72.7	3570.8	2.80049	88.6	88.4	3594.8	2.78180	77.7	77.0
3547.0	2.81928	67.7	74.1	3571.0	2.80034	90.4	89.3	3595.0	2.78164	71.8	75.1
3547.2	2.81912	75.2	78.2	3571.2	2.80018	92.2	90.5	3595.2	2.78149	65.4	73.2
3547.4	2.81896	81.8	82.5	3571.4	2.80002	93.5	91.3	3595.4	2.78133	62.6	72.8
3547.6	2.81881	86.1	85.5	3571.6	2.79987	94.1	92.1	3595.6	2.78118	64.8	72.1
3547.8	2.81865	88.5	87.7	3571.8	2.79971	94.7	92.6	3595.8	2.78102	69.8	71.3
3548.0	2.81849	89.3	89.3	3572.0	2.79955	94.9	93.2	3596.0	2.78087	74.4	75.2
3548.2	2.81833	89.7	90.5	3572.2	2.79940	95.1	93.6	3596.2	2.78071	77.8	77.2
3548.4	2.81817	90.4	91.2	3572.4	2.79924	95.2	93.7	3596.4	2.78056	80.5	78.6
3548.6	2.81801	91.8	92.0	3572.6	2.79908	95.0	93.8	3596.6	2.78040	83.8	81.3
3548.8	2.81785	92.7	92.6	3572.8	2.79893	94.6	93.9	3596.8	2.78025	86.2	82.8
3549.0	2.81770	93.8	93.2	3573.0	2.79877	94.6	93.7	3597.0	2.78009	87.7	81.8
3549.2	2.81754	96.8	93.0	3573.2	2.79862	94.2	93.7	3597.2	2.77994	88.1	81.2
3549.4	2.81738	96.7	91.9	3573.4	2.79846	93.9	93.5	3597.4	2.77979	88.0	80.9
3549.6	2.81722	96.5	91.1	3573.6	2.79830	93.7	93.5	3597.6	2.77963	86.9	80.9
3549.8	2.81706	96.4	91.1	3573.8	2.79814	93.3	93.2	3597.8	2.77948	85.1	80.4
3550.0	2.81690	96.1	94.0	3574.0	2.79799	92.9	93.2	3598.0	2.77932	91.3	86.1
3550.2	2.81674	93.8	93.8	3574.2	2.79783	91.9	93.0	3598.2	2.77917	81.8	81.6
3550.4	2.81658	93.4	93.4	3574.4	2.79767	91.2	92.8	3598.4	2.77901	82.0	81.7
3550.6	2.81643	93.3	93.3	3574.6	2.79752	91.2	92.8	3598.6	2.77886	82.9	81.9
3550.8	2.81627	92.9	92.8	3574.8	2.79736	91.7	92.9	3598.8	2.77870	86.0	83.9
3551.0	2.81611	92.7	92.2	3575.0	2.79720	92.2	93.0	3599.0	2.77855	85.3	84.3
3551.2	2.81595	91.5	91.5	3575.2	2.79705	91.1	93.3	3599.2	2.77840	85.5	84.3
3551.4	2.81579	89.6	89.6	3575.4	2.79689	93.8	93.2	3599.4	2.77824	85.6	84.5
3551.6	2.81563	88.1	88.1	3575.6	2.79673	88.1	91.7	3599.6	2.77809	84.7	84.7
3551.8	2.81547	85.6	88.1	3575.8	2.79658	94.6	91.7	3599.8	2.77793	84.5	85.0
3552.0	2.81532	79.8	86.7	3576.0	2.79642	94.6	93.6	3600.0	2.77778	83.9	83.7
3552.2	2.81516	78.3	86.1	3576.2	2.79626	93.7	93.5	3600.2	2.77762	83.1	83.4
3552.4	2.81500	78.1	86.0	3576.4	2.79611	92.6	93.1	3600.4	2.77747	81.8	82.4
3552.6	2.81484	82.4	86.4	3576.6	2.79595	91.7	92.8	3600.6	2.77731	79.6	82.4
3552.8	2.81468	85.9	87.4	3576.8	2.79580	90.6	92.5	3600.8	2.77716	77.4	82.1
3553.0	2.81452	88.3	88.3	3577.0	2.79564	90.1	92.2	3601.0	2.77701	75.7	82.0
3553.2	2.81436	89.6	89.0	3577.2	2.79548	90.5	92.4	3601.2	2.77686	78.8	82.3
3553.4	2.81421	89.2	89.4	3577.4	2.79533	91.7	92.5	3601.4	2.77670	81.5	83.0
3553.6	2.81405	88.0	89.5	3577.6	2.79517	93.2	93.0	3601.6			

Table 5-8 (Cont'd)

Sam. No.	33	34	Sam. No.	35	36	Sam. No.	37	38	Sam. No.	39	40	Sam. No.	41	42	
p(ata)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(ata)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(ata)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(ata)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(ata)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	
P _g (ata)	5.02 $\times 10^0$	1.002 $\times 10^0$	P _g (ata)	5.02 $\times 10^0$	1.002 $\times 10^0$	P _g (ata)	5.02 $\times 10^0$	1.002 $\times 10^0$	P _g (ata)	5.02 $\times 10^0$	1.002 $\times 10^0$	P _g (ata)	5.02 $\times 10^0$	1.002 $\times 10^0$	
w(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	w(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	w(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	w(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	w(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	
(cm ⁻¹)	(microns)	T n 100	(cm ⁻¹)	(microns)	T n 100	(cm ⁻¹)	(microns)	T n 100	(cm ⁻¹)	(microns)	T n 100	(cm ⁻¹)	(microns)	T n 100	
3660.0	2.73224	86.4	81.3	3660.0	2.73164	85.5	79.2	3700.0	2.69687	73.6	66.5	3732.0	2.67951	18.5	31.0
3660.2	2.73209	87.2	81.9	3660.2	2.73149	82.5	74.5	3700.2	2.69673	69.2	63.4	3732.2	2.67938	18.0	30.4
3660.4	2.73194	87.9	82.5	3660.4	2.73135	81.3	73.7	3700.4	2.69658	63.4	62.1	3730.4	2.67926	21.9	30.9
3660.6	2.73179	88.9	83.0	3660.6	2.73160	80.5	72.9	3700.6	2.69646	57.0	56.7	3732.6	2.67910	29.0	32.7
3660.8	2.73164	89.1	83.4	3660.8	2.73145	80.4	72.1	3700.8	2.69632	49.1	53.7	3732.8	2.67895	36.7	34.9
3661.0	2.73149	89.9	83.7	3661.0	2.73130	80.5	71.2	3700.0	2.69616	42.1	51.1	3733.0	2.67881	43.9	37.1
3661.2	2.73134	90.2	84.2	3661.2	2.73115	80.5	70.4	3700.2	2.69602	36.0	48.7	3733.2	2.67867	48.6	39.1
3661.4	2.73120	90.2	84.5	3661.4	2.73101	80.1	69.2	3700.4	2.69588	35.4	47.5	3733.4	2.67853	51.0	40.2
3661.6	2.73105	90.4	84.7	3661.6	2.73086	79.1	67.6	3700.6	2.69573	30.5	47.2	3733.6	2.67838	51.0	40.3
3661.8	2.73090	90.5	84.7	3661.8	2.73072	77.7	65.8	3700.8	2.69558	23.8	47.0	3733.8	2.67824	48.5	39.4
3662.0	2.73075	90.6	84.9	3662.0	2.73057	76.0	63.5	3710.0	2.69542	69.4	47.1	3734.0	2.67809	43.5	37.2
3662.2	2.73060	90.6	84.9	3662.2	2.73042	73.4	61.5	3710.2	2.69527	53.4	46.7	3734.2	2.67795	37.3	36.5
3662.4	2.73045	90.9	85.1	3662.4	2.73027	70.2	57.8	3710.4	2.69513	39.8	46.0	3734.4	2.67781	30.5	35.8
3662.6	2.73030	90.8	84.9	3662.6	2.73013	64.1	53.7	3710.6	2.69498	31.1	46.0	3734.6	2.67766	24.9	28.0
3662.8	2.73015	90.8	85.0	3662.8	2.73000	61.4	49.7	3710.8	2.69484	23.5	46.7	3734.8	2.67752	21.2	25.0
3663.0	2.73000	90.6	84.7	3663.0	2.72985	55.8	45.2	3711.0	2.69469	48.2	44.3	3735.0	2.67738	20.0	24.3
3663.2	2.72985	90.7	84.7	3663.2	2.72970	48.0	40.5	3711.2	2.69455	43.0	41.9	3735.2	2.67723	21.0	23.0
3663.4	2.72970	90.7	84.5	3663.4	2.72955	40.2	35.2	3711.4	2.69440	35.5	39.0	3735.4	2.67709	23.7	24.0
3663.6	2.72955	90.5	84.5	3663.6	2.72940	30.8	30.1	3711.6	2.69426	30.0	35.0	3735.6	2.67695	26.1	24.2
3663.8	2.72940	90.5	84.2	3663.8	2.72925	22.1	25.7	3711.8	2.69411	23.5	32.0	3735.8	2.67680	28.3	23.9
3664.0	2.72925	90.1	83.8	3664.0	2.72910	14.4	22.1	3712.0	2.69397	17.5	30.5	3736.0	2.67666	27.6	22.9
3664.2	2.72910	90.1	83.4	3664.2	2.72895	9.5	17.5	3712.2	2.69382	11.1	28.6	3736.2	2.67652	23.5	21.1
3664.4	2.72895	89.7	83.2	3664.4	2.72880	7.4	16.3	3712.4	2.69368	15.7	28.0	3736.4	2.67637	17.0	19.1
3664.6	2.72880	89.1	82.7	3664.6	2.72865	6.4	15.0	3712.6	2.69353	20.4	32.0	3736.6	2.67623	17.0	17.8
3664.8	2.72865	89.2	82.2	3664.8	2.72850	14.3	21.0	3712.8	2.69339	27.6	32.4	3736.8	2.67609	17.9	18.1
3665.0	2.72850	88.7	81.6	3665.0	2.72835	21.5	26.3	3713.0	2.69324	37.0	36.5	3737.0	2.67595	19.4	21.2
3665.2	2.72835	88.2	80.9	3665.2	2.72820	29.6	28.2	3713.2	2.69309	46.0	41.2	3737.2	2.67580	24.9	25.7
3665.4	2.72820	87.7	80.1	3665.4	2.72805	17.5	27.1	3713.4	2.69295	55.4	45.0	3737.4	2.67566	42.1	31.0
3665.6	2.72805	87.0	79.4	3665.6	2.72790	41.0	35.7	3713.6	2.69280	62.5	51.1	3737.6	2.67551	46.9	35.0
3665.8	2.72790	86.3	78.3	3665.8	2.72775	67.5	38.6	3713.8	2.69266	67.5	55.2	3737.8	2.67537	50.0	39.5
3666.0	2.72775	85.6	77.3	3666.0	2.72760	48.4	40.4	3714.0	2.69251	70.7	58.3	3738.0	2.67523	50.0	42.8
3666.2	2.72760	84.8	76.0	3666.2	2.72745	47.9	41.8	3714.2	2.69237	71.7	60.4	3738.2	2.67509	50.7	45.0
3666.4	2.72745	83.9	74.8	3666.4	2.72730	45.3	42.0	3714.4	2.69222	72.2	61.3	3738.4	2.67494	51.0	47.0
3666.6	2.72730	82.8	73.0	3666.6	2.72715	41.5	41.7	3714.6	2.69208	65.0	61.0	3738.6	2.67480	55.1	49.1
3666.8	2.72715	81.3	71.3	3666.8	2.72700	36.5	41.2	3714.8	2.69193	63.4	61.2	3738.8	2.67465	59.6	50.9
3667.0	2.72700	79.5	69.2	3667.0	2.72685	32.3	41.1	3715.0	2.69179	66.4	62.6	3739.0	2.67451	63.5	52.4
3667.2	2.72685	78.9	69.6	3667.2	2.72670	31.1	41.7	3715.2	2.69165	70.1	66.2	3739.2	2.67437	66.5	54.0
3667.4	2.72670	76.1	63.7	3667.4	2.72655	34.3	43.3	3715.4	2.69150	70.9	70.0	3739.4	2.67423	68.4	54.0
3667.6	2.72655	69.1	64.3	3667.6	2.72640	41.8	46.4	3715.6	2.69136	83.1	75.2	3739.6	2.67408	69.3	55.1
3667.8	2.72640	68.6	56.5	3667.8	2.72625	51.0	50.4	3715.8	2.69121	86.4	75.3	3739.8	2.67394	68.0	55.2
3668.0	2.72625	57.7	52.4	3668.0	2.72610	59.4	56.5	3716.0	2.69107	85.2	76.8	3740.0	2.67380	67.3	54.5
3668.2	2.72610	49.7	48.2	3668.2	2.72595	65.0	58.2	3716.2	2.69092	83.0	78.0	3740.2	2.67365	65.1	53.4
3668.4	2.72595	48.4	48.0	3668.4	2.72580	70.8	62.0	3716.4	2.69078	81.4	78.1	3740.4	2.67351	61.7	51.0
3668.6	2.72580	34.0	41.1	3668.6	2.72565	76.7	65.1	3716.6	2.69063	66.0	76.4	3740.6	2.67337	57.0	50.0
3668.8	2.72565	37.4	38.4	3668.8	2.72550	77.2	68.1	3716.8	2.69049	66.9	76.7	3740.8	2.67322	53.0	48.2
3669.0	2.72550	31.6	34.6	3669.0	2.72535	77.0	70.4	3717.0	2.69034	87.1	79.0	3741.0	2.67308	50.7	46.6
3669.2	2.72535	34.0	35.6	3669.2	2.72520	84.4	72.3	3717.2	2.69020	87.4	80.0	3741.2	2.67294	50.6	47.7
3669.4	2.72520	37.4	34.5	3669.4	2.72505	81.4	70.0	3717.4	2.69005	70.4	78.0	3741.4	2.67280	53.0	45.2
3669.6	2.72505	37.4	32.7	3669.6	2.72490	82.6	75.5	3717.6	2.68991	66.0	79.3	3741.6	2.67265	56.0	46.6
3669.8	2.72490	34.0	30.0	3669.8	2.72475	83.7	76.6	3717.8	2.68976	66.0	78.0	3741.8	2.67251	57.9	45.0
3670.0	2.72475	28.2	27.0	3670.0	2.72460	84.7	77.7	3718.0	2.68962	82.0	77.0	3742.0	2.67237	58.2	42.5
3670.2	2.72460	21.5	23.0	3670.2	2.72445	85.7	76.6	3718.2	2.68947	80.2	76.0	3742.2	2.67222	56.0	40.1
3670.4	2.72445	16.0	21.1	3670.4	2.72430	84.3	74.6	3718.4	2.68933	78.2	75.0	3742.4	2.67208	56.0	37.4
3670.6	2.72430	10.8	19.0	3670.6	2.72415	87.0	80.9	3718.6	2.68918	71.7	73.6	3742.6	2.67194	60.7	33.0
3670.8	2.72415	8.0	18.1	3670.8	2.72400	87.5	81.3	3718.8	2.68904	68.4	72.0	3742.8	2.67180	61.0	39.4
3671.0	2.72400	11.0	18.9	3671.0	2.72385	88.1	81.9	3719.0	2.68889	67.7	72.8	3743.0	2.67165	56.7	25.1
3671.2	2.72385	16.7	21.4	3671.2	2.72370	88.4	82.2	3719.2	2.68875	70.3	71.9	3743.2	2.67151	28.5	20.2
3671.4	2.72370	28.1	25.0	3671.4	2.72355	88.9	82.7	3719.4	2.68860	70.2	72.0	3743.4	2.67137	29.5	16.0
3671.6	2.72355	36.0	29.1	3671.6	2.72340	89.6	82.9	3719.6	2.68846	77.7	73.3	3743.6	2.67123	12.9	9.1
3671.8	2.72340	62.4	33.5	3671.8	2.72325	87.9	83.0	3719.8	2.68832	80.0	74.1	3743.8	2.67109	6.2	9.0
3672.0	2.72325	49.9	37.5	3672.0	2.72310	87.2	82.8	3720.0	2.68817	81.5	76.7	3744.0	2.67095	5.1	7.0
3672.2	2.72310	55.1	41.1	3672.2	2.72295	82.1	82.9	3720.2	2.68803	82.4	80.0	3744.2	2.67081	32.4	16.0
3672.4	2.72295	59.0	43.0	3672.4	2.72280	80.1	81.0	3720.4	2.68789	82.7	79.1	3744.4	2.67067	5.4	7.0
3672.6	2.72280	61.4	45.1	3672.6	2.72265	86.7	83.1	3720.6	2.68774	87.4	79.1	3744.6	2.67053	5.5	4.7
3672.8	2.72265	62.9	47.2	3672.8	2.72250	87.7	83.5	3720.8	2.68760	81.1	76.2	3744.8	2.67039	5.1	5.3
3673.0	2.72250	61.2	47.5	3673.0	2.72235	88.4	84.0	3721.0	2.68746	78.4	72.8	3745.0	2.67025	6.1	6.0
3673.2	2.72235	62.0	46.9	3673.2	2.72220	89.7	84.3								

Table 5-8 (Cont'd)

Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	
p(atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	p(atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	
P ₀ (atm)	5.02 $\times 10^0$	1.002 $\times 10^1$	P ₀ (atm)	5.02 $\times 10^0$	1.002 $\times 10^1$	P ₀ (atm)	5.02 $\times 10^0$	1.002 $\times 10^1$	P ₀ (atm)	5.02 $\times 10^0$	1.002 $\times 10^1$	P ₀ (atm)	5.02 $\times 10^0$	1.002 $\times 10^1$	
v(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	v(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	v(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	v(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	v(gm/cm ³)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	
λ (cm ⁻¹)	λ (micron)	T x 100	T x 100	λ (cm ⁻¹)	λ (micron)	T x 100	T x 100	λ (cm ⁻¹)	λ (micron)	T x 100	T x 100	λ (cm ⁻¹)	λ (micron)	T x 100	T x 100
1780.0	2.64550	61.1	67.4	1804.0	2.62881	65.5	70.9	1828.0	2.61213	75.3	67.5	1852.0	2.59545	7.2	11.0
1780.2	2.64558	69.8	70.0	1804.2	2.62887	67.8	72.7	1828.2	2.61219	76.7	68.1	1852.2	2.59552	7.5	11.1
1780.4	2.64562	78.8	72.5	1804.4	2.62894	69.0	73.9	1828.4	2.61226	78.3	69.8	1852.4	2.59559	17.0	7.9
1780.6	2.64568	80.3	75.1	1804.6	2.62900	69.8	76.5	1828.6	2.61192	79.4	70.5	1852.6	2.59565	12.9	17.1
1780.8	2.64574	80.4	77.3	1804.8	2.62876	69.2	76.3	1828.8	2.61178	80.4	71.0	1852.8	2.59551	14.0	7.9
1781.0	2.64480	85.5	78.9	1805.0	2.62812	68.4	75.6	1829.0	2.61165	81.7	71.4	1853.0	2.59538	12.5	9.0
1781.2	2.64466	87.0	80.3	1805.2	2.62798	68.4	77.3	1829.2	2.61151	82.0	71.3	1853.2	2.59525	9.6	7.9
1781.4	2.64452	88.0	81.6	1805.4	2.62784	63.7	70.3	1829.4	2.61138	81.9	70.9	1853.4	2.59511	6.7	6.6
1781.6	2.64438	88.6	82.5	1805.6	2.62771	60.6	68.1	1829.6	2.61124	81.7	70.4	1853.6	2.59498	4.6	5.7
1781.8	2.64424	89.8	83.0	1805.8	2.62757	59.9	67.3	1829.8	2.61110	80.9	69.4	1853.8	2.59484	3.7	5.1
1782.0	2.64410	89.5	83.8	1806.0	2.62743	49.4	63.0	1830.0	2.61097	79.4	68.0	1854.0	2.59471	3.6	5.2
1782.2	2.64396	90.1	84.4	1806.2	2.62729	41.9	58.9	1830.2	2.61083	77.4	66.3	1854.2	2.59457	4.4	5.9
1782.4	2.64382	90.6	84.6	1806.4	2.62715	33.7	54.9	1830.4	2.61069	76.7	65.7	1854.4	2.59444	6.9	7.5
1782.6	2.64368	90.8	84.9	1806.6	2.62702	25.8	51.7	1830.6	2.61056	71.3	61.7	1854.6	2.59430	11.9	10.5
1782.8	2.64354	90.9	84.9	1806.8	2.62688	19.2	29.4	1830.8	2.61042	66.1	58.5	1854.8	2.59417	18.8	14.3
1783.0	2.64340	90.8	86.7	1807.0	2.62674	15.0	28.3	1831.0	2.61028	59.0	55.3	1855.0	2.59403	27.2	14.7
1783.2	2.64326	90.2	86.7	1807.2	2.62660	15.8	28.3	1831.2	2.61015	59.0	55.3	1855.2	2.59390	36.1	23.7
1783.4	2.64313	89.8	86.1	1807.4	2.62646	20.1	30.6	1831.4	2.61001	42.7	49.7	1855.4	2.59376	63.5	24.7
1783.6	2.64299	88.2	83.4	1807.6	2.62633	27.9	34.0	1831.6	2.60988	37.4	48.1	1855.6	2.59363	69.3	31.4
1783.8	2.64285	86.5	82.6	1807.8	2.62619	37.8	38.4	1831.8	2.60974	37.3	48.0	1855.8	2.59350	53.7	37.3
1784.0	2.64271	83.7	81.5	1808.0	2.62605	47.7	43.3	1832.0	2.60960	42.1	49.2	1856.0	2.59336	56.7	43.6
1784.2	2.64257	80.7	80.8	1808.2	2.62591	55.4	47.8	1832.2	2.60947	49.1	51.2	1856.2	2.59323	57.8	43.5
1784.4	2.64243	78.1	80.0	1808.4	2.62577	62.8	52.6	1832.4	2.60933	56.5	53.6	1856.4	2.59310	56.6	45.1
1784.6	2.64229	76.9	79.6	1808.6	2.62564	68.2	56.9	1832.6	2.60919	62.4	55.9	1856.6	2.59296	53.8	46.2
1784.8	2.64215	77.6	79.5	1808.8	2.62550	72.5	60.5	1832.8	2.60906	67.3	57.6	1856.8	2.59282	50.7	47.2
1785.0	2.64201	74.3	83.1	1809.0	2.62536	75.7	63.4	1833.0	2.60892	70.1	58.8	1857.0	2.59269	50.9	47.8
1785.2	2.64187	81.5	80.6	1809.2	2.62522	78.1	66.1	1833.2	2.60879	71.3	59.0	1857.2	2.59255	57.2	51.1
1785.4	2.64173	83.7	81.6	1809.4	2.62508	80.1	68.9	1833.4	2.60865	71.7	57.7	1857.4	2.59242	61.0	54.6
1785.6	2.64159	85.5	82.4	1809.6	2.62495	81.8	70.2	1833.6	2.60851	70.6	57.4	1857.6	2.59229	67.0	57.0
1785.8	2.64145	87.1	83.3	1809.8	2.62481	82.9	71.6	1833.8	2.60838	68.4	55.8	1857.8	2.59215	71.6	57.8
1786.0	2.64131	88.1	84.1	1810.0	2.62467	83.7	72.9	1834.0	2.60824	66.5	53.5	1858.0	2.59202	74.8	62.5
1786.2	2.64117	89.1	84.7	1810.2	2.62453	84.5	74.0	1834.2	2.60811	58.7	50.4	1858.2	2.59189	77.1	69.7
1786.4	2.64103	90.0	85.4	1810.4	2.62440	85.1	74.8	1834.4	2.60797	50.6	46.3	1858.4	2.59175	76.7	69.5
1786.6	2.64089	90.7	85.9	1810.6	2.62426	85.8	75.2	1834.6	2.60783	41.8	43.3	1858.6	2.59161	79.9	67.8
1786.8	2.64075	91.1	86.5	1810.8	2.62412	85.9	75.7	1834.8	2.60770	30.4	40.6	1858.8	2.59148	80.6	59.8
1787.0	2.64061	91.6	87.0	1811.0	2.62398	86.2	76.0	1835.0	2.60756	30.4	38.7	1859.0	2.59134	81.0	69.5
1787.2	2.64047	92.2	87.4	1811.2	2.62385	86.4	76.2	1835.2	2.60743	32.6	38.4	1859.2	2.59121	81.5	70.0
1787.4	2.64033	92.7	87.8	1811.4	2.62371	86.4	76.2	1835.4	2.60729	38.6	39.1	1859.4	2.59108	81.6	70.3
1787.6	2.64019	93.1	88.1	1811.6	2.62357	86.4	76.1	1835.6	2.60715	45.1	40.2	1859.6	2.59094	81.6	70.3
1787.8	2.64005	93.6	88.3	1811.8	2.62343	86.2	75.9	1835.8	2.60702	50.4	40.8	1859.8	2.59081	81.5	70.4
1788.0	2.63992	93.7	88.5	1812.0	2.62329	85.9	75.4	1836.0	2.60688	42.9	40.6	1860.0	2.59067	80.8	69.8
1788.2	2.63978	93.7	88.6	1812.2	2.62315	85.4	75.1	1836.2	2.60675	52.3	39.4	1860.2	2.59054	79.6	68.4
1788.4	2.63964	93.7	88.6	1812.4	2.62302	85.1	74.6	1836.4	2.60661	49.6	37.1	1860.4	2.59041	77.8	66.8
1788.6	2.63950	93.5	88.6	1812.6	2.62288	84.5	74.2	1836.6	2.60647	46.4	35.7	1860.6	2.59027	75.3	65.7
1788.8	2.63936	93.5	88.7	1812.8	2.62274	83.8	72.6	1836.8	2.60634	37.5	29.8	1860.8	2.59014	71.3	62.2
1789.0	2.63922	93.2	88.6	1813.0	2.62261	83.0	71.3	1837.0	2.60620	29.1	25.7	1861.0	2.59000	65.3	59.0
1789.2	2.63908	93.0	88.5	1813.2	2.62247	82.0	70.3	1837.2	2.60607	20.6	21.5	1861.2	2.58987	58.3	54.2
1789.4	2.63894	92.5	88.5	1813.4	2.62233	80.5	68.3	1837.4	2.60593	13.1	18.3	1861.4	2.58973	49.6	52.3
1789.6	2.63880	93.3	88.6	1813.6	2.62219	79.6	66.1	1837.6	2.60580	8.4	15.2	1861.6	2.58960	42.5	50.2
1789.8	2.63866	93.4	88.7	1813.8	2.62206	78.6	63.9	1837.8	2.60566	6.7	14.1	1861.8	2.58947	41.7	49.3
1790.0	2.63852	93.7	88.7	1814.0	2.62192	76.2	61.0	1838.0	2.60552	7.9	14.6	1862.0	2.58933	43.6	52.2
1790.2	2.63838	93.9	88.7	1814.2	2.62178	71.1	57.8	1838.2	2.60539	11.6	16.0	1862.2	2.58920	53.8	57.4
1790.4	2.63824	94.8	88.8	1814.4	2.62164	66.9	53.6	1838.4	2.60525	19.0	14.7	1862.4	2.58906	63.2	54.2
1790.6	2.63810	94.0	88.8	1814.6	2.62151	61.9	49.3	1838.6	2.60512	25.2	21.9	1862.6	2.58893	66.6	56.1
1790.8	2.63797	93.6	88.8	1814.8	2.62137	55.5	46.1	1838.8	2.60499	31.5	23.4	1862.8	2.58880	67.5	57.4
1791.0	2.63783	93.8	88.5	1815.0	2.62123	47.7	39.2	1839.0	2.60485	38.4	24.9	1863.0	2.58866	69.5	58.2
1791.2	2.63769	93.7	88.3	1815.2	2.62109	38.7	33.6	1839.2	2.60471	42.2	23.6	1863.2	2.58853	69.1	58.0
1791.4	2.63755	94.4	88.1	1815.4	2.62096	28.1	28.0	1839.4	2.60457	43.7	23.8	1863.4	2.58840	76.9	54.9
1791.6	2.63741	13.3	87.9	1815.6	2.62082	19.2	23.3	1839.6	2.60443	43.3	23.1	1863.6	2.58827	82.7	51.2
1791.8	2.63727	93.1	87.9	1815.8	2.62068	12.3	18.8	1839.8	2.60430	42.0	24.5	1863.8	2.58813	60.5	52.8
1792.0	2.63713	93.1	87.4	1816.0	2.62055	8.1	17.7	1840.0	2.60417	42.0	27.3	1864.0	2.58800	55.5	49.6
1792.2	2.63699	92.7	87.0	1816.2	2.62041	8.2	17.2	1840.2	2.60403	42.0	37.4	1864.2	2.58786	49.6	46.1
1792.4	2.63685	92.6	86.6	1816.4	2.62027	10.5	18.3	1840.4	2.60389	40.3	38.3	1864.4	2.58773	46.8	44.8
1792.6	2.63671	92.3	86.4	1816.6	2.62013	15.5	21.1	1840.6	2.60376	39.1	38.5	1864.6	2.58759	33.9	39.0
1792.8	2.63657	91.9	86.0	1816.8	2.62000	24.6	24.1	1840.8	2.60362	37.8	38.8	1864.8	2.58746	26.8	36.1
1793.0	2.63644	91.7	85.5	1817.0	2.61986	31.6	28.9	1841.0	2.60348	37.0	39.7	1865.0	2.58732	23.2	35.3

Table 5-8 (Cont'd)

Sm. No.	31	34	Sm. No.	31	34	Sm. No.	31	34			
$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}	$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}	$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}			
$P_0(\text{atm})$	5.02×10^0	1.002×10^0	$P_0(\text{atm})$	5.02×10^0	1.002×10^0	$P_0(\text{atm})$	5.02×10^0	1.002×10^0			
$w(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$w(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$w(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}			
(cm ²)	(microns)	T = 100	T = 100	(cm ²)	(microns)	T = 100	T = 100	(cm ²)	(microns)	T = 100	T = 100
1900.0	2.56410	55.1	48.4	1924.0	2.56884	82.4	82.2	1948.0	2.57293	85.4	85.8
1900.2	2.56397	62.1	51.7	1924.2	2.56879	81.2	81.1	1948.2	2.57280	87.4	87.1
1900.4	2.56384	64.0	53.2	1924.4	2.56864	79.5	80.2	1948.4	2.57267	90.8	88.9
1900.6	2.56371	67.0	53.6	1924.6	2.56850	77.6	78.1	1948.6	2.57254	92.4	89.4
1900.8	2.56358	65.3	52.1	1924.8	2.56837	76.7	76.8	1948.8	2.57241	92.4	90.7
1901.0	2.56345	60.2	48.5	1925.0	2.56777	71.8	78.4	1949.0	2.57229	91.7	90.6
1901.2	2.56331	51.7	43.5	1925.2	2.56764	71.5	78.8	1949.2	2.57216	89.4	90.0
1901.4	2.56318	40.1	37.4	1925.4	2.56751	70.9	80.1	1949.4	2.57203	87.9	89.4
1901.6	2.56305	29.2	32.4	1925.6	2.56738	60.3	82.3	1949.6	2.57190	85.2	89.0
1901.8	2.56292	22.9	29.3	1925.8	2.56725	85.4	84.5	1949.8	2.57177	84.0	88.7
1902.0	2.56279	23.4	29.7	1926.0	2.56712	89.5	86.8	1950.0	2.57165	84.4	89.0
1902.2	2.56266	12.2	15.4	1926.2	2.56699	92.3	87.7	1950.2	2.57152	84.4	89.4
1902.4	2.56253	42.8	38.5	1926.4	2.56686	94.0	90.5	1950.4	2.57139	89.2	90.5
1902.6	2.56239	52.1	43.4	1926.6	2.56673	95.2	91.8	1950.6	2.57126	91.5	91.7
1902.8	2.56226	57.7	47.0	1926.8	2.56660	95.9	92.5	1950.8	2.57113	93.5	92.7
1903.0	2.56213	58.3	48.1	1927.0	2.56647	96.2	93.2	1951.0	2.57100	95.2	93.4
1903.2	2.56200	56.7	48.1	1927.2	2.56634	96.4	93.4	1951.2	2.57087	96.3	94.4
1903.4	2.56187	50.8	46.7	1927.4	2.56621	96.4	93.5	1951.4	2.57075	97.0	94.8
1903.6	2.56174	47.7	46.3	1927.6	2.56608	96.1	93.4	1951.6	2.57062	97.4	95.1
1903.8	2.56161	34.0	42.1	1927.8	2.56595	95.7	93.4	1951.8	2.57049	97.4	95.5
1904.0	2.56148	28.2	41.0	1928.0	2.56582	95.0	93.1	1952.0	2.57036	97.5	95.6
1904.2	2.56135	23.4	41.9	1928.2	2.56570	94.0	92.8	1952.2	2.57024	97.9	95.7
1904.4	2.56122	15.0	40.9	1928.4	2.56557	94.0	92.8	1952.4	2.57011	96.8	95.7
1904.6	2.56108	44.8	40.1	1928.6	2.56544	93.5	92.1	1952.6	2.57000	96.4	95.6
1904.8	2.56095	54.7	53.9	1928.8	2.56531	92.9	91.6	1952.8	2.56985	95.8	95.4
1905.0	2.56082	61.6	58.3	1929.0	2.56518	90.4	91.1	1953.0	2.56972	95.5	95.5
1905.2	2.56069	65.4	60.7	1929.2	2.56505	90.0	91.7	1953.2	2.56959	95.7	95.4
1905.4	2.56056	46.4	64.1	1929.4	2.56492	88.1	90.0	1953.4	2.56947	96.3	95.8
1905.6	2.56043	44.1	65.9	1929.6	2.56479	88.1	89.5	1953.6	2.56935	97.1	96.8
1905.8	2.56030	44.1	65.9	1929.8	2.56466	90.4	89.2	1953.8	2.56922	97.4	96.3
1906.0	2.56016	47.0	69.4	1930.0	2.56453	88.8	88.8	1954.0	2.56909	96.3	96.5
1906.2	2.56003	71.8	72.0	1930.2	2.56440	88.4	88.5	1954.2	2.56896	96.3	96.8
1906.4	2.55990	77.5	76.9	1930.4	2.56427	87.4	88.1	1954.4	2.56883	96.7	97.0
1906.6	2.55977	82.5	77.9	1930.6	2.56414	87.2	87.4	1954.6	2.56870	96.7	97.6
1906.8	2.55964	86.4	80.7	1930.8	2.56401	87.8	87.2	1954.8	2.56857	96.6	97.1
1907.0	2.55951	89.2	83.2	1931.0	2.56388	86.5	86.7	1955.0	2.56845	96.5	97.1
1907.2	2.55938	91.1	85.2	1931.2	2.56375	86.4	86.8	1955.2	2.56832	96.4	97.0
1907.4	2.55925	92.5	86.8	1931.4	2.56362	85.4	86.5	1955.4	2.56819	96.5	97.2
1907.6	2.55912	93.3	88.0	1931.6	2.56349	85.3	86.1	1955.6	2.56806	96.3	97.1
1907.8	2.55899	94.0	89.1	1931.8	2.56336	76.6	76.7	1955.8	2.56793	96.6	97.0
1908.0	2.55886	94.6	90.0	1932.0	2.56323	87.7	71.7	1956.0	2.56781	96.4	96.8
1908.2	2.55873	95.2	90.7	1932.2	2.56310	86.4	80.7	1956.2	2.56768	96.1	96.9
1908.4	2.55860	95.8	91.4	1932.4	2.56297	86.1	82.7	1956.4	2.56755	97.4	96.5
1908.6	2.55847	96.8	92.0	1932.6	2.56284	81.1	84.3	1956.6	2.56742	96.7	96.2
1908.8	2.55834	96.4	92.5	1932.8	2.56272	72.2	70.4	1956.8	2.56729	96.1	96.0
1909.0	2.55821	96.4	92.9	1933.0	2.56259	85.5	78.1	1957.0	2.56717	96.1	96.8
1909.2	2.55808	96.5	93.2	1933.2	2.56246	89.2	81.7	1957.2	2.56704	96.0	96.8
1909.4	2.55795	96.7	93.5	1933.4	2.56233	81.4	87.1	1957.4	2.56691	97.4	96.2
1909.6	2.55782	96.9	93.6	1933.6	2.56220	91.5	88.4	1957.6	2.56678	97.7	96.9
1909.8	2.55769	97.1	93.9	1933.8	2.56207	90.4	89.4	1957.8	2.56665	97.7	96.4
1910.0	2.55756	97.2	94.2	1934.0	2.56194	90.0	89.9	1958.0	2.56653	97.6	96.5
1910.2	2.55743	97.2	94.4	1934.2	2.56181	81.0	90.8	1958.2	2.56640	97.7	96.7
1910.4	2.55730	97.3	94.6	1934.4	2.56168	81.6	90.8	1958.4	2.56627	96.8	96.8
1910.6	2.55717	97.4	94.7	1934.6	2.56155	90.7	91.0	1958.6	2.56614	96.4	97.1
1910.8	2.55704	97.5	94.7	1934.8	2.56143	90.1	91.0	1958.8	2.56602	96.7	97.1
1911.0	2.55691	97.6	94.8	1935.0	2.56130	90.8	94.6	1959.0	2.56589	96.6	97.1
1911.2	2.55678	97.7	94.9	1935.2	2.56117	91.2	94.2	1959.2	2.56576	96.8	97.0
1911.4	2.55665	97.7	95.0	1935.4	2.56104	97.4	95.7	1959.4	2.56564	97.0	97.8
1911.6	2.55652	97.7	95.0	1935.6	2.56091	97.9	96.2	1959.6	2.56551	97.6	96.0
1911.8	2.55639	97.4	94.9	1935.8	2.56078	96.1	96.4	1959.8	2.56538	96.1	97.0
1912.0	2.55626	97.5	94.9	1936.0	2.56065	96.4	96.6	1960.0	2.56525	96.4	97.1
1912.2	2.55613	97.4	94.8	1936.2	2.56052	96.4	96.8				
1912.4	2.55600	97.3	94.5	1936.4	2.56039	96.6	96.8				
1912.6	2.55587	97.1	94.9	1936.6	2.56026	96.7	97.0				
1912.8	2.55574	97.1	95.6	1936.8	2.56013	96.7	97.0				
1913.0	2.55561	97.3	96.6	1937.0	2.56000	96.6	96.9				
1913.2	2.55548	97.2	96.5	1937.2	2.55987	96.5	96.6				
1913.4	2.55535	97.2	96.5	1937.4	2.55974	96.5	96.6				
1913.6	2.55522	97.2	96.5	1937.6	2.55961	96.5	96.6				
1913.8	2.55509	97.0	96.4	1937.8	2.55948	96.5	96.6				
1914.0	2.55496	96.8	96.0	1938.0	2.55935	96.5	96.6				
1914.2	2.55483	96.5	95.6	1938.2	2.55922	96.5	96.6				
1914.4	2.55470	96.4	95.3	1938.4	2.55909	96.5	96.6				
1914.6	2.55457	96.1	94.9	1938.6	2.55896	96.5	96.6				
1914.8	2.55444	97.7	97.7	1938.8	2.55883	96.5	96.6				
1915.0	2.55431	96.3	94.7	1939.0	2.55870	97.0	96.7				
1915.2	2.55418	95.3	94.3	1939.2	2.55857	97.2	96.8				
1915.4	2.55405	94.4	94.6	1939.4	2.55844	97.0	96.9				
1915.6	2.55392	96.7	95.3	1939.6	2.55831	97.0	96.8				
1915.8	2.55379	96.7	95.3	1939.8	2.55818	97.0	96.8				
1916.0	2.55366	96.8	96.1	1940.0	2.55805	97.0	96.8				
1916.2	2.55353	94.9	96.1	1940.2	2.55792	97.1	96.6				
1916.4	2.55340	94.9	96.1	1940.4	2.55779	97.1	96.6				
1916.6	2.55327	94.9	96.1	1940.6	2.55766	97.1	96.6				
1916.8	2.55314	94.9	96.1	1940.8	2.55753	97.1	96.6				
1917.0	2.55301	94.9	96.1	1941.0	2.55740	97.1	96.6				
1917.2	2.55288	94.9	96.1	1941.2	2.55727	97.1	96.6				
1917.4	2.55275	94.9	96.1	1941.4	2.55714	97.1	96.6				
1917.6	2.55262	94.9	96.1	1941.6	2.55701	97.1	96.6				
1917.8	2.55249	94.9	96.1	1941.8	2.55688	97.1	96.6				
1918.0	2.55236	94.9	96.1	1942.0	2.55675	97.1	96.6				
1918.2	2.55223	94.9	96.1	1942.2	2.55662	97.1	96.6				
1918.4	2.55210	94.9	96.1	1942.4	2.55649	97.1	96.6				
1918.6	2.55197	94.9	96.1	1942.6	2.55636	97.1	96.6				
1918.8	2.55184	94.9	96.1	1942.8	2.55623	97.1	96.6				
1919.0	2.55171	94.9	96.1	1943.0	2.55610	97.1	96.6				
1919.2	2.55158	94.9	96.1	1943.2	2.55597	97.1	96.6				
1919.4	2.55145	94.9	96.1	1943.4	2.55584	97.1	96.6				

Table 5-9 $\int A(\nu) d\nu$

Sam. No.	11	36	Sam. No.	11	36	Sam. No.	11	36	Sam. No.	11	36	Sam. No.	11	36
p (atm)	1.20	1.20	p (atm)	1.20	1.20	p (atm)	1.20	1.20	p (atm)	1.20	1.20	p (atm)	1.20	1.20
ρ (atm)	1.02	1.02	ρ (atm)	1.02	1.02	ρ (atm)	1.02	1.02	ρ (atm)	1.02	1.02	ρ (atm)	1.02	1.02
ν (g/cm ²)	0.0	0.0	ν (g/cm ²)	0.0	0.0	ν (g/cm ²)	0.0	0.0	ν (g/cm ²)	0.0	0.0	ν (g/cm ²)	0.0	0.0
	± 1.00	± 1.00		± 1.00	± 1.00		± 1.00	± 1.00		± 1.00	± 1.00		± 1.00	± 1.00
3562.0	0.017	0.017	3567.0	0.017	0.017	3572.0	0.017	0.017	3577.0	0.017	0.017	3582.0	0.017	0.017
3563.0	0.017	0.017	3568.0	0.017	0.017	3573.0	0.017	0.017	3578.0	0.017	0.017	3583.0	0.017	0.017
3564.0	0.017	0.017	3569.0	0.017	0.017	3574.0	0.017	0.017	3579.0	0.017	0.017	3584.0	0.017	0.017
3565.0	0.017	0.017	3570.0	0.017	0.017	3575.0	0.017	0.017	3580.0	0.017	0.017	3585.0	0.017	0.017
3566.0	0.017	0.017	3571.0	0.017	0.017	3576.0	0.017	0.017	3581.0	0.017	0.017	3586.0	0.017	0.017
3567.0	0.017	0.017	3572.0	0.017	0.017	3577.0	0.017	0.017	3582.0	0.017	0.017	3587.0	0.017	0.017
3568.0	0.017	0.017	3573.0	0.017	0.017	3578.0	0.017	0.017	3583.0	0.017	0.017	3588.0	0.017	0.017
3569.0	0.017	0.017	3574.0	0.017	0.017	3579.0	0.017	0.017	3584.0	0.017	0.017	3589.0	0.017	0.017
3570.0	0.017	0.017	3575.0	0.017	0.017	3580.0	0.017	0.017	3590.0	0.017	0.017	3595.0	0.017	0.017
3571.0	0.017	0.017	3576.0	0.017	0.017	3581.0	0.017	0.017	3596.0	0.017	0.017	3601.0	0.017	0.017
3572.0	0.017	0.017	3577.0	0.017	0.017	3582.0	0.017	0.017	3602.0	0.017	0.017	3607.0	0.017	0.017
3573.0	0.017	0.017	3578.0	0.017	0.017	3583.0	0.017	0.017	3608.0	0.017	0.017	3613.0	0.017	0.017
3574.0	0.017	0.017	3579.0	0.017	0.017	3584.0	0.017	0.017	3609.0	0.017	0.017	3614.0	0.017	0.017
3575.0	0.017	0.017	3580.0	0.017	0.017	3585.0	0.017	0.017	3610.0	0.017	0.017	3615.0	0.017	0.017
3576.0	0.017	0.017	3581.0	0.017	0.017	3586.0	0.017	0.017	3611.0	0.017	0.017	3616.0	0.017	0.017
3577.0	0.017	0.017	3582.0	0.017	0.017	3587.0	0.017	0.017	3612.0	0.017	0.017	3617.0	0.017	0.017
3578.0	0.017	0.017	3583.0	0.017	0.017	3588.0	0.017	0.017	3613.0	0.017	0.017	3618.0	0.017	0.017
3579.0	0.017	0.017	3584.0	0.017	0.017	3589.0	0.017	0.017	3614.0	0.017	0.017	3619.0	0.017	0.017
3580.0	0.017	0.017	3585.0	0.017	0.017	3590.0	0.017	0.017	3620.0	0.017	0.017	3620.0	0.017	0.017
3581.0	0.017	0.017	3586.0	0.017	0.017	3591.0	0.017	0.017	3621.0	0.017	0.017	3621.0	0.017	0.017
3582.0	0.017	0.017	3587.0	0.017	0.017	3592.0	0.017	0.017	3622.0	0.017	0.017	3622.0	0.017	0.017
3583.0	0.017	0.017	3588.0	0.017	0.017	3593.0	0.017	0.017	3623.0	0.017	0.017	3623.0	0.017	0.017
3584.0	0.017	0.017	3589.0	0.017	0.017	3594.0	0.017	0.017	3624.0	0.017	0.017	3624.0	0.017	0.017
3585.0	0.017	0.017	3590.0	0.017	0.017	3595.0	0.017	0.017	3625.0	0.017	0.017	3625.0	0.017	0.017
3586.0	0.017	0.017	3591.0	0.017	0.017	3596.0	0.017	0.017	3626.0	0.017	0.017	3626.0	0.017	0.017
3587.0	0.017	0.017	3592.0	0.017	0.017	3597.0	0.017	0.017	3627.0	0.017	0.017	3627.0	0.017	0.017
3588.0	0.017	0.017	3593.0	0.017	0.017	3598.0	0.017	0.017	3628.0	0.017	0.017	3628.0	0.017	0.017
3589.0	0.017	0.017	3594.0	0.017	0.017	3599.0	0.017	0.017	3629.0	0.017	0.017	3629.0	0.017	0.017
3590.0	0.017	0.017	3595.0	0.017	0.017	3600.0	0.017	0.017	3630.0	0.017	0.017	3630.0	0.017	0.017
3591.0	0.017	0.017	3596.0	0.017	0.017	3601.0	0.017	0.017	3631.0	0.017	0.017	3631.0	0.017	0.017
3592.0	0.017	0.017	3597.0	0.017	0.017	3602.0	0.017	0.017	3632.0	0.017	0.017	3632.0	0.017	0.017
3593.0	0.017	0.017	3598.0	0.017	0.017	3603.0	0.017	0.017	3633.0	0.017	0.017	3633.0	0.017	0.017
3594.0	0.017	0.017	3599.0	0.017	0.017	3604.0	0.017	0.017	3634.0	0.017	0.017	3634.0	0.017	0.017
3595.0	0.017	0.017	3600.0	0.017	0.017	3605.0	0.017	0.017	3635.0	0.017	0.017	3635.0	0.017	0.017
3596.0	0.017	0.017	3601.0	0.017	0.017	3606.0	0.017	0.017	3636.0	0.017	0.017	3636.0	0.017	0.017
3597.0	0.017	0.017	3602.0	0.017	0.017	3607.0	0.017	0.017	3637.0	0.017	0.017	3637.0	0.017	0.017
3598.0	0.017	0.017	3603.0	0.017	0.017	3608.0	0.017	0.017	3638.0	0.017	0.017	3638.0	0.017	0.017
3599.0	0.017	0.017	3604.0	0.017	0.017	3609.0	0.017	0.017	3639.0	0.017	0.017	3639.0	0.017	0.017
3600.0	0.017	0.017	3605.0	0.017	0.017	3610.0	0.017	0.017	3640.0	0.017	0.017	3640.0	0.017	0.017
3601.0	0.017	0.017	3606.0	0.017	0.017	3611.0	0.017	0.017	3641.0	0.017	0.017	3641.0	0.017	0.017
3602.0	0.017	0.017	3607.0	0.017	0.017	3612.0	0.017	0.017	3642.0	0.017	0.017	3642.0	0.017	0.017
3603.0	0.017	0.017	3608.0	0.017	0.017	3613.0	0.017	0.017	3643.0	0.017	0.017	3643.0	0.017	0.017
3604.0	0.017	0.017	3609.0	0.017	0.017	3614.0	0.017	0.017	3644.0	0.017	0.017	3644.0	0.017	0.017
3605.0	0.017	0.017	3610.0	0.017	0.017	3615.0	0.017	0.017	3645.0	0.017	0.017	3645.0	0.017	0.017
3606.0	0.017	0.017	3611.0	0.017	0.017	3616.0	0.017	0.017	3646.0	0.017	0.017	3646.0	0.017	0.017
3607.0	0.017	0.017	3612.0	0.017	0.017	3617.0	0.017	0.017	3647.0	0.017	0.017	3647.0	0.017	0.017
3608.0	0.017	0.017	3613.0	0.017	0.017	3618.0	0.017	0.017	3648.0	0.017	0.017	3648.0	0.017	0.017
3609.0	0.017	0.017	3614.0	0.017	0.017	3619.0	0.017	0.017	3649.0	0.017	0.017	3649.0	0.017	0.017
3610.0	0.017	0.017	3615.0	0.017	0.017	3620.0	0.017	0.017	3650.0	0.017	0.017	3650.0	0.017	0.017
3611.0	0.017	0.017	3616.0	0.017	0.017	3621.0	0.017	0.017	3651.0	0.017	0.017	3651.0	0.017	0.017
3612.0	0.017	0.017	3617.0	0.017	0.017	3622.0	0.017	0.017	3652.0	0.017	0.017	3652.0	0.017	0.017
3613.0	0.017	0.017	3618.0	0.017	0.017	3623.0	0.017	0.017	3653.0	0.017	0.017	3653.0	0.017	0.017
3614.0	0.017	0.017	3619.0	0.017	0.017	3624.0	0.017	0.017	3654.0	0.017	0.017	3654.0	0.017	0.017
3615.0	0.017	0.017	3620.0	0.017	0.017	3625.0	0.017	0.017	3655.0	0.017	0.017	3655.0	0.017	0.017
3616.0	0.017	0.017	3621.0	0.017	0.017	3626.0	0.017	0.017	3656.0	0.017	0.017	3656.0	0.017	0.017
3617.0	0.017	0.017	3622.0	0.017	0.017	3627.0	0.017	0.017	3657.0	0.017	0.017	3657.0	0.017	0.017
3618.0	0.017	0.017	3623.0	0.017	0.017	3628.0	0.017	0.017	3658.0	0.017	0.017	3658.0	0.017	0.017
3619.0	0.017	0.017	3624.0	0.017	0.017	3629.0	0.017	0.017	3659.0	0.017	0.017	3659.0	0.017	0.017
3620.0	0.017	0.017	3625.0	0.017	0.017	3630.0	0.017	0.017	3660.0	0.017	0.017	3660.0	0.017	0.017
3621.0	0.017	0.017	3626.0	0.017	0.017	3631.0	0.017	0.017	3661.0	0.017	0.017	3661.0	0.017	0.017
3622.0	0.017	0.017	3627.0	0.017	0.017	3632.0	0.017	0.017	3662.0	0.017	0.017	3662.0	0.017	0.017
3623.0	0.017	0.017	3628.0	0.017	0.017	3633.0	0.017	0.017	3663.0	0.017	0.017	3663.0	0.017	0.017
3624.0	0.017	0.017	3629.0	0.017	0.017	3634.0	0.017	0.017	3664.0	0.017	0.017	3664.0	0.017	0.017
3625.0	0.017	0.017	3630.0	0.017	0.017	3635.0	0.017	0.017	3665.0	0.017	0.017	3665.0	0.017	0.017
3626.0	0.017	0.017	3631.0	0.017	0.017	3636.0	0.017	0.017	3666.0	0.017	0.017	3666.0	0.017	0.017
3627.0	0.017	0.017	3632.0	0.017	0.017	3637.0	0.017	0.017	3667.0	0.017	0.017	3667.0	0.017	0.017
3628.0	0.017	0.017	3633.0	0.017	0.017	3638.0	0.017	0.017	3668.0	0.017	0.017	3668.0	0.017	0.017
3629.0	0.017	0.017	3634.0	0.017	0.017	3639.0	0.017	0.017	3669.0	0.017	0.017	3669.0	0.017	0.017
3630.0	0.017	0.017	3635.0	0.017	0.017	3640.0	0.017	0.017	3670.0	0.017	0.017	3670.0	0.017	0.017
3631.0	0.017	0.017	3636.0	0.017	0.017	3641.0	0.017	0.017	3671.0	0.017	0.017	3671.0	0.017	0.017
3632.0	0.017	0.017	3637.0	0.017	0.017	3642.0	0.017	0.017	3672.0	0.017	0.017	3672.0	0.017	0.017
3633.0	0.017	0.017	3638.0	0.017	0.017	3643.0	0.017	0.017	3673.0	0.017	0.017	3673.0	0.017	0.017
3634.0	0.017	0.017	3639.0	0.017	0.017	3644.0	0.017	0.017	3674.0	0.017	0.017	3674.0	0.017	0.017

Table 5-9 $\int A(\nu) d\nu$ (cont'd)

Am. No.	31	36	Am. No.	31	36	Am. No.	31	36	Am. No.	31	36
P (cm)	1.26	1.26	P (cm)	1.26	1.26	P (cm)	1.26	1.26	P (cm)	1.26	1.26
P ₁ (cm)	1.02	1.02	P ₁ (cm)	1.02	1.02	P ₁ (cm)	1.02	1.02	P ₁ (cm)	1.02	1.02
W (gm/cm ²)	0.0	0.0	W (gm/cm ²)	0.0	0.0	W (gm/cm ²)	0.0	0.0	W (gm/cm ²)	0.0	0.0
	0.10 ⁻⁶	0.10 ⁻⁶		0.10 ⁻⁶	0.10 ⁻⁶		0.10 ⁻⁶	0.10 ⁻⁶		0.10 ⁻⁶	0.10 ⁻⁶
	13300	13300		13300	13300		13300	13300		13300	13300
(cm ²)			(cm ²)			(cm ²)			(cm ²)		
1777.5	75.750	82.455	1875.0	91.911	100.000	1877.5	115.641	125.471	1975.0	127.740	140.421
1778.0	75.816	82.555	1875.5	92.026	101.000	1878.0	115.760	125.560	1975.5	127.811	140.512
1778.5	75.881	82.650	1876.0	92.140	101.100	1878.5	115.870	125.650	1976.0	127.881	140.600
1779.0	75.946	82.745	1876.5	92.255	101.200	1879.0	115.980	125.740	1976.5	127.951	140.690
1779.5	76.010	82.840	1877.0	92.360	101.300	1879.5	116.090	125.830	1977.0	128.021	140.780
1780.0	76.075	82.935	1877.5	92.475	101.400	1880.0	116.200	125.920	1977.5	128.091	140.870
1780.5	76.140	83.030	1878.0	92.590	101.500	1880.5	116.310	126.010	1978.0	128.161	140.960
1781.0	76.205	83.125	1878.5	92.705	101.600	1881.0	116.420	126.100	1978.5	128.231	141.050
1781.5	76.270	83.220	1879.0	92.820	101.700	1881.5	116.530	126.190	1979.0	128.301	141.140
1782.0	76.335	83.315	1879.5	92.935	101.800	1882.0	116.640	126.280	1979.5	128.371	141.230
1782.5	76.400	83.410	1880.0	93.050	101.900	1882.5	116.750	126.370	1980.0	128.441	141.320
1783.0	76.465	83.505	1880.5	93.165	102.000	1883.0	116.860	126.460	1980.5	128.511	141.410
1783.5	76.530	83.600	1881.0	93.280	102.100	1883.5	116.970	126.550	1981.0	128.581	141.500
1784.0	76.595	83.695	1881.5	93.395	102.200	1884.0	117.080	126.640	1981.5	128.651	141.590
1784.5	76.660	83.790	1882.0	93.510	102.300	1884.5	117.190	126.730	1982.0	128.721	141.680
1785.0	76.725	83.885	1882.5	93.625	102.400	1885.0	117.300	126.820	1982.5	128.791	141.770
1785.5	76.790	83.980	1883.0	93.740	102.500	1885.5	117.410	126.910	1983.0	128.861	141.860
1786.0	76.855	84.075	1883.5	93.855	102.600	1886.0	117.520	127.000	1983.5	128.931	141.950
1786.5	76.920	84.170	1884.0	93.970	102.700	1886.5	117.630	127.090	1984.0	129.001	142.040
1787.0	76.985	84.265	1884.5	94.085	102.800	1887.0	117.740	127.180	1984.5	129.071	142.130
1787.5	77.050	84.360	1885.0	94.200	102.900	1887.5	117.850	127.270	1985.0	129.141	142.220
1788.0	77.115	84.455	1885.5	94.315	103.000	1888.0	117.960	127.360	1985.5	129.211	142.310
1788.5	77.180	84.550	1886.0	94.430	103.100	1888.5	118.070	127.450	1986.0	129.281	142.400
1789.0	77.245	84.645	1886.5	94.545	103.200	1889.0	118.180	127.540	1986.5	129.351	142.490
1789.5	77.310	84.740	1887.0	94.660	103.300	1889.5	118.290	127.630	1987.0	129.421	142.580
1790.0	77.375	84.835	1887.5	94.775	103.400	1890.0	118.400	127.720	1987.5	129.491	142.670
1790.5	77.440	84.930	1888.0	94.890	103.500	1890.5	118.510	127.810	1988.0	129.561	142.760
1791.0	77.505	85.025	1888.5	95.005	103.600	1891.0	118.620	127.900	1988.5	129.631	142.850
1791.5	77.570	85.120	1889.0	95.120	103.700	1891.5	118.730	127.990	1989.0	129.701	142.940
1792.0	77.635	85.215	1889.5	95.235	103.800	1892.0	118.840	128.080	1989.5	129.771	143.030
1792.5	77.700	85.310	1890.0	95.350	103.900	1892.5	118.950	128.170	1990.0	129.841	143.120
1793.0	77.765	85.405	1890.5	95.465	104.000	1893.0	119.060	128.260	1990.5	129.911	143.210
1793.5	77.830	85.500	1891.0	95.580	104.100	1893.5	119.170	128.350	1991.0	130.000	143.300
1794.0	77.895	85.595	1891.5	95.695	104.200	1894.0	119.280	128.440	1991.5	130.070	143.390
1794.5	77.960	85.690	1892.0	95.810	104.300	1894.5	119.390	128.530	1992.0	130.140	143.480
1795.0	78.025	85.785	1892.5	95.925	104.400	1895.0	119.500	128.620	1992.5	130.210	143.570
1795.5	78.090	85.880	1893.0	96.040	104.500	1895.5	119.610	128.710	1993.0	130.280	143.660
1796.0	78.155	85.975	1893.5	96.155	104.600	1896.0	119.720	128.800	1993.5	130.350	143.750
1796.5	78.220	86.070	1894.0	96.270	104.700	1896.5	119.830	128.890	1994.0	130.420	143.840
1797.0	78.285	86.165	1894.5	96.385	104.800	1897.0	119.940	128.980	1994.5	130.490	143.930
1797.5	78.350	86.260	1895.0	96.500	104.900	1897.5	120.050	129.070	1995.0	130.560	144.020
1798.0	78.415	86.355	1895.5	96.615	105.000	1898.0	120.160	129.160	1995.5	130.630	144.110
1798.5	78.480	86.450	1896.0	96.730	105.100	1898.5	120.270	129.250	1996.0	130.700	144.200
1799.0	78.545	86.545	1896.5	96.845	105.200	1899.0	120.380	129.340	1996.5	130.770	144.290
1799.5	78.610	86.640	1897.0	96.960	105.300	1899.5	120.490	129.430	1997.0	130.840	144.380
1800.0	78.675	86.735	1897.5	97.075	105.400	1900.0	120.600	129.520	1997.5	130.910	144.470
1800.5	78.740	86.830	1898.0	97.190	105.500	1900.5	120.710	129.610	1998.0	130.980	144.560
1801.0	78.805	86.925	1898.5	97.305	105.600	1901.0	120.820	129.700	1998.5	131.050	144.650
1801.5	78.870	87.020	1899.0	97.420	105.700	1901.5	120.930	129.790	1999.0	131.120	144.740
1802.0	78.935	87.115	1899.5	97.535	105.800	1902.0	121.040	129.880	1999.5	131.190	144.830
1802.5	79.000	87.210	1900.0	97.650	105.900	1902.5	121.150	129.970	2000.0	131.260	144.920
1803.0	79.065	87.305	1900.5	97.765	106.000	1903.0	121.260	130.060			
1803.5	79.130	87.400	1901.0	97.880	106.100	1903.5	121.370	130.150			
1804.0	79.195	87.495	1901.5	97.995	106.200	1904.0	121.480	130.240			
1804.5	79.260	87.590	1902.0	98.110	106.300	1904.5	121.590	130.330			
1805.0	79.325	87.685	1902.5	98.225	106.400	1905.0	121.700	130.420			
1805.5	79.390	87.780	1903.0	98.340	106.500	1905.5	121.810	130.510			
1806.0	79.455	87.875	1903.5	98.455	106.600	1906.0	121.920	130.600			
1806.5	79.520	87.970	1904.0	98.570	106.700	1906.5	122.030	130.690			
1807.0	79.585	88.065	1904.5	98.685	106.800	1907.0	122.140	130.780			
1807.5	79.650	88.160	1905.0	98.800	106.900	1907.5	122.250	130.870			
1808.0	79.715	88.255	1905.5	98.915	107.000	1908.0	122.360	130.960			
1808.5	79.780	88.350	1906.0	99.030	107.100	1908.5	122.470	131.050			
1809.0	79.845	88.445	1906.5	99.145	107.200	1909.0	122.580	131.140			
1809.5	79.910	88.540	1907.0	99.260	107.300	1909.5	122.690	131.230			
1810.0	79.975	88.635	1907.5	99.375	107.400	1910.0	122.800	131.320			
1810.5	80.040	88.730	1908.0	99.490	107.500	1910.5	122.910	131.410			
1811.0	80.105	88.825	1908.5	99.605	107.600	1911.0	123.020	131.500			
1811.5	80.170	88.920	1909.0	99.720	107.700	1911.5	123.130	131.590			
1812.0	80.235	89.015	1909.5	99.835	107.800	1912.0	123.240	131.680			
1812.5	80.300	89.110	1910.0	99.950	107.900	1912.5	123.350	131.770			
1813.0	80.365	89.205	1910.5	100.065	108.000	1913.0	123.460	131.860			
1813.5	80.430	89.300	1911.0	100.180	108.100	1913.5	123.570	131.950			
1814.0	80.495	89.395	1911.5	100.295	108.200	1914.0	123.680	132.040			
1814.5	80.560	89.490	1912.0	100.410	108.300	1914.5	123.790	132.130			
1815.0	80.625	89.585	1912.5	100.525	108.400	1915.0	123.900	132.220			
1815.5	80.690	89.680	1913.0	100.640	108.500	1915.5	124.010	132.310			
1816.0	80.755	89.775	1913.5	100.755	108.600	1916.0	124.120	132.400			
1816.5	80.820	89.870	1914.0	100.870	108.700	1916.5	124.230	132.490			
1817.0	80.885	89.965	1914.5	100.985	108.800	1917.0	124.340	132.580			
1817.5	80.950	90.060	1915.0	101.100	108.900	1917.5	124.450	132.670			
1818.0	81.015	90.155	1915.5	101.215	109.000	1918.0	124.560	132.760			
1818.5	81.080	90.250	1916.0	101.330	109.100	1918.5	124.670	132.850			
1819.0	81.145	90.345	1916.5	101.445	109.200	1919.0	124.780	132.940			
1819.5	81.210	90.440	1917.0	101.560	109.300	1919.5	124.890	133.030			
1820.0	81.275	90.535	1917.5	101.675	109.400	1920.0	125.000	133.120			
1820.5	81.340	90.630	1918.0	101.790	109.500						
1821.0	81.405	90.725	1918.5	101.905	109.600						
1821.5	81.470	90.820	1919.0	102.020	109.70						

Table 5-10 $\frac{1}{v} \int_{-\infty}^{\infty} \ln T(v) dv$

Snn. No.			33			34			Snn. No.			33			34		
p (atm)			p (atm)			p (atm)			p (atm)			p (atm)			p (atm)		
P _v (atm)			P _v (atm)			P _v (atm)			P _v (atm)			P _v (atm)			P _v (atm)		
u (gm/cm ³)			u (gm/cm ³)			u (gm/cm ³)			u (gm/cm ³)			u (gm/cm ³)			u (gm/cm ³)		
v (cm ³)			v (cm ³)			v (cm ³)			v (cm ³)			v (cm ³)			v (cm ³)		
v (cm ³)			v (cm ³)			v (cm ³)			v (cm ³)			v (cm ³)			v (cm ³)		
3540.0	0.	0.	3592.5	1.2178819+004	1.1518520+004	3645.0	3.7621775+004	3.7526366+004	3697.5	8.1151780+004	8.2864551+004	3750.0	8.1496599+004	8.3404316+004	3802.5	8.2969141+004	8.4899354+004
3540.5	2.1135466+001	1.7864000+001	3593.0	1.2300157+004	1.1634008+004	3645.5	3.7580827+004	3.7523600+004	3698.0	8.1212713+004	8.2948032+004	3750.5	8.1602977+004	8.3539684+004	3803.0	8.3167334+004	8.5000014+004
3541.0	4.2170196+001	3.5696677+001	3593.5	1.2426530+004	1.1774162+004	3646.0	3.7809721+004	3.7652709+004	3698.5	8.1271819+004	8.3048716+004	3751.0	8.1775500+004	8.3766375+004	3803.5	8.3404455+004	8.5273188+004
3541.5	6.3167054+001	5.6107737+001	3594.0	1.2553902+004	1.1917805+004	3646.5	3.8194554+004	3.8047602+004	3699.0	8.1336782+004	8.3156234+004	3751.5	8.1880209+004	8.4044455+004	3804.0	8.3630477+004	8.5548671+004
3542.0	8.4156155+001	8.0753392+001	3594.5	1.2681274+004	1.2058780+004	3647.0	3.8709222+004	3.8527467+004	3699.5	8.1413711+004	8.3273304+004	3752.0	8.2088412+004	8.4360077+004	3804.5	8.3855999+004	8.5829355+004
3542.5	1.2403579+002	1.1280528+002	3595.0	1.2808646+004	1.2219465+004	3647.5	3.9311793+004	3.9147999+004	3700.0	8.1496599+004	8.3404316+004	3752.5	8.2296391+004	8.4685914+004	3805.0	8.4081455+004	8.6110014+004
3543.0	1.7633824+002	1.5561781+002	3595.5	1.3171193+004	1.2414448+004	3648.0	4.0391229+004	4.0266250+004	3700.5	8.1602977+004	8.3539684+004	3753.0	8.2504370+004	8.4999354+004	3805.5	8.4306914+004	8.6385471+004
3543.5	2.4146950+002	2.1206481+002	3596.0	1.3408118+004	1.2608277+004	3648.5	4.1204499+004	4.1262435+004	3701.0	8.1775500+004	8.3766375+004	3753.5	8.2712367+004	8.5273188+004	3806.0	8.4532355+004	8.6655999+004
3544.0	3.1716893+002	2.7574100+002	3596.5	1.3560118+004	1.2765071+004	3649.0	4.2114591+004	4.2188029+004	3701.5	8.2088412+004	8.4044455+004	3754.0	8.2920355+004	8.5548671+004	3806.5	8.4757814+004	8.6931014+004
3544.5	4.0147890+002	3.4515754+002	3597.0	1.3658861+004	1.2886292+004	3649.5	4.3068799+004	4.3214674+004	3702.0	8.2296391+004	8.4685914+004	3754.5	8.3128342+004	8.5829355+004	3807.0	8.4982274+004	8.7206541+004
3545.0	5.3904350+002	4.6373485+002	3597.5	1.3738996+004	1.2970474+004	3650.0	4.4523567+004	4.4715244+004	3702.5	8.2496391+004	8.4999354+004	3755.0	8.3336329+004	8.6110014+004	3807.5	8.5197263+004	8.7481555+004
3545.5	7.2738150+002	6.3767141+002	3598.0	1.3778117+004	1.3071177+004	3650.5	4.5365211+004	4.5628758+004	3703.0	8.2712367+004	8.5273188+004	3755.5	8.3544316+004	8.6385471+004	3808.0	8.5402252+004	8.7756541+004
3546.0	8.4056479+002	7.1760611+002	3598.5	1.3788636+004	1.3120449+004	3651.0	4.6267830+004	4.6587070+004	3703.5	8.2920355+004	8.5548671+004	3756.0	8.3752304+004	8.6655999+004	3808.5	8.5607237+004	8.8031555+004
3546.5	9.5282151+002	8.4301386+002	3599.0	1.3799155+004	1.3171324+004	3651.5	4.7054504+004	4.7409791+004	3704.0	8.3128342+004	8.5829355+004	3756.5	8.3960293+004	8.6931014+004	3809.0	8.5812218+004	8.8306541+004
3547.0	1.1875149+003	1.0766110+003	3599.5	1.4066119+004	1.3418977+004	3652.0	4.7589708+004	4.7946992+004	3704.5	8.3336329+004	8.6110014+004	3757.0	8.4168282+004	8.7206541+004	3809.5	8.6017199+004	8.8581555+004
3547.5	1.3550052+003	1.1717651+003	3600.0	1.4270505+004	1.3527334+004	3652.5	4.7893035+004	4.7450048+004	3705.0	8.3544316+004	8.6385471+004	3757.5	8.4376271+004	8.7481555+004	3810.0	8.6222180+004	8.8856541+004
3548.0	1.4381464+003	1.2580508+003	3600.5	1.4389850+004	1.3641448+004	3653.0	4.8100884+004	4.7766380+004	3705.5	8.3752304+004	8.6655999+004	3758.0	8.4584260+004	8.7756541+004	3810.5	8.6427161+004	8.9131555+004
3548.5	1.5039988+003	1.3199228+003	3601.0	1.4542430+004	1.3763181+004	3653.5	4.8265588+004	4.8026576+004	3706.0	8.3960293+004	8.6931014+004	3758.5	8.4792249+004	8.8031555+004	3811.0	8.6632142+004	8.9406541+004
3549.0	1.5533279+003	1.3687353+003	3601.5	1.4684842+004	1.3882438+004	3654.0	4.8410783+004	4.8265122+004	3706.5	8.4168282+004	8.7206541+004	3759.0	8.4999354+004	8.8306541+004	3811.5	8.6837123+004	8.9681555+004
3549.5	1.5896406+003	1.4093349+003	3602.0	1.4775518+004	1.3985956+004	3654.5	4.8559762+004	4.8506796+004	3707.0	8.4376271+004	8.7481555+004	3759.5	8.5207237+004	8.8581555+004	3812.0	8.7042104+004	8.9956541+004
3550.0	1.6256372+003	1.4472769+003	3602.5	1.4857647+004	1.4078900+004	3655.0	4.8745555+004	4.8781672+004	3707.5	8.4584260+004	8.7756541+004	3800.0	8.5410221+004	8.8856541+004	3812.5	8.7247085+004	9.0231555+004
3550.5	1.6628281+003	1.4876624+003	3603.0	1.4936733+004	1.4164997+004	3655.5	4.9033858+004	4.9135150+004	3800.5	8.4792249+004	8.8031555+004	3813.0	8.5618210+004	8.9131555+004	3813.5	8.7452066+004	9.0506541+004
3551.0	1.7106526+003	1.5353168+003	3603.5	1.5003079+004	1.4244398+004	3656.0	4.9587776+004	4.9623646+004	3801.0	8.4999354+004	8.8306541+004	3813.5	8.5826191+004	8.9406541+004	3814.0	8.7657051+004	9.0781555+004
3551.5	1.7705334+003	1.5933304+003	3604.0	1.5036304+004	1.4318458+004	3656.5	5.0476904+004	5.0223167+004	3801.5	8.5207237+004	8.8581555+004	3814.5	8.6034170+004	8.9681555+004	3814.5	8.7862036+004	9.1056541+004
3552.0	1.8766696+003	1.6875670+003	3604.5	1.5104081+004	1.4392598+004	3657.0	5.1136929+004	5.0768449+004	3802.0	8.5410221+004	8.8856541+004	3815.0	8.6242151+004	8.9956541+004	3815.0	8.8067021+004	9.1331555+004
3552.5	2.0225773+003	1.7600246+003	3605.0	1.5161652+004	1.4473824+004	3657.5	5.1463896+004	5.1163036+004	3802.5	8.5618210+004	8.9131555+004	3815.5	8.6450170+004	9.0231555+004	3815.5	8.8272006+004	9.1606541+004
3553.0	2.2251310+003	1.8654487+003	3605.5	1.5229328+004	1.4570280+004	3658.0	5.1688880+004	5.1439510+004	3803.0	8.5826191+004	8.9406541+004	3816.0	8.6658151+004	9.0506541+004	3816.0	8.8477091+004	9.1881555+004
3553.5	2.4967654+003	1.9177440+003	3606.0	1.5319620+004	1.4683650+004	3658.5	5.1757516+004	5.1685844+004	3803.5	8.6034170+004	8.9681555+004	3816.5	8.6866132+004	9.0781555+004	3816.5	8.8682076+004	9.2156541+004
3554.0	2.7719101+003	1.9857611+003	3606.5	1.5474291+004	1.4865200+004	3659.0	5.1874759+004	5.1813058+004	3804.0	8.6242151+004	8.9956541+004	3817.0	8.7070151+004	9.1056541+004	3817.0	8.8887061+004	9.2431555+004
3554.5	2.3160136+003	2.0405044+003	3607.0	1.5761730+004	1.5100362+004	3659.5	5.1965034+004	5.1960085+004	3804.5	8.6450170+004	9.0231555+004	3817.5	8.7275132+004	9.1331555+004	3817.5	8.9092046+004	9.2706541+004
3555.0	2.3675588+003	2.0790610+003	3607.5	1.6081542+004	1.5374719+004	3660.0	5.2058336+004	5.2094835+004	3805.0	8.6658151+004	9.0506541+004	3818.0	8.7480113+004	9.1606541+004	3818.0	8.9307031+004	9.2981555+004
3555.5	2.3936247+003	2.1089176+003	3608.0	1.6321747+004	1.5664264+004	3660.5	5.2142353+004	5.2217993+004	3805.5	8.6866132+004	9.0781555+004	3818.5	8.7685094+004	9.1881555+004	3818.5	8.9512012+004	9.3256541+004
3556.0	2.4178755+003	2.1354205+003	3608.5	1.6625205+004	1.6039740+004	3661.0	5.2213400+004	5.2332014+004	3806.0	8.7070151+004	9.1056541+004	3819.0	8.7890075+004	9.2156541+004	3819.0	8.9717092+004	9.3531555+004
3556.5	2.4436290+003	2.1613686+003	3609.0	1.7287696+004	1.6592975+004	3661.5	5.2277850+004	5.2439008+004	3806.5	8.7275132+004	9.1331555+004	381					

Sam. No.	12	34	Sam. No.	33	34	Sam. No.	11	34	Sam. No.	31	34
P (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	P (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	P (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	P (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$
P _g (atm)	5.02 $\times 10^0$	5.02 $\times 10^0$	P _g (atm)	5.02 $\times 10^0$	5.02 $\times 10^0$	P _g (atm)	5.02 $\times 10^0$	5.02 $\times 10^0$	P _g (atm)	5.02 $\times 10^0$	5.02 $\times 10^0$
U (cm/s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	U (cm/s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	U (cm/s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	U (cm/s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$
V (cm ³)	V ⁻¹³⁶⁰ cm ³	V ⁻¹³⁶⁰ cm ³	V (cm ³)	V ⁻¹³⁶⁰ cm ³	V ⁻¹³⁶⁰ cm ³	V (cm ³)	V ⁻¹³⁶⁰ cm ³	V ⁻¹³⁶⁰ cm ³	V (cm ³)	V ⁻¹³⁶⁰ cm ³	V ⁻¹³⁶⁰ cm ³
3750.0	1.2783641+005	1.3787584+005	3602.5	1.5735571+005	1.6675777+005	3855.0	2.3851852+005	2.2050467+005	3607.5	2.4411926+005	2.5921847+005
3750.5	1.2789029+005	1.3402490+005	3603.0	1.5746024+005	1.6556571+005	3855.5	2.0910665+005	2.2137891+005	3608.0	2.4421939+005	2.5928081+005
3751.0	1.2792756+005	1.3505889+005	3603.5	1.5755627+005	1.6601771+005	3856.0	2.0906190+005	2.2231177+005	3608.5	2.4424452+005	2.5934764+005
3751.5	1.3072524+005	1.3619550+005	3604.0	1.5767413+005	1.6647299+005	3856.5	2.0905231+005	2.2324969+005	3609.0	2.4427326+005	2.5939948+005
3752.0	1.3222193+005	1.3751805+005	3754.5	1.5785555+005	1.6585492+005	3857.0	2.1035804+005	2.2398845+005	3609.5	2.4427599+005	2.5946476+005
3752.5	1.3395151+005	1.3889611+005	3605.0	1.5791843+005	1.6725071+005	3857.5	2.1070947+005	2.2469459+005	3610.0	2.4431348+005	2.5948027+005
3753.0	1.3529060+005	1.4003717+005	3605.5	1.5795448+005	1.6766179+005	3858.0	2.1093119+005	2.2537650+005	3610.5	2.4431086+005	2.5951538+005
3753.5	1.3575061+005	1.4105904+005	3606.0	1.5799064+005	1.6818714+005	3858.5	2.1101915+005	2.2602644+005	3611.0	2.4431661+005	2.5954991+005
3754.0	1.3618355+005	1.4184777+005	3606.5	1.5803288+005	1.6875252+005	3859.0	2.1122758+005	2.2673766+005	3611.5	2.4431812+005	2.5958375+005
3754.5	1.3648716+005	1.4194531+005	3607.0	1.5813533+005	1.6950235+005	3859.5	2.1132755+005	2.2744592+005	3612.0	2.4431780+005	2.5961472+005
3755.0	1.3672405+005	1.4233261+005	3607.5	1.5824424+005	1.7026222+005	3860.0	2.1148328+005	2.2818118+005	3612.5	2.4432923+005	2.5964655+005
3755.5	1.3694306+005	1.4278125+005	3608.0	1.5831081+005	1.7102664+005	3860.5	2.1163057+005	2.2892258+005	3613.0	2.4441387+005	2.5968269+005
3756.0	1.3710940+005	1.4320132+005	3608.5	1.5836548+005	1.7173121+005	3861.0	2.1176168+005	2.2971377+005	3613.5	2.4448289+005	2.5971602+005
3756.5	1.3725796+005	1.4358798+005	3609.0	1.5840672+005	1.7246133+005	3861.5	2.1221271+005	2.3058841+005	3614.0	2.4464469+005	2.5975390+005
3757.0	1.3739546+005	1.4375213+005	3609.5	1.5843176+005	1.7318956+005	3862.0	2.1233395+005	2.3140200+005	3614.5	2.4467187+005	2.5979035+005
3757.5	1.3819384+005	1.4406031+005	3610.0	1.5843790+005	1.7371068+005	3862.5	2.1242790+005	2.3218974+005	3615.0	2.4465014+005	2.5982674+005

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[illegible]

Table 5-11 (Cont'd)

Sam. No.	Y	W	Sam. No.	Y	W	Sam. No.	Y	W	Sam. No.	Y	W
p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$	p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$	p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$	p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$
P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$	P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$	P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$	P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$
u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$	u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$	u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$	u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$
Y	W	Y	W	Y	W	Y	W	Y	W	Y	W
(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)
4055.0	2.44609	94.6	94.2	4079.0	2.45158	77.1	84.6	4153.0	2.45724	93.0	93.8
4055.2	2.44617	94.6	94.0	4079.2	2.45164	75.7	83.4	4153.2	2.45732	92.5	92.8
4055.4	2.44619	94.8	93.7	4079.4	2.45134	73.1	82.3	4153.4	2.45700	90.2	92.5
4055.6	2.44615	95.0	93.7	4079.6	2.45122	76.6	81.6	4153.6	2.45688	89.5	91.1
4055.8	2.44610	95.0	93.9	4079.8	2.45110	76.0	82.5	4153.8	2.45677	87.9	90.2
4056.0	2.44618	95.7	93.6	4080.0	2.45098	87.0	82.6	4154.0	2.45665	86.2	89.1
4056.2	2.44616	95.3	93.7	4080.2	2.45086	84.4	83.6	4154.2	2.45653	84.2	87.5
4056.4	2.44612	95.2	94.2	4080.4	2.45074	85.5	84.8	4154.4	2.45641	82.5	86.6
4056.6	2.44612	94.7	93.8	4080.6	2.45062	86.2	86.0	4154.6	2.45629	81.6	85.6
4056.8	2.44600	94.7	93.6	4080.8	2.45050	85.9	86.5	4154.8	2.45617	80.5	84.0
4057.0	2.44608	94.8	93.4	4081.0	2.45038	85.3	87.1	4155.0	2.45605	79.3	82.7
4057.2	2.44615	94.5	93.2	4081.2	2.45026	85.7	87.5	4155.2	2.45593	78.1	81.4
4057.4	2.44603	94.1	93.2	4081.4	2.45014	87.5	87.9	4155.4	2.45581	75.2	80.1
4057.6	2.44611	93.1	93.2	4081.6	2.45002	88.3	89.1	4155.6	2.45569	70.6	78.8
4057.8	2.44619	92.3	92.9	4081.8	2.44990	90.0	89.8	4155.8	2.45557	69.6	77.0
4058.0	2.44627	92.9	92.4	4082.0	2.44978	91.7	90.0	4156.0	2.45545	63.3	75.4
4058.2	2.44615	93.0	92.3	4082.2	2.44966	92.5	91.3	4156.2	2.45533	65.5	76.7
4058.4	2.44603	93.3	92.1	4082.4	2.44954	93.0	91.9	4156.4	2.45521	70.7	75.1
4058.6	2.44610	93.3	91.7	4082.6	2.44942	93.0	92.0	4156.6	2.45509	71.0	77.0
4058.8	2.44618	93.3	91.8	4082.8	2.44930	93.4	92.5	4156.8	2.45497	82.2	79.7
4059.0	2.44616	92.2	91.0	4083.0	2.44918	93.7	93.2	4157.0	2.45485	85.3	82.1
4059.2	2.44614	91.3	90.2	4083.2	2.44906	93.9	93.2	4157.2	2.45473	84.3	84.7
4059.4	2.44612	89.3	89.8	4083.4	2.44894	93.7	91.5	4157.4	2.45461	80.4	86.8
4059.6	2.44610	87.6	88.6	4083.6	2.44882	93.9	93.5	4157.6	2.45449	91.4	88.6
4059.8	2.44618	84.9	87.6	4083.8	2.44870	93.4	93.1	4157.8	2.45437	92.4	90.0
4060.0	2.44616	81.5	86.3	4084.0	2.44858	93.2	93.0	4158.0	2.45425	92.0	90.9
4060.2	2.44614	78.9	85.4	4084.2	2.44846	92.7	93.5	4158.2	2.45413	92.9	91.5
4060.4	2.44612	78.1	86.6	4084.4	2.44834	92.2	92.5	4158.4	2.45401	92.7	92.7
4060.6	2.44610	80.2	86.7	4084.6	2.44822	91.4	92.4	4158.6	2.45389	93.3	92.7
4060.8	2.44618	83.6	85.3	4084.8	2.44810	91.4	92.2	4158.8	2.45377	93.3	92.7
4061.0	2.44616	86.3	86.1	4085.0	2.44798	91.9	92.2	4159.0	2.45365	92.9	93.1
4061.2	2.44614	88.4	87.3	4085.2	2.44786	90.9	91.4	4159.2	2.45353	92.2	93.3
4061.4	2.44612	90.1	88.5	4085.4	2.44774	90.7	91.3	4159.4	2.45341	91.8	93.5
4061.6	2.44610	88.2	89.2	4085.6	2.44762	89.0	90.8	4159.6	2.45329	91.6	92.9
4061.8	2.44618	93.1	90.4	4085.8	2.44750	87.8	90.4	4159.8	2.45317	92.7	93.3
4062.0	2.44616	93.4	90.6	4086.0	2.44738	87.1	89.8	4160.0	2.45305	93.5	93.5
4062.2	2.44614	93.8	91.3	4086.2	2.44726	87.4	89.3	4160.2	2.45293	94.0	94.0
4062.4	2.44612	94.2	92.4	4086.4	2.44714	87.5	88.5	4160.4	2.45281	94.1	94.6
4062.6	2.44610	94.5	93.1	4086.6	2.44702	88.4	88.9	4160.6	2.45269	95.0	95.1
4062.8	2.44618	94.9	93.2	4086.8	2.44690	88.6	88.7	4160.8	2.45257	94.6	95.4
4063.0	2.44616	94.7	93.4	4087.0	2.44678	87.4	88.3	4161.0	2.45245	94.6	95.3
4063.2	2.44614	93.1	93.7	4087.2	2.44666	89.1	87.5	4161.2	2.45233	92.1	95.5
4063.4	2.44612	94.9	94.0	4087.4	2.44654	81.9	86.5	4161.4	2.45221	95.4	95.4
4063.6	2.44610	94.9	94.2	4087.6	2.44642	78.2	85.6	4161.6	2.45209	95.8	95.5
4063.8	2.44618	95.5	94.4	4087.8	2.44630	75.2	84.5	4161.8	2.45197	95.8	95.8
4064.0	2.44616	95.2	94.6	4088.0	2.44618	74.3	83.6	4162.0	2.45185	95.1	96.0
4064.2	2.44614	95.7	94.7	4088.2	2.44606	75.6	82.8	4162.2	2.45173	95.7	96.0
4064.4	2.44612	96.7	94.7	4088.4	2.44594	76.7	83.0	4162.4	2.45161	96.0	96.1
4064.6	2.44610	95.7	94.4	4088.6	2.44582	83.3	84.2	4162.6	2.45149	95.8	95.9
4064.8	2.44618	95.6	94.9	4088.8	2.44570	86.4	85.6	4162.8	2.45137	95.4	96.2
4065.0	2.44616	95.9	95.0	4089.0	2.44558	86.4	86.8	4163.0	2.45125	95.7	96.1
4065.2	2.44614	96.1	95.1	4089.2	2.44546	90.7	87.9	4163.2	2.45113	95.7	96.4
4065.4	2.44612	96.1	95.8	4089.4	2.44534	91.8	88.4	4163.4	2.45101	96.2	95.9
4065.6	2.44610	95.6	96.7	4089.6	2.44522	90.8	87.8	4163.6	2.45089	96.0	96.1
4065.8	2.44618	95.7	95.0	4089.8	2.44510	93.5	91.7	4163.8	2.45077	95.0	96.7
4066.0	2.44616	94.9	94.9	4090.0	2.44498	93.6	92.5	4164.0	2.45065	96.1	96.3
4066.2	2.44614	95.1	95.1	4090.2	2.44486	91.2	91.2	4164.2	2.45053	96.0	96.1
4066.4	2.44612	95.6	95.0	4090.4	2.44474	90.2	93.9	4164.4	2.45041	95.9	95.9
4066.6	2.44610	96.0	95.1	4090.6	2.44462	93.0	93.0	4164.6	2.45029	95.9	96.3
4066.8	2.44618	96.3	95.4	4090.8	2.44450	94.3	94.7	4164.8	2.45017	96.1	96.5
4067.0	2.44616	96.0	95.3	4091.0	2.44438	94.4	94.6	4165.0	2.45005	96.3	96.2
4067.2	2.44614	95.9	95.5	4091.2	2.44426	94.7	94.8	4165.2	2.45002	96.0	96.1
4067.4	2.44612	96.3	95.6	4091.4	2.44414	93.1	94.8	4165.4	2.45000	96.2	96.1
4067.6	2.44610	95.6	95.3	4091.6	2.44402	94.6	95.3	4165.6	2.45000	96.0	96.4
4067.8	2.44618	95.2	95.5	4091.8	2.44390	94.6	95.1	4165.8	2.45000	96.1	96.6
4068.0	2.44616	95.4	95.3	4092.0	2.44378	95.8	95.3	4166.0	2.45000	96.5	96.6
4068.2	2.44614	95.6	95.6	4092.2	2.44366	95.0	95.4	4166.2	2.45000	96.0	96.6
4068.4	2.44612	95.7	95.5	4092.4	2.44354	94.9	95.6	4166.4	2.45000	95.6	96.4
4068.6	2.44610	95.7	95.4	4092.6	2.44342	95.3	95.5	4166.6	2.45000	96.2	96.5
4068.8	2.44618	96.0	95.8	4092.8	2.44330	94.8	95.5	4166.8	2.45000	96.2	96.5
4069.0	2.44616	95.4	95.3	4093.0	2.44318	95.2	95.4	4167.0	2.45000	96.0	96.7
4069.2	2.44614	95.6	95.2	4093.2	2.44306	94.4	95.0	4167.2	2.45000	96.5	96.7
4069.4	2.44612	95.8	95.1	4093.4	2.44294	94.2	95.1	4167.4	2.45000	95.9	96.6
4069.6	2.44610	95.5	95.2	4093.6	2.44282	94.6	95.2	4167.6	2.45000	95.0	96.5
4069.8	2.44618	95.8	95.3	4093.8	2.44270	94.4	95.0	4167.8	2.45000	96.0	96.7
4070.0	2.44616	95.2	95.4	4094.0	2.44258	94.9	95.6	4168.0	2.45000	95.8	96.7
4070.2	2.44614	95.3	95.3	4094.2	2.44246	94.3	95.3	4168.2	2.45000	96.0	96.8
4070.4	2.44612	95.3	95.3	4094.4	2.44234	94.8	96.2	4168.4	2.45000	95.0	96.7
4070.6	2.44610	95.8	95.7	4094.6	2.44222	95.3	96.2	4168.6	2.45000	96.4	96.6
4070.8	2.44618	95.2	95.6	4094.8	2.44210	95.2	96.7	4168.8	2.45000	96.3	96.9
4071.0	2.44616	94.8	95.3	4095.0	2.44198	95.8	96.3	4169.0	2.45000	96.1	96.7
4071.2	2.44614	95.1	95.3	4095.2	2.44186	95.8	96.0	4169.2	2.45000	96.9	96.7
4071.4	2.44612	95.3	95.1	4095.4	2.44174	95.1	96.1	4169.4	2.45000	96.0	96.9
4071.6	2.44610	95.2	95.0	4095.6	2.44162	94.6	96.3	4169.6	2.45000	96.2	96.6
4071.8	2.44618	95.1	94.7	4095.8	2.44150	95.0	96.5	4169.8	2.45000	95.9	96.5
4072.0	2.44616	95.2	94.7	4096.0	2.44138	95.8	96.6	4170.0	2.45000	96.0	96.5
4072.2	2.44614	94.9	94.6	4096.2	2.44126	95.7	96.6	4170.2	2.45000	96.7	96.1
4072.4	2.44612	94.7	94.6	4096.4	2.44114	95.9	96.5	4170.4	2.45000	96.7	96.

Table 5-12 $\int A(z) dz$

Sam. No.	35	36	Sam. No.	35	36	Sam. No.	35	36	Sam. No.	35	36
$p(\text{atm})$	0.42 $\times 10^{-1}$	0.42 $\times 10^{-2}$	$p(\text{atm})$	0.42 $\times 10^{-1}$	0.42 $\times 10^{-2}$	$p(\text{atm})$	0.42 $\times 10^{-1}$	0.42 $\times 10^{-2}$	$p(\text{atm})$	0.42 $\times 10^{-1}$	0.42 $\times 10^{-2}$
$P_0(\text{atm})$	5.03 $\times 10^0$	1.003 $\times 10^1$	$P_0(\text{atm})$	5.03 $\times 10^0$	1.003 $\times 10^1$	$P_0(\text{atm})$	5.03 $\times 10^0$	1.003 $\times 10^1$	$P_0(\text{atm})$	5.03 $\times 10^0$	1.003 $\times 10^1$
$u(\text{gm/cm}^2)$	2.05 $\times 10^{-2}$	1.05 $\times 10^{-2}$	$u(\text{gm/cm}^2)$	2.05 $\times 10^{-2}$	1.05 $\times 10^{-2}$	$u(\text{gm/cm}^2)$	2.05 $\times 10^{-2}$	1.05 $\times 10^{-2}$	$u(\text{gm/cm}^2)$	2.05 $\times 10^{-2}$	1.05 $\times 10^{-2}$
v (cm^{-1})	$v^{\circ}3933$ cm^{-1}	$v^{\circ}3933$ cm^{-1}	v (cm^{-1})	$v^{\circ}3933$ cm^{-1}	$v^{\circ}3933$ cm^{-1}	v (cm^{-1})	$v^{\circ}3933$ cm^{-1}	$v^{\circ}3933$ cm^{-1}	v (cm^{-1})	$v^{\circ}3933$ cm^{-1}	$v^{\circ}3933$ cm^{-1}
3935.0	0.	0.	3987.5	26.286	29.450	4040.0	35.219	39.757	4092.5	40.787	44.920
3935.5	0.289	0.381	3988.0	26.343	29.534	4040.5	35.556	39.799	4093.0	40.812	44.942
3936.0	0.532	0.722	3988.5	26.402	29.625	4041.0	35.590	39.843	4093.5	40.840	44.967
3936.5	0.742	1.034	3989.0	26.473	29.725	4041.5	35.676	39.888	4094.0	40.867	44.991
3937.0	0.942	1.331	3989.5	26.550	29.832	4042.0	35.664	39.937	4094.5	40.892	45.010
3937.5	1.150	1.629	3990.0	26.793	30.045	4042.5	35.716	39.997	4095.0	40.915	45.028
3938.0	1.436	1.949	3990.5	27.036	30.273	4043.0	35.764	40.073	4095.5	40.936	45.047
3938.5	1.777	2.301	3991.0	27.308	30.517	4043.5	35.804	40.172	4096.0	40.957	45.065
3939.0	2.103	2.667	3991.5	27.507	30.776	4044.0	36.034	40.299	4096.5	40.978	45.082
3939.5	2.396	3.022	3992.0	27.632	30.894	4044.5	36.260	40.459	4097.0	41.000	45.100
3940.0	2.659	3.379	3992.5	27.749	31.046	4045.0	36.516	40.645	4097.5	41.021	45.117
3940.5	2.945	3.727	3993.0	27.882	31.183	4045.5	36.735	40.833	4098.0	41.043	45.134
3941.0	3.272	4.113	3993.5	27.986	31.331	4046.0	36.865	40.963	4098.5	41.064	45.150
3941.5	3.648	4.535	3994.0	28.099	31.669	4046.5	36.942	41.094	4099.0	41.086	45.166
3942.0	4.092	4.966	3994.5	28.275	31.628	4047.0	36.995	41.173	4099.5	41.105	45.181
3942.5	4.574	5.400	3995.0	28.532	31.622	4047.5	37.038	41.234	4100.0	41.128	45.197
3943.0	5.064	5.975	3995.5	28.767	32.027	4048.0	37.075	41.288	4100.5	41.153	45.215
3943.5	5.539	6.467	3996.0	28.989	32.199	4048.5	37.107	41.332	4101.0	41.177	45.232
3944.0	5.991	6.966	3996.5	29.098	32.332	4049.0	37.137	41.372	4101.5	41.200	45.251
3944.5	6.421	7.487	3997.0	29.069	32.430	4049.5	37.165	41.409	4102.0	41.230	45.272
3945.0	6.770	7.837	3997.5	29.128	32.529	4050.0	37.193	41.444	4102.5	41.260	45.293
3945.5	7.067	8.224	3998.0	29.175	32.604	4050.5	37.222	41.480	4103.0	41.282	45.324
3946.0	7.307	8.589	3998.5	29.220	32.677	4051.0	37.255	41.517	4103.5	41.334	45.364
3946.5	7.486	8.966	3999.0	29.269	32.747	4051.5	37.288	41.553	4104.0	41.393	45.408
3947.0	8.011	9.396	3999.5	29.311	32.814	4052.0	37.320	41.592	4104.5	41.474	45.471
3947.5	8.488	9.877	4000.0	29.352	32.877	4052.5	37.378	41.635	4105.0	41.570	45.549
3948.0	8.971	10.370	4000.5	29.397	32.941	4053.0	37.422	41.678	4105.5	41.683	45.644
3948.5	9.432	10.855	4001.0	29.440	33.077	4053.5	37.455	41.716	4106.0	41.804	45.756
3949.0	9.863	11.324	4001.5	29.501	33.076	4054.0	37.482	41.750	4106.5	41.811	45.889
3949.5	10.321	11.787	4002.0	29.548	33.142	4054.5	37.508	41.782	4107.0	41.899	45.946
3950.0	10.802	12.250	4002.5	29.596	33.208	4055.0	37.533	41.814	4107.5	41.966	46.060
3950.5	11.273	12.725	4003.0	29.677	33.297	4055.5	37.559	41.844	4108.0	42.204	46.112
3951.0	11.684	13.170	4003.5	29.752	33.393	4056.0	37.586	41.875	4108.5	42.261	46.154
3951.5	12.009	13.646	4004.0	29.809	33.481	4056.5	37.607	41.906	4109.0	42.275	46.190
3952.0	12.268	13.922	4004.5	29.856	33.553	4057.0	37.633	41.937	4109.5	42.314	46.224
3952.5	12.566	14.255	4005.0	29.917	33.628	4057.5	37.661	41.971	4110.0	42.352	46.250
3953.0	12.834	14.587	4005.5	29.988	33.711	4058.0	37.696	42.006	4110.5	42.382	46.287
3953.5	13.179	14.918	4006.0	30.056	33.775	4058.5	37.730	42.045	4111.0	42.408	46.311
3954.0	13.504	15.226	4006.5	30.122	33.808	4059.0	37.765	42.080	4111.5	42.432	46.333
3954.5	13.745	15.500	4007.0	30.207	33.991	4059.5	37.812	42.136	4112.0	42.454	46.355
3955.0	13.968	15.754	4007.5	30.136	34.110	4060.0	37.885	42.197	4112.5	42.476	46.375
3955.5	14.187	16.000	4008.0	30.131	34.275	4060.5	37.908	42.271	4113.0	42.498	46.396
3956.0	14.383	16.246	4008.5	30.001	34.475	4061.0	37.975	42.345	4113.5	42.510	46.414
3956.5	14.568	16.540	4009.0	31.055	34.686	4061.5	38.131	42.407	4114.0	42.539	46.433
3957.0	14.809	16.866	4009.5	31.215	34.872	4062.0	38.167	42.457	4114.5	42.559	46.453
3957.5	15.178	17.154	4010.0	31.314	35.019	4062.5	38.198	42.499	4115.0	42.579	46.471
3958.0	15.548	17.445	4010.5	31.393	35.130	4063.0	38.224	42.533	4115.5	42.590	46.490
3958.5	15.799	17.720	4011.0	31.462	35.241	4063.5	38.249	42.564	4116.0	42.617	46.508
3959.0	16.086	17.973	4011.5	31.531	35.330	4064.0	38.273	42.593	4116.5	42.637	46.526
3959.5	16.265	18.225	4012.0	31.611	35.433	4064.5	38.296	42.619	4117.0	42.656	46.543
3960.0	16.468	18.483	4012.5	31.717	35.534	4065.0	38.317	42.645	4117.5	42.675	46.559
3960.5	16.659	18.723	4013.0	31.820	35.639	4065.5	38.337	42.670	4118.0	42.695	46.576
3961.0	16.849	18.960	4013.5	31.893	35.734	4066.0	38.359	42.696	4118.5	42.715	46.593
3961.5	17.232	19.310	4014.0	31.954	35.827	4066.5	38.381	42.721	4119.0	42.734	46.609
3962.0	17.697	19.779	4014.5	32.014	35.906	4067.0	38.400	42.745	4119.5	42.752	46.626
3962.5	18.075	20.172	4015.0	32.070	35.980	4067.5	38.420	42.767	4120.0	42.772	46.644
3963.0	18.161	20.441	4015.5	32.126	36.054	4068.0	38.442	42.790	4120.5	42.790	46.660
3963.5	18.196	20.687	4016.0	32.179	36.127	4068.5	38.460	42.813	4121.0	42.807	46.675
3964.0	18.450	20.834	4016.5	32.239	36.205	4069.0	38.485	42.835	4121.5	42.821	46.700
3964.5	18.602	21.000	4017.0	32.314	36.294	4069.5	38.507	42.859	4122.0	42.842	46.735
3965.0	18.749	21.174	4017.5	32.390	36.394	4070.0	38.529	42.883	4122.5	42.865	46.760
3965.5	18.860	21.367	4018.0	32.462	36.472	4070.5	38.552	42.906	4123.0	42.877	46.786
3966.0	18.950	21.564	4018.5	32.567	36.573	4071.0	38.575	42.929	4123.5	42.894	46.803
3966.5	19.036	21.762	4019.0	32.699	36.672	4071.5	38.598	42.952	4124.0	42.908	46.825
3967.0	19.117	21.922	4019.5	32.877	36.840	4072.0	38.623	42.976	4124.5	42.929	46.846
3967.5	19.230	22.064	4020.0	33.036	36.969	4072.5	38.650	43.000	4125.0	42.943	46.866
3968.0	19.371	22.229	4020.5	33.190	37.0	4073.0	38.667	43.025	4125.5	42.957	46.886
3968.5	19.568	22.374	4021.0	33.210	37.291	4073.5	38.736	43.072	4126.0	42.972	46.904
3969.0	19.680	22.486	4021.5	33.200	37.391	4074.0	38.800	43.118	4126.5	42.986	46.923
3969.5	20.162	22.762	4022.0	33.305	37.372	4074.5	38.856	43.162	4127.0	43.014	46.957
3970.0	20.300	23.033	4022.5	33.394	37.460	4075.0	38.903	43.202	4127.5	43.034	46.974
3970.5	20.594	23.170	4023.0	33.661	37.510	4075.5	38.930	43.230	4128.0	43.055	46.994
3971.0	20.710	23.409	4023.5	33.694	37.560	4076.0	38.962	43.276	4128.5	43.079	47.015
3971.5	20.795	23.600	4024.0	33.536	37.600	4076.5	38.991	43.303	4129.0	43.100	47.036
3972.0	21.174	23.830	4024.5	33.664	37.794	4077.0	39.022	43.340	4129.5	43.123	47.050
3972.5	21.471	24.100	4025.0	33.880	37.897	4077.5	39.056	43.375	4130.0	43.146	47.064
3973.0	21.763	24.362	4025.5	34.081	38.001	4078.0	39.080	43.411			
3973.5	21.997	24.717	4026.0	34.196	38.202	4078.5	39.104	43.441			
3974.0	22.262	25.060	4026.5	34.290	38.395	4079.0	39.131	43.471			
3974.5	22.523	25.223	4027.0	34.351	38.485	4079.5	39.160	43.500			
3975.0	22.862	25.484	4027.5	34.462	38.582	4080.0	39.182	43.526			
3975.5	23.067	25.703	4028.0	34.644	38.679	4080.5	39.206	43.579			
3976.0	23.413	26.100	4028.5	34.691	38.695	4081.0	39.230				

Table 5-13 $\frac{1}{v} \int_0^v -\ln T(v) dz$

Snn. No.			Snn. No.			Snn. No.			Snn. No.		
35			36			35			36		
p(atm)			p(atm)			p(atm)			p(atm)		
$\times 10^{-1}$			$\times 10^{-1}$			$\times 10^{-1}$			$\times 10^{-1}$		
P_e (atm)			P_e (atm)			P_e (atm)			P_e (atm)		
$\times 10^0$			$\times 10^0$			$\times 10^0$			$\times 10^0$		
v (gm/cm ²)			v (gm/cm ²)			v (gm/cm ²)			v (gm/cm ²)		
$\times 10^{-2}$			$\times 10^{-2}$			$\times 10^{-2}$			$\times 10^{-2}$		
v^{-1} 3935			v^{-1} 3935			v^{-1} 3935			v^{-1} 3935		
cm ⁻¹			cm ⁻¹			cm ⁻¹			cm ⁻¹		
3935.0	0.	0.	3935.0	2.3292566+003	2.8143661+003	4035.0	2.8643578+003	3.4034478+003	4085.0	3.1209510+003	3.6557267+003
3935.5	2.1109209+001	3.5196405+001	3935.5	2.3354011+003	2.8207644+003	4035.5	2.8660171+003	3.4055020+003	4085.5	3.1233268+003	3.6578976+003
3936.0	3.7341392+001	6.3110975+001	3936.0	2.3405574+003	2.8271948+003	4036.0	2.8676261+003	3.4073606+003	4086.0	3.1263931+003	3.6604141+003
3936.5	5.0646666+001	8.6964751+001	3936.5	2.3450752+003	2.8329761+003	4036.5	2.8692841+003	3.4091499+003	4086.5	3.1296608+003	3.6631490+003
3937.0	6.3063747+001	1.0899654+002	3937.0	2.3486596+003	2.8380593+003	4037.0	2.8709526+003	3.4109931+003	4087.0	3.1327172+003	3.6660776+003
3937.5	7.4687851+001	1.3105747+002	3937.5	2.3517043+003	2.8427863+003	4037.5	2.8726240+003	3.4127039+003	4087.5	3.1360470+003	3.6694067+003
3938.0	9.4772951+001	1.5590691+002	3938.0	2.3546492+003	2.8472888+003	4038.0	2.8743277+003	3.4143915+003	4088.0	3.1395071+003	3.6732453+003
3938.5	1.2479609+002	1.8566707+002	3938.5	2.3574722+003	2.8520419+003	4038.5	2.8751167+003	3.4161127+003	4088.5	3.1430982+003	3.6774934+003
3939.0	1.5051947+002	2.1753029+002	3939.0	2.3614988+003	2.8574299+003	4039.0	2.8761339+003	3.4179096+003	4089.0	3.1536393+003	3.6818377+003
3939.5	1.7201701+002	2.4783763+002	3939.5	2.3685117+003	2.8647805+003	4039.5	2.8784375+003	3.4198153+003	4089.5	3.1562070+003	3.6846470+003
3940.0	1.9022289+002	2.7681750+002	3940.0	2.3805851+003	2.8766851+003	4040.0	2.8801411+003	3.4217994+003	4090.0	3.1579031+003	3.6870363+003
3940.5	2.1091187+002	3.0700315+002	3940.5	2.3969135+003	2.8915631+003	4040.5	2.8819466+003	3.4239076+003	4090.5	3.1593935+003	3.6887218+003
3941.0	2.3468465+002	3.4352898+002	3941.0	2.4161172+003	2.9079036+003	4041.0	2.8837756+003	3.4261477+003	4091.0	3.1607090+003	3.6901667+003
3941.5	2.7124603+002	3.8992929+002	3941.5	2.4286350+003	2.9210798+003	4041.5	2.8855130+003	3.4284284+003	4091.5	3.1619647+003	3.6914753+003
3942.0	3.2627492+002	4.5202098+002	3942.0	2.4356187+003	2.9310770+003	4042.0	2.8871944+003	3.4309712+003	4092.0	3.1632296+003	3.6926726+003
3942.5	4.1064880+002	5.3737159+002	3942.5	2.4421282+003	2.9394964+003	4042.5	2.8901517+003	3.4340748+003	4092.5	3.1644427+003	3.6938132+003
3943.0	5.0310444+002	6.4776513+002	3943.0	2.4496882+003	2.9480854+003	4043.0	2.8937379+003	3.4381167+003	4093.0	3.1656746+003	3.6949604+003
3943.5	5.7681574+002	7.4958227+002	3943.5	2.4553405+003	2.9562377+003	4043.5	2.8979945+003	3.4434865+003	4093.5	3.1670481+003	3.6961512+003
3944.0	6.3625029+002	8.2875267+002	3944.0	2.4616067+003	2.9641119+003	4044.0	2.8992306+003	3.4506420+003	4094.0	3.1684119+003	3.6973657+003
3944.5	6.8259659+002	8.9129967+002	3944.5	2.4722833+003	2.9734511+003	4044.5	2.9221762+003	3.4600104+003	4094.5	3.1696551+003	3.6983169+003
3945.0	7.1225768+002	9.3939022+002	3945.0	2.4899426+003	2.9853873+003	4045.0	2.9391752+003	3.4713940+003	4095.0	3.1708278+003	3.6991872+003
3945.5	7.3203872+002	9.7572561+002	3945.5	2.5050495+003	2.9982412+003	4045.5	2.9518861+003	3.4827125+003	4095.5	3.1718785+003	3.7001145+003
3946.0	7.4984760+002	1.0076114+003	3946.0	2.5136855+003	3.0085811+003	4046.0	2.9612769+003	3.4915546+003	4096.0	3.1729293+003	3.7010278+003
3946.5	7.7226342+002	1.0420134+003	3946.5	2.5184985+003	3.0160956+003	4046.5	2.9653276+003	3.4976548+003	4096.5	3.1739707+003	3.7018892+003
3947.0	8.1497040+002	1.0908890+003	3947.0	2.5222259+003	3.0219650+003	4047.0	2.9680524+003	3.5018829+003	4097.0	3.1750077+003	3.7027819+003
3947.5	8.9147572+002	1.1749072+003	3947.5	2.5252639+003	3.0256223+003	4047.5	2.9702309+003	3.5050659+003	4097.5	3.1761105+003	3.7036130+003
3948.0	9.7431114+002	1.2785887+003	3948.0	2.5276675+003	3.0308951+003	4048.0	2.9721138+003	3.5078034+003	4098.0	3.1771709+003	3.7044714+003
3948.5	1.0382047+003	1.3656338+003	3948.5	2.5299591+003	3.0354303+003	4048.5	2.9737249+003	3.5100835+003	4098.5	3.1782431+003	3.7052748+003
3949.0	1.0863748+003	1.4399090+003	3949.0	2.5324986+003	3.0382811+003	4049.0	2.9752578+003	3.5120866+003	4099.0	3.1792530+003	3.7061593+003
3949.5	1.1479452+003	1.4989125+003	3949.5	2.5346477+003	3.0417632+003	4049.5	2.9767104+003	3.5139857+003	4099.5	3.1802952+003	3.7068990+003
3950.0	1.2285490+003	1.5663332+003	4000.0	2.5366848+003	3.0450425+003	4050.0	2.9780662+003	3.5157614+003	4100.0	3.1814310+003	3.7075520+003
3950.5	1.2990512+003	1.6334203+003	4000.5	2.5390200+003	3.0484122+003	4050.5	2.9795209+003	3.5175768+003	4100.5	3.1825557+003	3.7084960+003
3951.0	1.3423200+003	1.6873853+003	4001.0	2.5416230+003	3.0518598+003	4051.0	2.9811714+003	3.5194207+003	4101.0	3.1836964+003	3.7093759+003
3951.5	1.3681699+003	1.7264690+003	4001.5	2.5446373+003	3.0554681+003	4051.5	2.9828183+003	3.5212651+003	4101.5	3.1848204+003	3.7102796+003
3952.0	1.3860837+003	1.7565711+003	4002.0	2.5466732+003	3.0589013+003	4052.0	2.9845706+003	3.5232406+003	4102.0	3.1859576+003	3.7112198+003
3952.5	1.4102564+003	1.7813503+003	4002.5	2.5494953+003	3.0623226+003	4052.5	2.9864445+003	3.5253437+003	4102.5	3.1870463+003	3.7121847+003
3953.0	1.4393751+003	1.8089933+003	4003.0	2.5535425+003	3.0671331+003	4053.0	2.9884991+003	3.5276229+003	4103.0	3.1880943+003	3.7131800+003
3953.5	1.4680475+003	1.8367276+003	4003.5	2.5575677+003	3.0723410+003	4053.5	2.9913221+003	3.5295470+003	4103.5	3.1891780+003	3.7142177+003
3954.0	1.4864050+003	1.8595921+003	4004.0	2.5604390+003	3.0770418+003	4054.0	2.9926795+003	3.5312720+003	4104.0	3.1903311+003	3.7151800+003
3954.5	1.4995644+003	1.8798761+003	4004.5	2.5629255+003	3.0808275+003	4054.5	2.9939735+003	3.5328805+003	4104.5	3.1915912+003	3.7161669+003
3955.0	1.5117765+003	1.8962474+003	4005.0	2.5659857+003	3.0846177+003	4055.0	2.9952622+003	3.5346517+003	4105.0	3.1928429+003	3.7172590+003
3955.5	1.5259362+003	1.9113760+003	4005.5	2.5694742+003	3.0889183+003	4055.5	2.9965676+003	3.5365001+003	4105.5	3.1940979+003	3.7183574+003
3956.0	1.5396207+003	1.9259719+003	4006.0	2.5733991+003	3.0938184+003	4056.0	2.9977771+003	3.5384154+003	4106.0	3.1953579+003	3.7194623+003
3956.5	1.5509320+003	1.9405491+003	4006.5	2.5767546+003	3.0992685+003	4056.5	2.9989491+003	3.5403961+003	4106.5	3.1966240+003	3.7205737+003
3957.0	1.5658467+003	1.9736643+003	4007.0	2.5812698+003	3.1043639+003	4057.0	3.0002525+003	3.5426631+003	4107.0	3.1978952+003	3.7216848+003
3957.5	1.6069378+003	1.9970391+003	4007.5	2.5868910+003	3.1114480+003	4057.5	3.0016442+003	3.5451570+003	4107.5	3.1991601+003	3.7227960+003
3958.0	1.6258038+003	2.0129550+003	4008.0	2.6007335+003	3.1209176+003	4058.0	3.0030916+003	3.5481535+003	4108.0	3.2004239+003	3.7239072+003
3958.5	1.6427849+003	2.0377081+003	4008.5	2.6116880+003	3.1310272+003	4058.5	3.0051359+003	3.5512180+003	4108.5	3.2016877+003	3.7250184+003
3959.0	1.6556640+003	2.0554955+003	4009.0	2.6207009+003	3.1466154+003	4059.0	3.0068834+003	3.5542646+003	4109.0	3.2029513+003	3.7261296+003
3959.5	1.6717388+003	2.0719981+003	4009.5	2.6266579+003	3.1577929+003	4059.5	3.0082031+003	3.5573689+003	4109.5	3.2042266+003	3.7272408+003
3960.0	1.6862065+003	2.0890418+003	4010.0	2.6315906+003	3.1662988+003	4060.0	3.0113151+003	3.5593662+003	4110.0	3.2055077+003	3.7283520+003
3960.5	1.6971480+003	2.1050441+003	4010.5	2.6361348+003	3.1						

SECTION 6

SAMPLES WITH LARGE ABSORBER THICKNESS AND LOW PRESSURE

6.1 DISCUSSION

The spectra discussed in this section were selected to show the maximum structure and to provide data from which half-widths of many of the lines can be determined. After the line strengths have been determined, the half-widths can be found from the integrated absorptance by the use of the well-known Ladenberg and Reiche¹⁶ function which has been tabulated by Kaplan and Eggers.¹⁷

The samples were chosen with P_e sufficiently low that the integrated absorptance of the stronger lines was highly pressure dependent, yet high enough that Doppler broadening could be neglected. Of course, the half-widths must be determined from samples in which the integrated absorptance is dependent on pressure. Approximate values of the strengths of some of the weaker lines can be found from the results of Samples 39 and 41, whose equivalent pressures are approximately 1 atm. The sample parameters are listed in Table 6-1.

Several H_2O and HDO lines which can be seen below 2900 cm^{-1} in the spectra of Samples 40 and 41 have not been observed in solar spectra because of overlapping CH_4 lines. The most important HDO lines have been observed and identified by Benedict, Gailar and Plyler;⁷ and some which are not hidden in solar spectra have been identified by Migeotte et al.⁶

Several of the lines used for calibration are indicated in the spectra of Samples 37, 38 and 40. Every tenth line has been numbered, and lines whose numbers end in 5 have been indicated with an "x." Wavenumbers of these lines are given in Table 2-2.

The results for $\nu < 3000 \text{ cm}^{-1}$ are considerably less accurate than those for higher wavenumbers because of the uncertainty in placing the zero absorptance (background) curves on the spectra. In this region the recorder deflection was low and there were no tie-points nearby. Furthermore, there was some unexplained variation in zero-absorptance curves from one day to another. We did not determine the cause of this unusual variation, but it may have been a varying film of oil or other substance on some of the optical components. In order to reduce the spectra, an estimated zero absorptance curve was obtained by joining several of the absorptance minima of Sample 40 by a smooth curve. A curve having the same shape was then drawn on the spectrum of Sample 41 with the height adjusted to give a "reasonable" absorptance near the absorptance minima.

6.2 RESULTS

TABLE 6-1
SAMPLE PARAMETERS

Sam. No.	p torr	P torr	P _e [*] torr	p atm	P atm	P _e atm	L Path m	u gm/cm ²
37	5.6	230	252	0.00737	0.303	0.332	32.9	0.0180
38	4.15	134	151	0.00546	0.176	0.199	4.16	0.00169
39	7.35	723	752	0.00967	0.951	0.989	121	0.0867
40	15.3	152	213	0.0201	0.200	0.280	933	1.39
41	15.2	681	742	0.0200	0.896	0.976	933	1.38

Sam. No.	Spectral Region to which Transmittance and Integral Tables Are Shown		
	Table 6-2, 6-3 cm ⁻¹	Table 6-4, 6-5 cm ⁻¹	Table 6-6, 6-7 cm ⁻¹
37	2938-3464		
38		3464-3810	3810-4049
39	2929-3464	3464-3810	3810-4258
40	2808-3464		3810-4365
41	2808-3460		3810-4365

*P_e = P + 4p in accordance with Equation (3-8) and the results in Section 3. All samples were at room temperature, 296°K.

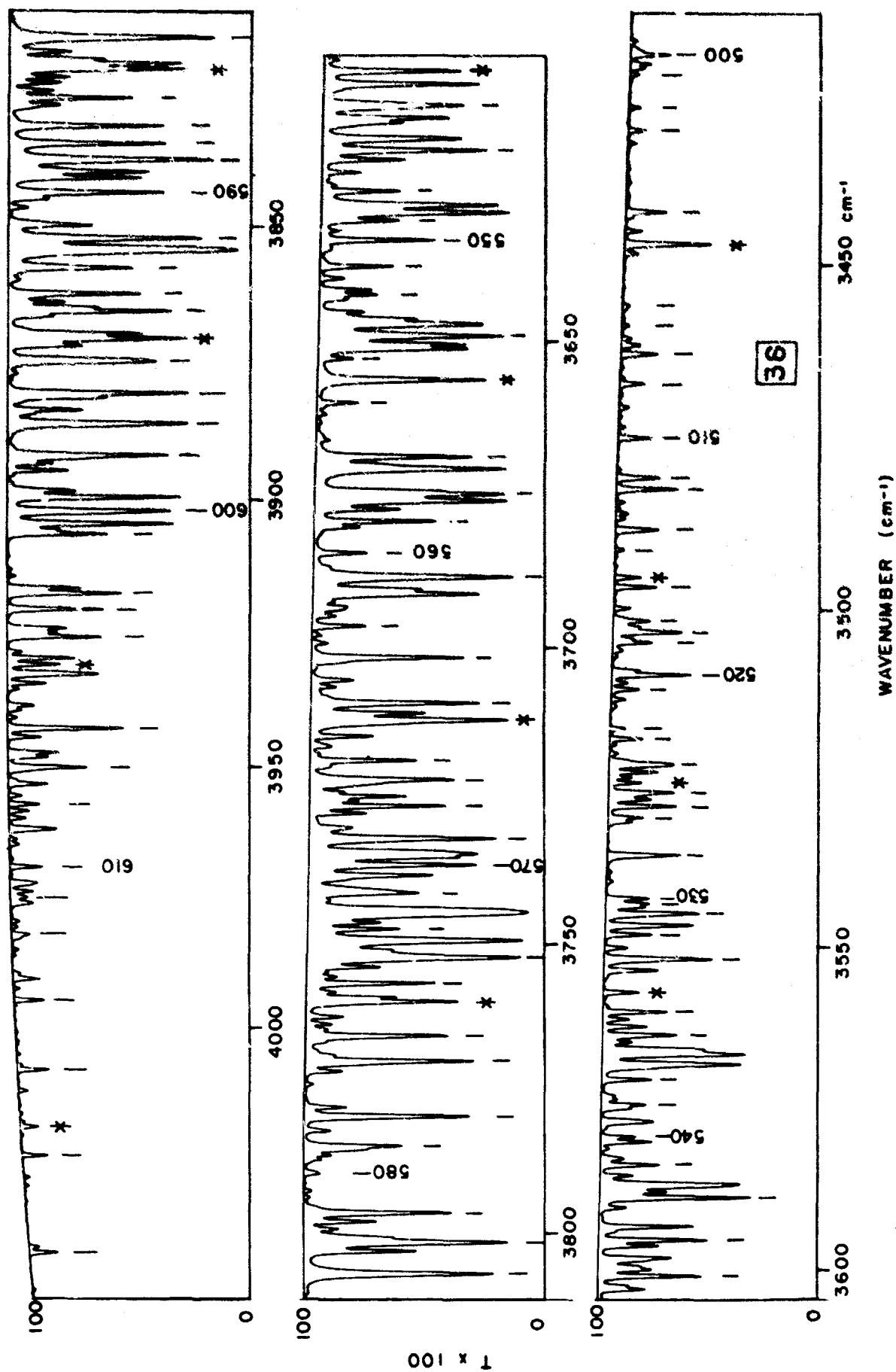


Fig. 6-2

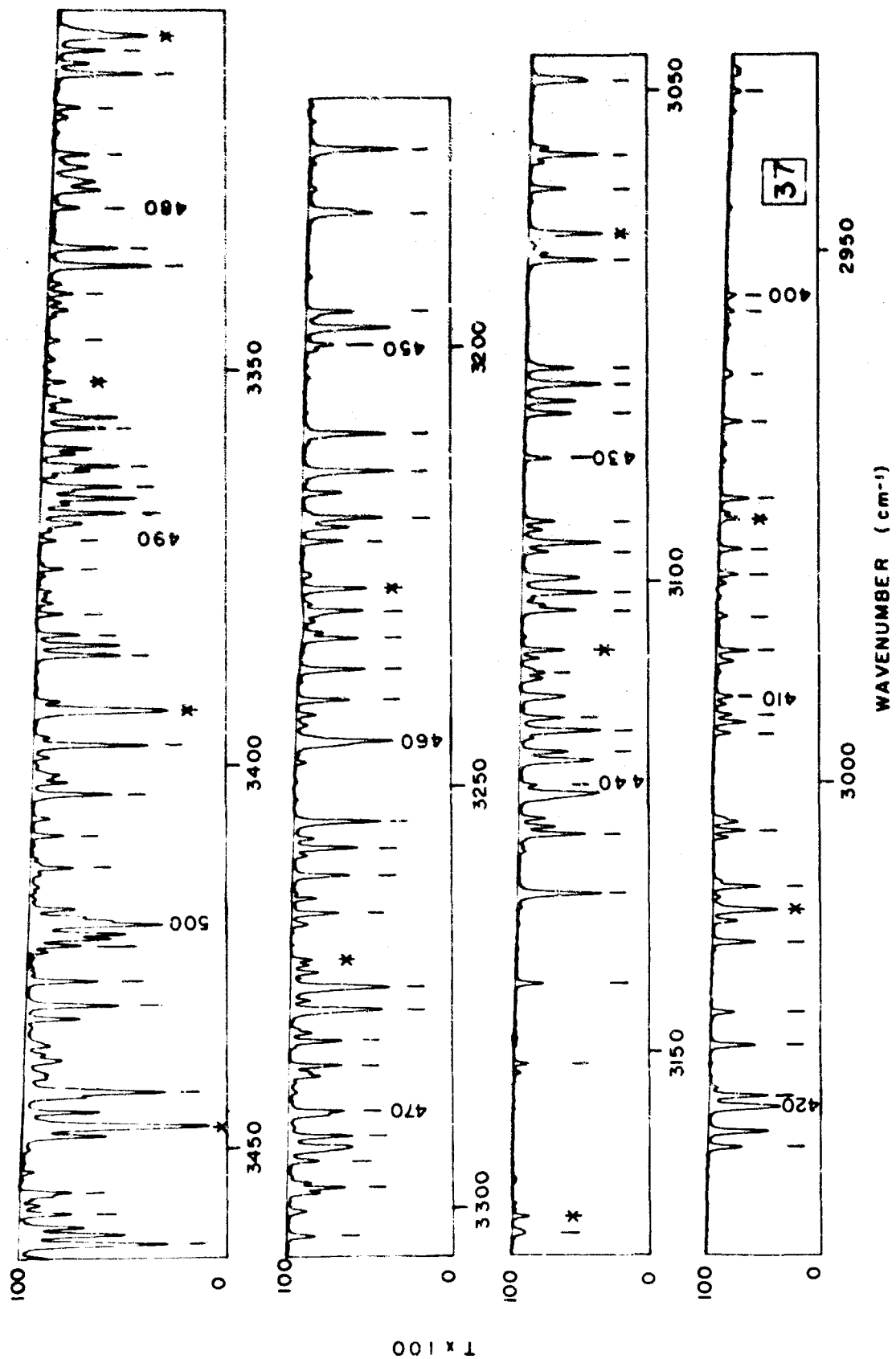


Fig. 6-1

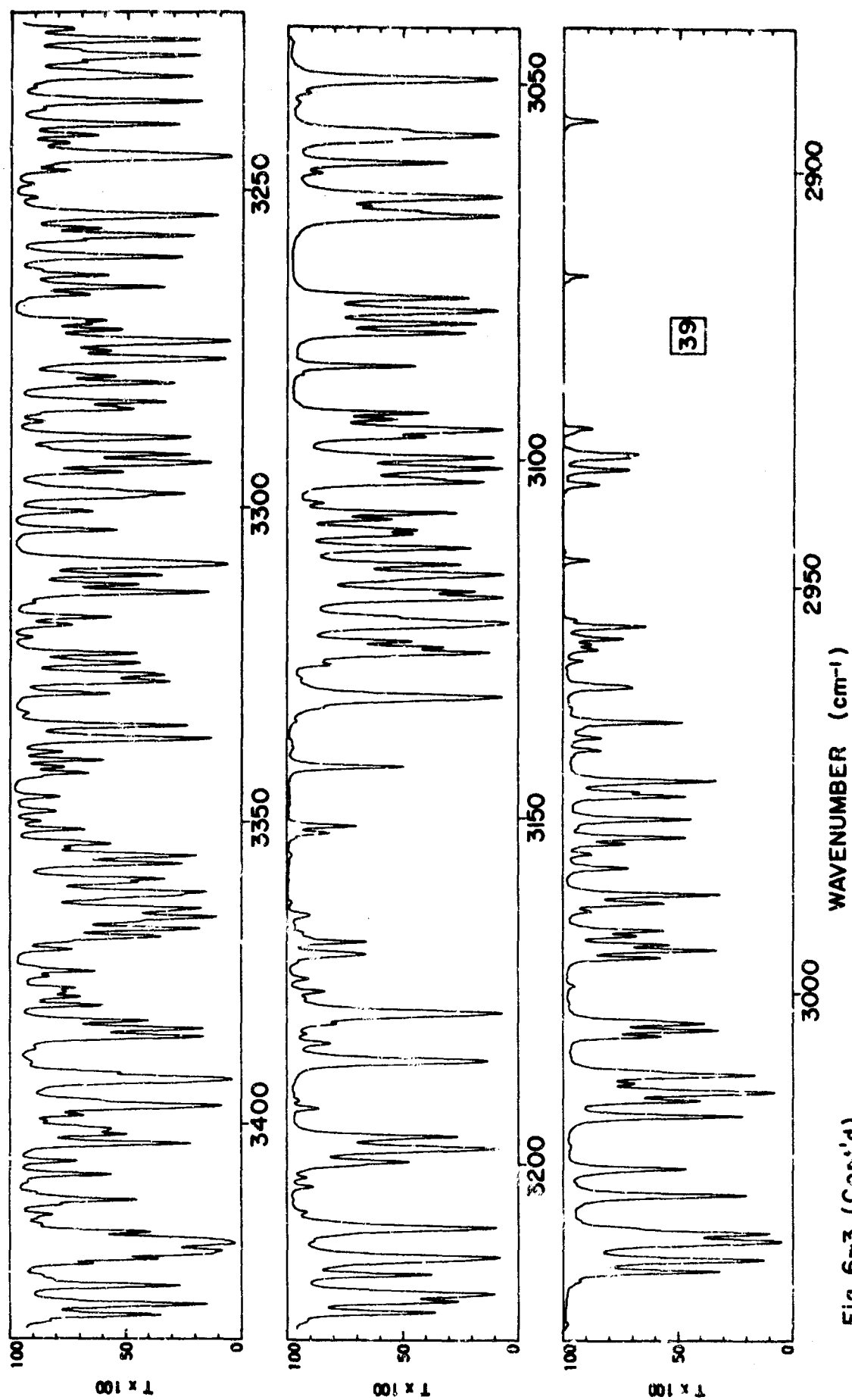


Fig. 6-3 (Cont'd)

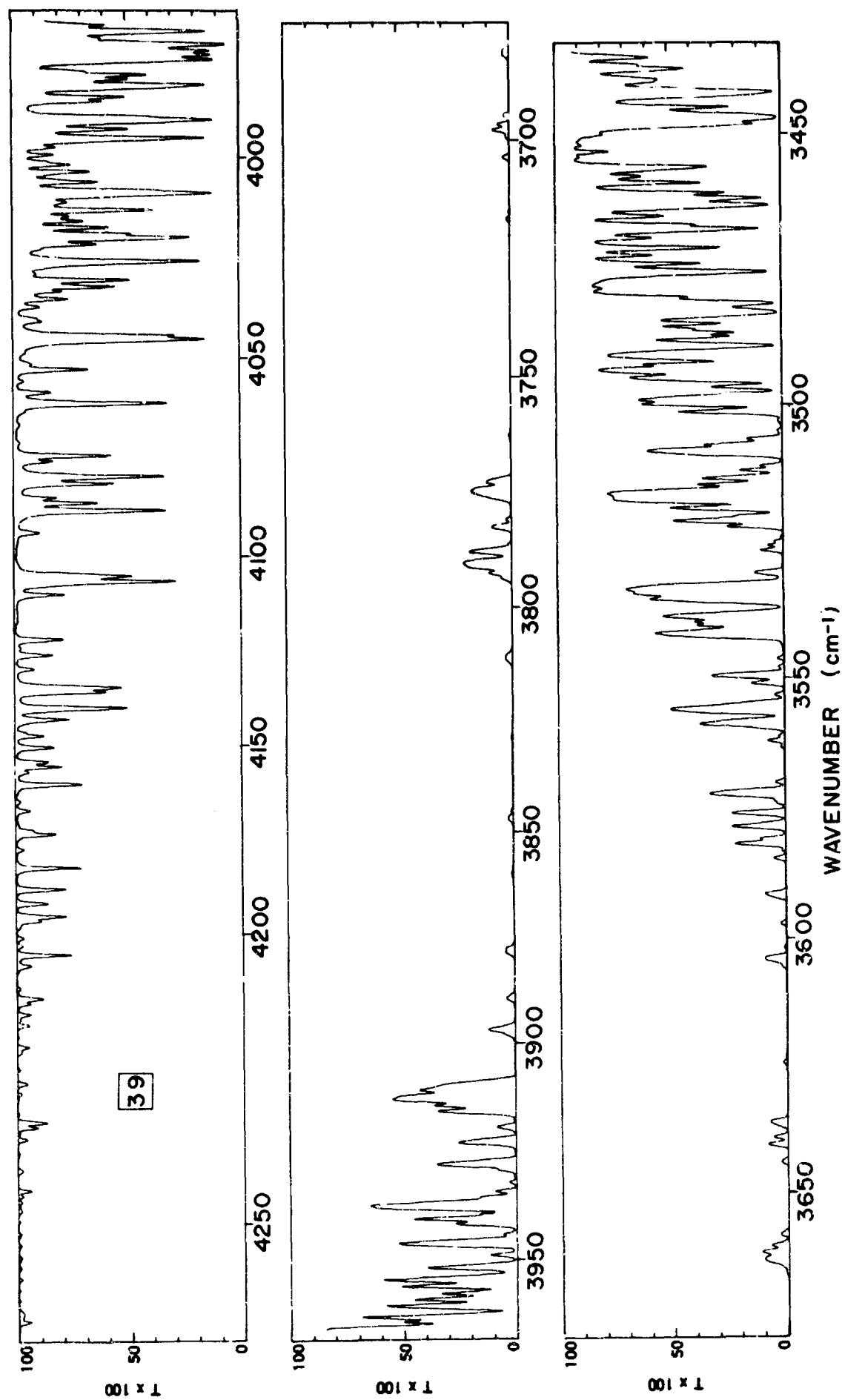


Fig. 6-3

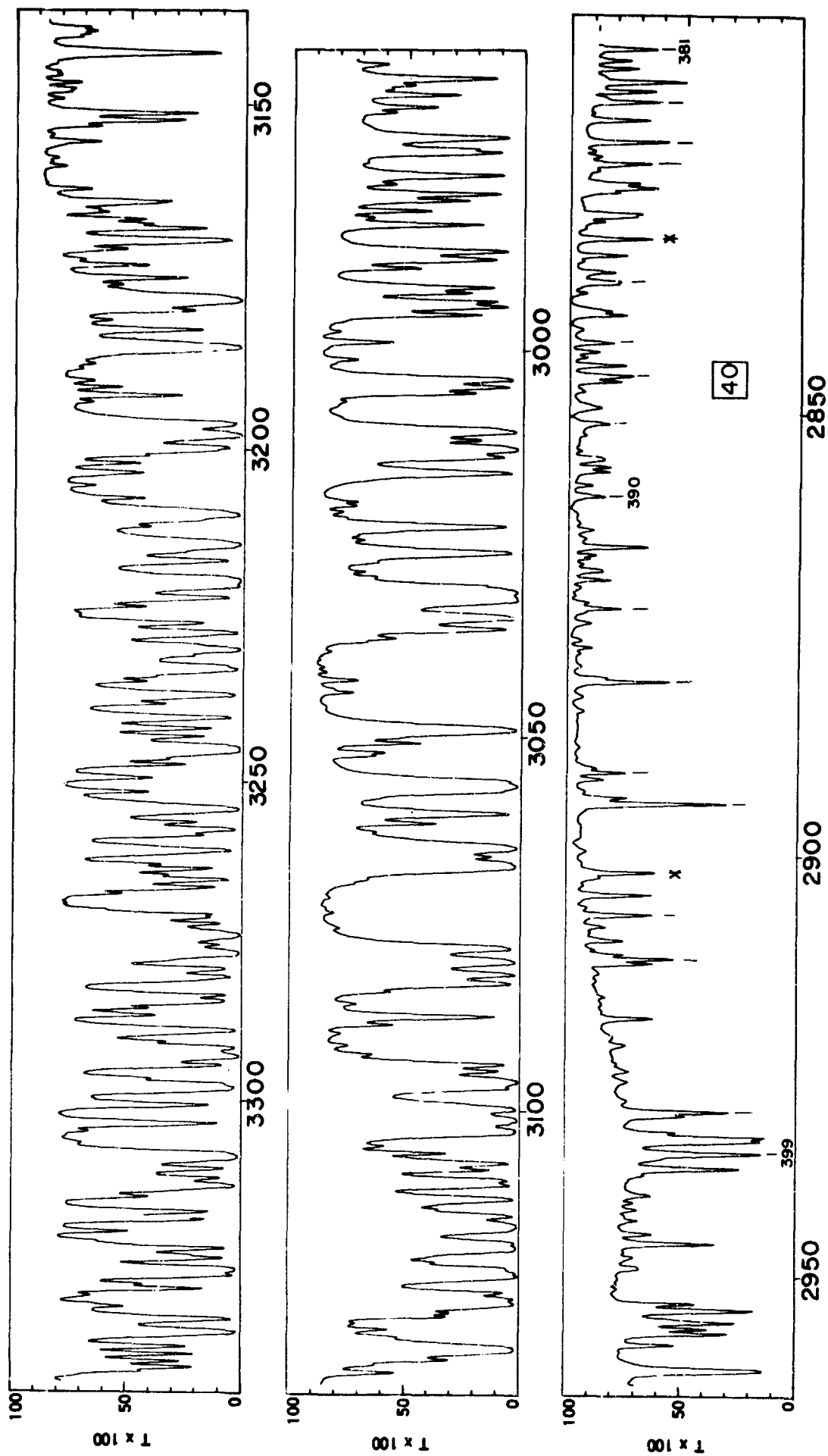


Fig. 6-4 (Cont'd)

WAVENUMBER (cm^{-1})

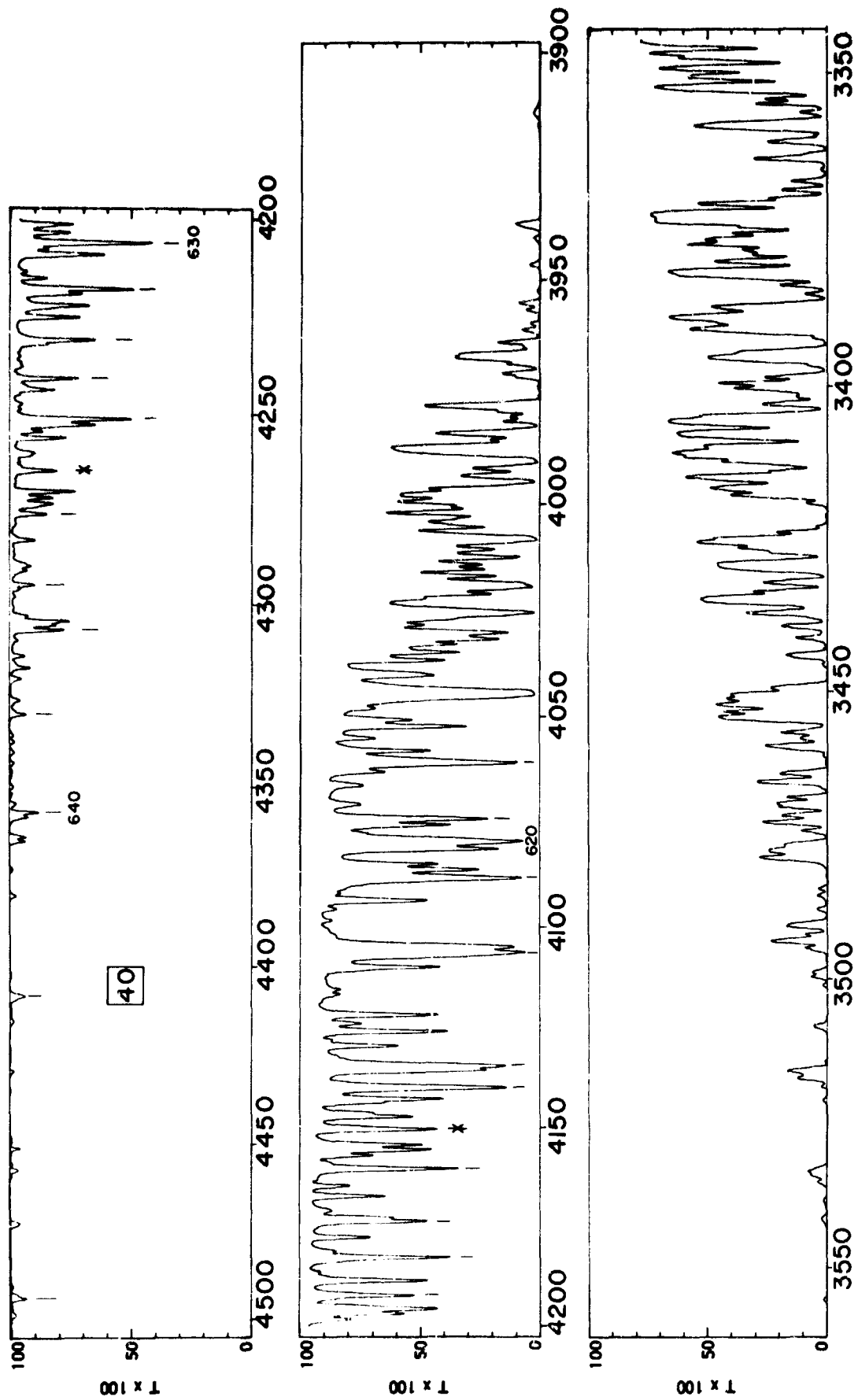


Fig. 6-4

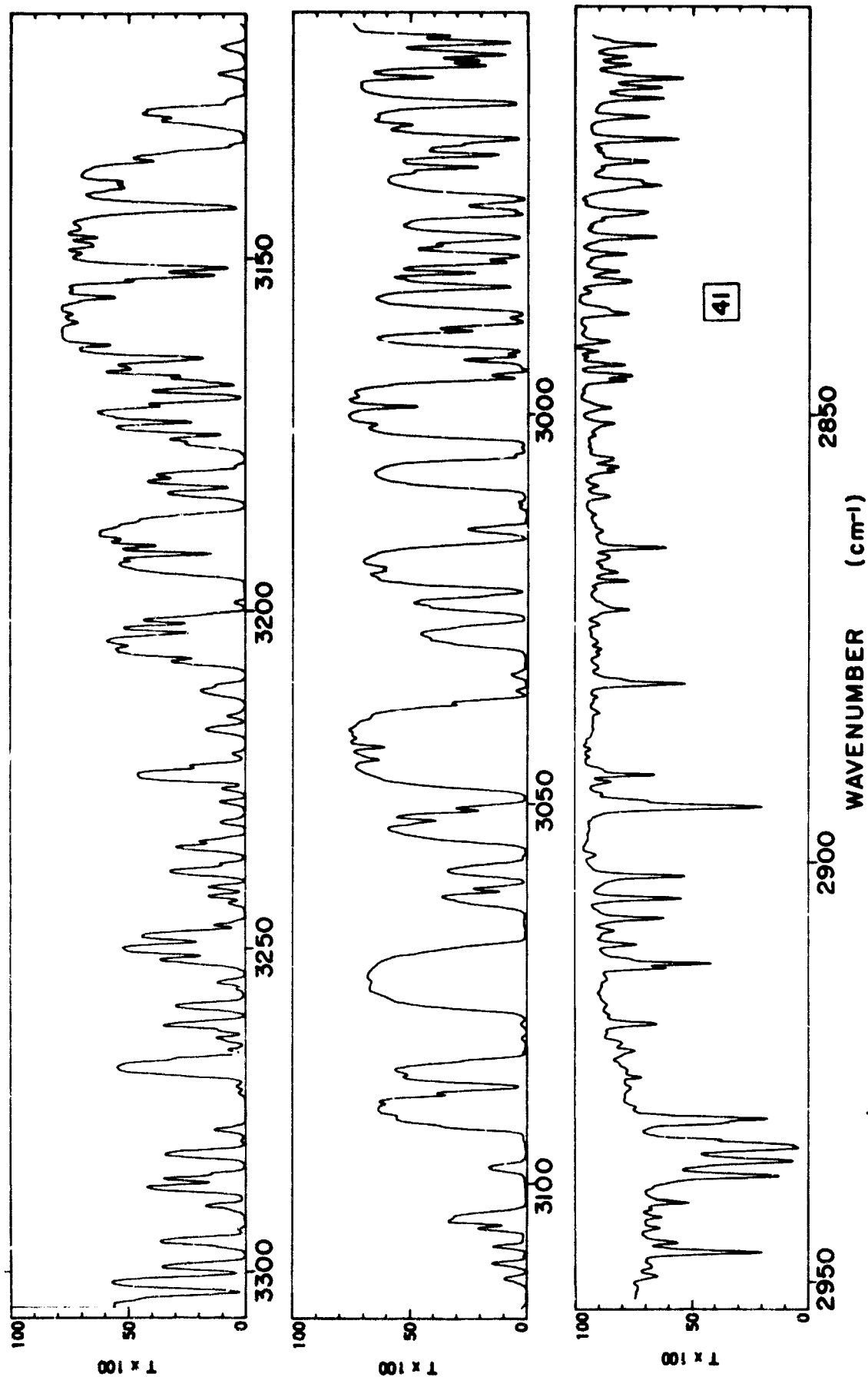


Fig. 6-5 (Cont'd)

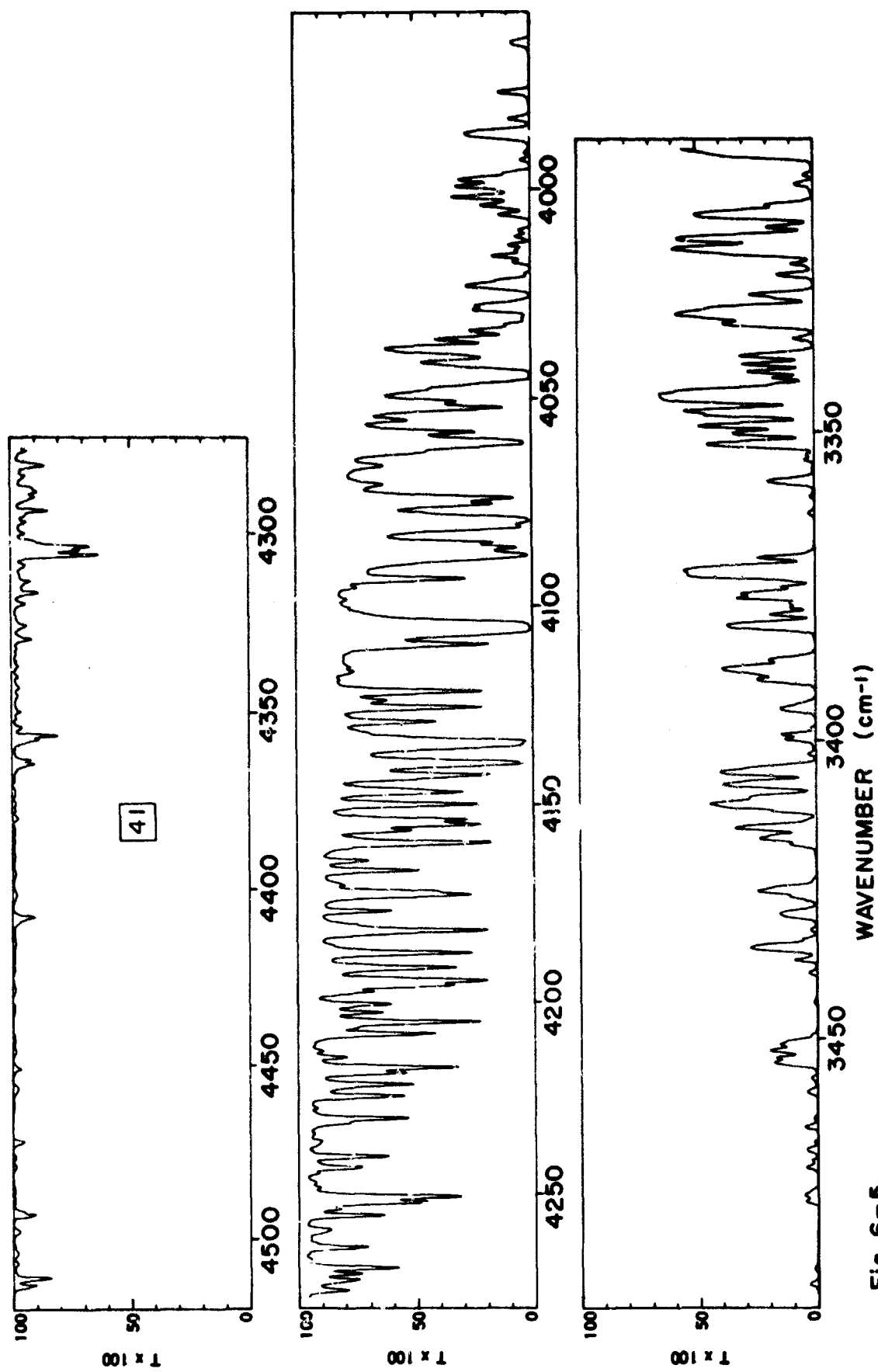


Fig. 6-5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000

Table 6-2

[illegible]

Table 6-2 (Cont'd)

[illegible]

[illegible]

[illegible]

Table 6-2 (Cont'd)

No.	Input				Output				Intermediate				Final			
	Year	Month	Day	Time	Year	Month	Day	Time	Year	Month	Day	Time	Year	Month	Day	Time
1	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
2	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
3	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
4	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
5	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
6	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
7	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
8	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
9	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
10	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
11	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
12	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
13	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
14	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
15	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
16	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
17	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
18	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
19	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
20	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
21	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
22	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
23	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
24	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
25	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
26	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
27	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
28	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
29	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
30	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
31	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
32	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
33	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
34	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
35	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
36	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
37	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
38	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
39	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
40	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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47	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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50	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
51	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
52	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
53	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
54	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
55	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
56	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
57	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
58	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
59	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
60	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
61	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
62	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
63	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
64	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
65	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
66	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
67	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
68	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
69	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
70	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
71	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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73	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
74	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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76	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
77	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
78	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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80	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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82	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
83	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
84	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
85	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
86	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
87	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
88	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
89	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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92	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
93	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
94	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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99	1990	1	1	1	1990	1	1	1	1990	1	1	1	1990	1	1	1
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1197.7	3.12980	3.11187	3221.0	3.08666	3.21645	99.5	97.0	74.5	60.0	1197.8	3.12981	3.11188	3221.1	3.08667	3.21646	99.6	97.1	74.6	60.1	1197.9	3.12982	3.11189	3221.2	3.08668	3.21647	99.7	97.2	74.7	60.2
1197.8	3.12981	3.11188	3221.1	3.08667	3.21646	99.6	97.1	74.6	60.1	1197.9	3.12982	3.11189	3221.2	3.08668	3.21647	99.7	97.2	74.7	60.2	1198.0	3.12983	3.11190	3221.3	3.08669	3.21648	99.8	97.3	74.8	60.3
1197.9	3.12982	3.11189	3221.2	3.08668	3.21647	99.7	97.2	74.7	60.2	1198.0	3.12983	3.11190	3221.3	3.08669	3.21648	99.8	97.3	74.8	60.3	1198.1	3.12984	3.11191	3221.4	3.08670	3.21649	99.9	97.4	74.9	60.4
1198.0	3.12983	3.11190	3221.3	3.08669	3.21648	99.8	97.3	74.8	60.3	1198.1	3.12984	3.11191	3221.4	3.08670	3.21649	99.9	97.4	74.9	60.4	1198.2	3.12985	3.11192	3221.5	3.08671	3.21650	100.0	97.5	75.0	60.5
1198.1	3.12984	3.11191	3221.4	3.08670	3.21649	99.9	97.4	74.9	60.4	1198.2	3.12985	3.11192	3221.5	3.08671	3.21650	100.0	97.5	75.0	60.5	1198.3	3.12986	3.11193	3221.6	3.08672	3.21651	100.1	97.6	75.1	60.6
1198.2	3.12985	3.11192	3221.5	3.08671	3.21650	100.0	97.5	75.0	60.5	1198.3	3.12986	3.11193	3221.6	3.08672	3.21651	100.1	97.6	75.1	60.6	1198.4	3.12987	3.11194	3221.7	3.08673	3.21652	100.2	97.7	75.2	60.7
1198.3	3.12986	3.11193	3221.6	3.08672	3.21651	100.1	97.6	75.1	60.6	1198.4	3.12987	3.11194	3221.7	3.08673	3.21652	100.2	97.7	75.2	60.7	1198.5	3.12988	3.11195	3221.8	3.08674	3.21653	100.3	97.8	75.3	60.8
1198.4	3.12987	3.11194	3221.7	3.08673	3.21652	100.2	97.7	75.2	60.7	1198.5	3.12988	3.11195	3221.8	3.08674	3.21653	100.3	97.8	75.3	60.8	1198.6	3.12989	3.11196	3221.9	3.08675	3.21654	100.4	97.9	75.4	60.9
1198.5	3.12988	3.11195	3221.8	3.08674	3.21653	100.3	97.8	75.3	60.8	1198.6	3.12989	3.11196	3221.9	3.08675	3.21654	100.4	97.9	75.4	60.9	1198.7	3.12990	3.11197	3222.0	3.08676	3.21655	100.5	98.0	75.5	61.0
1198.6	3.12989	3.11196	3221.9	3.08675	3.21654	100.4	97.9	75.4	60.9	1198.7	3.12990	3.11197	3222.0	3.08676	3.21655	100.5	98.0	75.5	61.0	1198.8	3.12991	3.11198	3222.1	3.08677	3.21656	100.6	98.1	75.6	61.1
1198.7	3.12990	3.11197	3222.0	3.08676	3.21655	100.5	98.0	75.5	61.0	1198.8	3.12991	3.11198	3222.1	3.08677	3.21656	100.6	98.1	75.6	61.1	1198.9	3.12992	3.11199	3222.2	3.08678	3.21657	100.7	98.2	75.7	61.2
1198.8	3.12991	3.11198	3222.1	3.08677	3.21656	100.6	98.1	75.6	61.1	1198.9	3.12992	3.11199	3222.2	3.08678	3.21657	100.7	98.2	75.7	61.2	1199.0	3.12993	3.11200	3222.3	3.08679	3.21658	100.8	98.3	75.8	61.3
1198.9	3.12992	3.11199	3222.2	3.08678	3.21657	100.7	98.2	75.7	61.2	1199.0	3.12993	3.11200	3222.3	3.08679	3.21658	100.8	98.3	75.8	61.3	1199.1	3.12994	3.11201	3222.4	3.08680	3.21659	100.9	98.4	75.9	61.4
1199.0	3.12993	3.11200	3222.3	3.08679	3.21658	100.8	98.3	75.8	61.3	1199.1	3.12994	3.11201	3222.4	3.08680	3.21659	100.9	98.4	75.9	61.4	1199.2	3.12995	3.11202	3222.5	3.08681	3.21660	101.0	98.5	76.0	61.5
1199.1	3.12994	3.11201	3222.4	3.08680	3.21659	100.9	98.4	75.9	61.4	1199.2	3.12995	3.11202	3222.5	3.08681	3.21660	101.0	98.5	76.0	61.5	1199.3	3.12996	3.11203	3222.6	3.08682	3.21661	101.1	98.6	76.1	61.6
1199.2	3.12995	3.11202	3222.5	3.08681	3.21660	101.0	98.5	76.0	61.5	1199.3	3.12996	3.11203	3222.6	3.08682	3.21661	101.1	98.6	76.1	61.6	1199.4	3.12997	3.11204	3222.7	3.08683	3.21662	101.2	98.7	76.2	61.7
1199.3	3.12996	3.11203	3222.6	3.08682	3.21661	101.1	98.6	76.1	61.6	1199.4	3.12997	3.11204	3222.7	3.08683	3.21662	101.2	98.7	76.2	61.7	1199.5	3.12998	3.11205	3222.8	3.08684	3.21663	101.3	98.8	76.3	61.8
1199.4	3.12997	3.11204	3222.7	3.08683	3.21662	101.2	98.7	76.2	61.7	1199.5	3.12998	3.11205	3222.8	3.08684	3.21663	101.3	98.8	76.3	61.8	1199.6	3.12999	3.11206	3222.9	3.08685	3.21664	101.4	98.9	76.4	61.9
1199.5	3.12998	3.11205	3222.8	3.08684	3.21663	101.3	98.8	76.3	61.8	1199.6	3.12999	3.11206	3222.9	3.08685	3.21664	101.4	98.9	76.4	61.9	1199.7	3.13000	3.11207	3223.0	3.08686	3.21665	101.5	99.0	76.5	62.0
1199.6	3.12999	3.11206	3222.9	3.08685	3.21664	101.4	98.9	76.4	61.9	1199.7	3.13000	3.11207	3223.0	3.08686	3.21665	101.5	99.0	76.5	62.0	1199.8	3.13001	3.11208	3223.1	3.08687	3.21666	101.6	99.1	76.6	62.1
1199.7	3.13000	3.11207	3223.0	3.08686	3.21665	101.5	99.0	76.5	62.0	1199.8	3.13001	3.11208	3223.1	3.08687	3.21666	101.6	99.1	76.6	62.1	1199.9	3.13002	3.11209	3223.2	3.08688	3.21667	101.7	99.2	76.7	62.2
1199.8	3.13001	3.11208	3223.1	3.08687	3.21666	101.6	99.1	76.6	62.1	1199.9	3.13002	3.11209	3223.2	3.08688	3.21667	101.7	99.2	76.7	62.2	1200.0	3.13003	3.11210	3223.3	3.08689	3.21668	101.8	99.3	76.8	62.3
1199.9	3.13002	3.11209	3223.2	3.08688	3.21667	101.7	99.2	76.7	62.2	1200.0	3.13003	3.11210	3223.3	3.08689	3.21668	101.8	99.3	76.8	62.3	1200.1	3.13004	3.11211	3223.4	3.08690	3.21669	101.9	99.4	76.9	62.4
1200.0	3.13003	3.11210	3223.3	3.08689	3.21668	101.8	99.3	76.8	62.3	1200.1	3.13004	3.11211	3223.4	3.08690	3.21669	101.9	99.4	76.9	62.4	1200.2	3.13005	3.11212	3223.5	3.08691	3.21670	102.0	99.5	77.0	62.5
1200.1	3.13004	3.11211	3223.4	3.08690	3.21669	101.9	99.4	76.9	62.4	1200.2	3.13005	3.11212	3223.5	3.08691	3.21670	102.0	99.5	77.0	62.5	1200.3	3.13006	3.11213	3223.6	3.08692	3.21671	102.1	99.6	77.1	62.6
1200.2	3.13005	3.11212	3223.5	3.08691	3.21670	102.0	99.5	77.0	62.5	1200.3	3.13006	3.11213	3223.6	3.08692	3.21671	102.1	99.6	77.1	62.6	1200.4	3.13007	3.11214	3223.7	3.08693	3.21672	102.2	99.7	77.2	62.7
1200.3	3.13006	3.11213	3223.6	3.08692	3.21671	102.1	99.6	77.1	62.6	1200.4	3.13007	3.11214	3223.7	3.08693	3.21672	102.2	99.7	77.2	62.7	1200.5	3.13008	3.11215	3223.8	3.08694	3.21673	102.3	99.8	77.3	62.8
1200.4	3.13007	3.11214	3223.7	3.08693	3.21672	102.2	99.7	77.2	62.7	1200.5	3.13008	3.11215	3223.8	3.08694	3.21673	102.3	99.8	77.3	62.8	1200.6	3.13009	3.11216	3223.9	3.08695	3.21674	102.4	99.9	77.4	62.9
1200.5	3.13008	3.11215	3223.8	3.08694	3.21673	102.3	99.8	77.3	62.8	1200.6	3.13009	3.11216	3223.9	3.08695	3.21674	102.4	99.9	77.4	62.9	1200.7	3.13010	3.11217	3224.0	3.08696	3.21675	102.5	100.0	77.5	63.0
1200.6	3.13009	3.11216	3223.9	3.08695	3.21674	102.4	99.9	77.4	62.9	1200.7	3.13010	3.11217	3224.0	3.08696	3.21675	102.5	100.0	77.5	63.0	1200.8	3.13011	3.11218	3224.1	3.08697	3.21676	102.6	100.1	77.6	63.1
1200.7	3.13010	3.11217	3224.0	3.08696	3.21675	102.5	100.0	77.5	63.0	1200.8	3.13011	3.11218	3224.1	3.08697	3.21676	102.6	100.1	77.6	63.1	1200.9	3.13012	3.11219	3224.2	3.08698	3.21677	102.7	100.2	77.7	63.2
1200.8	3.13011	3.11218	3224.1	3.08697	3.21676	102.6	100.1	77.6	63.1	1200.9	3.13012	3.11219	3224.2	3.08698	3.21677	102.7	100.2	77.7	63.2	1201.0	3.13013	3.11220	3224.3	3.08699	3.21678	102.8	100.3	77.8	63.3
1200.9	3.13012	3.11219	3224.2	3.08698	3.21677	102.7	100.2	77.7	63.2	1201.0	3.13013	3.11220	3224.3	3.08699	3.21678	102.8	100.3	77.8	63.3	1201.1	3.13014	3.11221	3224.4	3.08700	3.21679	102.9	100.4	77.9	63.4
1201.0	3.13013	3.11220	3224.3	3.08699	3.21678	102.8	100.3	77.8	63.3	1201.1	3.13014	3.11221	3224.4	3.08700	3.21679	102.9	100.4	77.9	63.4	1201.2	3.13015	3.11222	3224.5	3.08701	3.21680	103.0	100.5	78.0	63.5
1201.1	3.13014	3.11221	3224.4	3.08700	3.21679	102.9	100.4	77.9	63.4	1201.2	3.13015	3.11222	3224.5	3.08701	3.21680	103.0	100.5	78.0	63.5	1201.3	3.13016	3.11223	3224.6	3.08702	3.21681	103.1	100.6	78.1	63.6
1201.2	3.13015	3.11222	3224.5	3.08701	3.21680	103.0	100.5	78.0	63.5	1201.3	3.13016	3.11223	3224.6	3.08702	3.21681	103.1	100.6	78.1	63.6	1201.4	3.13017	3.11224	3224.7	3.08703	3.21682	103.2	100.7	78.2	63.7
1201.3	3.13016	3.11223	3224.6	3.08702	3.21681	103.1	100.6	78.1	63.6	1201.4	3.13017	3.11224	3224.7	3.08703	3.21682	103.2	100.7	78.2	63.7	1201.5	3.13018	3.11225	3224.8	3.08704	3.21683	103.3	100.8	78.3	63.8
1201.4	3.13017	3.11224	3224.7	3.08703	3.21682	103.2	100.7	78.2	63.7	1201.5	3.13018	3.11225	3224.8	3.08704	3.21683	103.3	100.8	78.3	63.8	1201.6	3.13019	3.11226	3224.9	3.08705	3.21684	103.4	100.9	78.4	63.9
1201.5	3.																												

Table 6-2 (Cont'd)

Sam. No.	37	39	40	41	Sam. No.	37	39	40	41	Sam. No.	37	39	40	41
ρ (g/cm ³)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	ρ (g/cm ³)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	ρ (g/cm ³)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07
ρ_e (g/cm ³)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	ρ_e (g/cm ³)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	ρ_e (g/cm ³)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07
μ (cm ² /g)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	μ (cm ² /g)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	μ (cm ² /g)	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07	1.37 ± 0.07

Table 6-2 (Cont'd)

[illegible]

00000	00001	00002	00003	00004	00005	00006	00007	00008	00009	00010	00011	00012	00013	00014	00015	00016	00017	00018	00019	00020	00021
00022	00023	00024	00025	00026	00027	00028	00029	00030	00031	00032	00033	00034	00035	00036	00037	00038	00039	00040	00041	00042	00043
00044	00045	00046	00047	00048	00049	00050	00051	00052	00053	00054	00055	00056	00057	00058	00059	00060	00061	00062	00063	00064	00065
00066	00067	00068	00069	00070	00071	00072	00073	00074	00075	00076	00077	00078	00079	00080	00081	00082	00083	00084	00085	00086	00087
00088	00089	00090	00091	00092	00093	00094	00095	00096	00097	00098	00099	00100	00101	00102	00103	00104	00105	00106	00107	00108	00109
00110	00111	00112	00113	00114	00115	00116	00117	00118	00119	00120	00121	00122	00123	00124	00125	00126	00127	00128	00129	00130	00131
00132	00133	00134	00135	00136	00137	00138	00139	00140	00141	00142	00143	00144	00145	00146	00147	00148	00149	00150	00151	00152	00153
00154	00155	00156	00157	00158	00159	00160	00161	00162	00163	00164	00165	00166	00167	00168	00169	00170	00171	00172	00173	00174	00175
00176	00177	00178	00179	00180	00181	00182	00183	00184	00185	00186	00187	00188	00189	00190	00191	00192	00193	00194	00195	00196	00197
00198	00199	00200	00201	00202	00203	00204	00205	00206	00207	00208	00209	00210	00211	00212	00213	00214	00215	00216	00217	00218	00219
00220	00221	00222	00223	00224	00225	00226	00227	00228	00229	00230	00231	00232	00233	00234	00235	00236	00237	00238	00239	00240	00241
00242	00243	00244	00245	00246	00247	00248	00249	00250	00251	00252	00253	00254	00255	00256	00257	00258	00259	00260	00261	00262	00263
00264	00265	00266	00267	00268	00269	00270	00271	00272	00273	00274	00275	00276	00277	00278	00279	00280	00281	00282	00283	00284	00285
00286	00287	00288	00289	00290	00291	00292	00293	00294	00295	00296	00297	00298	00299	00300	00301	00302	00303	00304	00305	00306	00307
00308	00309	00310	00311	00312	00313	00314	00315	00316	00317	00318	00319	00320	00321	00322	00323	00324	00325	00326	00327	00328	00329
00330	00331	00332	00333	00334	00335	00336	00337	00338	00339	00340	00341	00342	00343	00344	00345	00346	00347	00348	00349	00350	00351
00352	00353	00354	00355	00356	00357	00358	00359	00360	00361	00362	00363	00364	00365	00366	00367	00368	00369	00370	00371	00372	00373
00374	00375	00376	00377	00378	00379	00380	00381	00382	00383	00384	00385	00386	00387	00388	00389	00390	00391	00392	00393	00394	00395
00396	00397	00398	00399	00400	00401	00402	00403	00404	00405	00406	00407	00408	00409	00410	00411	00412	00413	00414	00415	00416	00417
00418	00419	00420	00421	00422	00423	00424	00425	00426	00427	00428	00429	00430	00431	00432	00433	00434	00435	00436	00437	00438	00439
00440	00441	00442	00443	00444	00445	00446	00447	00448	00449	00450	00451	00452	00453	00454	00455	00456	00457	00458	00459	00460	00461
00462	00463	00464	00465	00466	00467	00468	00469	00470	00471	00472	00473	00474	00475	00476	00477	00478	00479	00480	00481	00482	00483
00484	00485	00486	00487	00488	00489	00490	00491	00492	00493	00494	00495	00496	00497	00498	00499	00500	00501	00502	00503	00504	00505
00506	00507	00508	00509	00510	00511	00512	00513	00514	00515	00516	00517	00518	00519	00520	00521	00522	00523	00524	00525	00526	00527
00528	00529	00530	00531	00532	00533	00534	00535	00536	00537	00538	00539	00540	00541	00542	00543	00544	00545	00546	00547	00548	00549
00550	00551	00552	00553	00554	00555	00556	00557	00558	00559	00560	00561	00562	00563	00564	00565	00566	00567	00568	00569	00570	00571
00572	00573	00574	00575	00576	00577	00578	00579	00580	00581	00582	00583	00584	00585	00586	00587	00588	00589	00590	00591	00592	00593
00594	00595	00596	00597	00598	00599	00600	00601	00602	00603	00604	00605	00606	00607	00608	00609	00610	00611	00612	00613	00614	00615
00616	00617	00618	00619	00620	00621	00622	00623	00624	00625	00626	00627	00628	00629	00630	00631	00632	00633	00634	00635	00636	00637
00638	00639	00640	00641	00642	00643	00644	00645	00646	00647	00648	00649	00650	00651	00652	00653	00654	00655	00656	00657	00658	00659
00660	00661	00662	00663	00664	00665	00666	00667	00668	00669	00670	00671	00672	00673	00674	00675	00676	00677	00678	00679	00680	00681
00682	00683	00684	00685	00686	00687	00688	00689	00690	00691	00692	00693	00694	00695	00696	00697	00698	00699	00700	00701	00702	00703
00704	00705	00706	00707	00708	00709	00710	00711	00712	00713	00714	00715	00716	00717	00718	00719	00720	00721	00722	00723	00724	00725
00726	00727	00728	00729	00730	00731	00732	00733	00734	00735	00736	00737	00738	00739	00740	00741	00742	00743	00744	00745	00746	00747
00748	00749	00750	00751	00752	00753	00754	00755	00756	00757	00758	00759	00760	00761	00762	00763	00764	00765	00766	00767	00768	00769
00770	00771	00772	00773	00774	00775	00776	00777	00778	00779	00780	00781	00782	00783	00784	00785	00786	00787	00788	00789	00790	00791
00792	00793	00794	00795	00796	00797	00798	00799	00800	00801	00802	00803	00804	00805	00806	00807	00808	00809	00810	00811	00812	00813
00814	00815	00816	00817	00818	00819	00820	00821	00822	00823	00824	00825	00826	00827	00828	00829	00830	00831	00832	00833	00834	00835
00836	00837	00838	00839	00840	00841	00842	00843	00844	00845	00846	00847	00848	00849	00850	00851	00852	00853	00854	00855	00856	00857
00858	00859	00860	00861	00862	00863	00864	00865	00866	00867	00868	00869	00870	00871	00872	00873	00874	00875	00876	00877	00878	00879
00880	00881	00882	00883	00884	00885	00886	00887	00888	00889	00890	00891	00892	00893	00894	00895	00896	00897	00898	00899	00900	00901
00902	00903	00904	00905	00906	00907	00908	00909	00910	00911	00912	00913	00914	00915	00916	00917	00918	00919	00920	00921	00922	00923
00924	00925	00926	00927	00928	00929	00930	00931	00932	00933	00934	00935	00936	00937	00938	00939	00940	00941	00942	00943	00944	00945
00946	00947	00948	00949	00950	00951	00952	00953	00954	00955	00956	00957	00958	00959	00960	00961	00962	00963	00964	00965	00966	00967
00968	00969	00970	00971	00972	00973	00974	00975	00976	00977	00978	00979	00980	00981	00982	00983	00984	00985	00986	00987	00988	00989
00990	00991	00992	00993	00994	00995	00996	00997	00998	00999	01000	01001	01002	01003	01004	01005	01006	01007	01008	01009	01010	01011
01012	01013	01014	01015	01016	01017	01018	01019	01020	01021	01022	01023	01024	01025	01026	01027	01028	01029	01030	01031	01032	01033
01034	01035	01036	01037	01038	01039	01040	01041	01042	01043	01044	01045	01046	01047	01048	01049	01050	01051	01052	01053	01054	01055
01056	01057	01058	01059	01060	01061	01062	01063	01064	01065	01066	01067	01068	01069	01070	01071	01072	01073	01074	01075	01076	01077
01078	01079	01080	01081	01082	01083	01084	01085	01086	01087	01088	01089	01090	01091	01092	01093	01094	01095	01096	01097	01098	01099
01100	01101	01102	01103	01104	01105	01106	01107	01108	01109	01110	01111	01112	01113	01114	01115	01116	01117	01118	01119	01120	01121
01122	01123	01124	01125	01126	01127	01128	01129	01130	01131	01132	01133	01134	01135	01136	01137	01138	01139	01140	01141	01142	01143
01144	01145	01146	01147	01148	01149	01150	01151	01152	01153	01154	01155	01156	01157	01158	01159	01160	01161	01162	01163	01164	01165
01166	01167	01168	01169	01170	01171	01172	01173	01174	01175	01176	01177	01178	01179	01180	01181	01182	01183	01184	01185	01186	01187
01188	01189	01190	01191	01192	01193	01194	01195	01196	01197	01198	01199	01200	01201	01202	01203	01204	01205	01206	01207	01208	01209
01210	01211	01212	01213	01214	01215																

Table 6-2 (Cont'd)

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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Table 6-3 $\int A'(v) dv$ [illegible]

Table 6-3 $\int_1^{\infty} \dot{A}(v) dv$ (cont'd)[illegible]

Table 6-4

Time	Lat	Long	Alt	Temp	Hum	Wind	Dir	Speed	Pressure	Clouds	Visibility	Remarks
0000	10 00	105 00	100	20.0	85	10	090	10	1010.0	0	10	Clear
0100	10 05	105 05	100	19.5	84	10	090	10	1010.0	0	10	Clear
0200	10 10	105 10	100	19.0	83	10	090	10	1010.0	0	10	Clear
0300	10 15	105 15	100	18.5	82	10	090	10	1010.0	0	10	Clear
0400	10 20	105 20	100	18.0	81	10	090	10	1010.0	0	10	Clear
0500	10 25	105 25	100	17.5	80	10	090	10	1010.0	0	10	Clear
0600	10 30	105 30	100	17.0	79	10	090	10	1010.0	0	10	Clear
0700	10 35	105 35	100	16.5	78	10	090	10	1010.0	0	10	Clear
0800	10 40	105 40	100	16.0	77	10	090	10	1010.0	0	10	Clear
0900	10 45	105 45	100	15.5	76	10	090	10	1010.0	0	10	Clear
1000	10 50	105 50	100	15.0	75	10	090	10	1010.0	0	10	Clear
1100	10 55	105 55	100	14.5	74	10	090	10	1010.0	0	10	Clear
1200	11 00	106 00	100	14.0	73	10	090	10	1010.0	0	10	Clear
1300	11 05	106 05	100	13.5	72	10	090	10	1010.0	0	10	Clear
1400	11 10	106 10	100	13.0	71	10	090	10	1010.0	0	10	Clear
1500	11 15	106 15	100	12.5	70	10	090	10	1010.0	0	10	Clear
1600	11 20	106 20	100	12.0	69	10	090	10	1010.0	0	10	Clear
1700	11 25	106 25	100	11.5	68	10	090	10	1010.0	0	10	Clear
1800	11 30	106 30	100	11.0	67	10	090	10	1010.0	0	10	Clear
1900	11 35	106 35	100	10.5	66	10	090	10	1010.0	0	10	Clear
2000	11 40	106 40	100	10.0	65	10	090	10	1010.0	0	10	Clear
2100	11 45	106 45	100	9.5	64	10	090	10	1010.0	0	10	Clear
2200	11 50	106 50	100	9.0	63	10	090	10	1010.0	0	10	Clear
2300	11 55	106 55	100	8.5	62	10	090	10	1010.0	0	10	Clear
2400	12 00	107 00	100	8.0	61	10	090	10	1010.0	0	10	Clear

Table 6-4 (Cont'd)

[illegible]

Table 6-4 (Cont'd)

[illegible]

[illegible]

Table 6-5 $\int_4^2 A(v) dv$

[illegible]

Table 6-5 $\int_0^1 A(z') dz'$ (cont'd)

Table 6-6

[illegible]

[illegible]

4191.0	2-18255	4234.0	2-18189	4271.0	2-18137	4308.0	2-18081	4345.0	2-18025	4382.0	2-17969	4419.0	2-17913	4456.0	2-17857	4493.0	2-17801	4530.0	2-17745	4567.0	2-17689	4604.0	2-17633	4641.0	2-17577	4678.0	2-17521	4715.0	2-17465	4752.0	2-17409	4789.0	2-17353	4826.0	2-17297	4863.0	2-17241	4900.0	2-17185	4937.0	2-17129	4974.0	2-17073	5011.0	2-17017	5048.0	2-16961	5085.0	2-16905	5122.0	2-16849	5159.0	2-16793	5196.0	2-16737	5233.0	2-16681	5270.0	2-16625	5307.0	2-16569	5344.0	2-16513	5381.0	2-16457	5418.0	2-16401	5455.0	2-16345	5492.0	2-16289	5529.0	2-16233	5566.0	2-16177	5603.0	2-16121	5640.0	2-16065	5677.0	2-16009	5714.0	2-15953	5751.0	2-15897	5788.0	2-15841	5825.0	2-15785	5862.0	2-15729	5899.0	2-15673	5936.0	2-15617	5973.0	2-15561	6010.0	2-15505	6047.0	2-15449	6084.0	2-15393	6121.0	2-15337	6158.0	2-15281	6195.0	2-15225	6232.0	2-15169	6269.0	2-15113	6306.0	2-15057	6343.0	2-15001	6380.0	2-14945	6417.0	2-14889	6454.0	2-14833	6491.0	2-14777	6528.0	2-14721	6565.0	2-14665	6602.0	2-14609	6639.0	2-14553	6676.0	2-14497	6713.0	2-14441	6750.0	2-14385	6787.0	2-14329	6824.0	2-14273	6861.0	2-14217	6898.0	2-14161	6935.0	2-14105	6972.0	2-14049	7009.0	2-14000	7046.0	2-13944	7083.0	2-13888	7120.0	2-13832	7157.0	2-13776	7194.0	2-13720	7231.0	2-13664	7268.0	2-13608	7305.0	2-13552	7342.0	2-13496	7379.0	2-13440	7416.0	2-13384	7453.0	2-13328	7490.0	2-13272	7527.0	2-13216	7564.0	2-13160	7601.0	2-13104	7638.0	2-13048	7675.0	2-13000	7712.0	2-12944	7749.0	2-12888	7786.0	2-12832	7823.0	2-12776	7860.0	2-12720	7897.0	2-12664	7934.0	2-12608	7971.0	2-12552	8008.0	2-12496	8045.0	2-12440	8082.0	2-12384	8119.0	2-12328	8156.0	2-12272	8193.0	2-12216	8230.0	2-12160	8267.0	2-12104	8304.0	2-12048	8341.0	2-11992	8378.0	2-11936	8415.0	2-11880	8452.0	2-11824	8489.0	2-11768	8526.0	2-11712	8563.0	2-11656	8600.0	2-11600	8637.0	2-11544	8674.0	2-11488	8711.0	2-11432	8748.0	2-11376	8785.0	2-11320	8822.0	2-11264	8859.0	2-11208	8896.0	2-11152	8933.0	2-11096	8970.0	2-11040	9007.0	2-10984	9044.0	2-10928	9081.0	2-10872	9118.0	2-10816	9155.0	2-10760	9192.0	2-10704	9229.0	2-10648	9266.0	2-10592	9303.0	2-10536	9340.0	2-10480	9377.0	2-10424	9414.0	2-10368	9451.0	2-10312	9488.0	2-10256	9525.0	2-10200	9562.0	2-10144	9599.0	2-10088	9636.0	2-10032	9673.0	2-9976	9710.0	2-9920	9747.0	2-9884	9821.0	2-9768	9805.0	2-9712	9849.0	2-9656	9896.0	2-9592	9943.0	2-9488	9995.0	2-9384	10042.0	2-9280	10089.0	2-9176	10136.0	2-9072	10183.0	2-8968	10230.0	2-8864	10277.0	2-8760	10324.0	2-8656	10371.0	2-8552	10418.0	2-8448	10465.0	2-8344	10512.0	2-8240	10559.0	2-8136	10606.0	2-8032	10653.0	2-7928	10700.0	2-7824	10747.0	2-7720	10794.0	2-7616	10841.0	2-7512	10888.0	2-7408	10935.0	2-7304	10982.0	2-7200	11029.0	2-7096	11076.0	2-6992	11123.0	2-6888	11170.0	2-6784	11217.0	2-6680	11264.0	2-6576	11311.0	2-6472	11358.0	2-6368	11405.0	2-6264	11452.0	2-6160	11499.0	2-6056	11546.0	2-5952	11593.0	2-5848	11640.0	2-5744	11687.0	2-5640	11734.0	2-5536	11781.0	2-5432	11828.0	2-5328	11875.0	2-5224	11922.0	2-5120	11969.0	2-5016	12016.0	2-4912	12063.0	2-4808	12110.0	2-4704	12157.0	2-4600	12204.0	2-4496	12251.0	2-4392	12298.0	2-4288	12345.0	2-4184	12392.0	2-4080	12439.0	2-3976	12486.0	2-3872	12533.0	2-3768	12580.0	2-3664	12627.0	2-3560	12674.0	2-3456	12721.0	2-3352	12768.0	2-3248	12815.0	2-3144	12862.0	2-3040	12909.0	2-2936	12956.0	2-2832	13003.0	2-2728	13050.0	2-2624	13097.0	2-2520	13144.0	2-2416	13191.0	2-2312	13238.0	2-2208	13285.0	2-2104	13332.0	2-2000	13379.0	2-1896	13426.0	2-1792	13473.0	2-1688	13520.0	2-1584	13567.0	2-1480	13614.0	2-1376	13661.0	2-1272	13709.0	2-1168	13756.0	2-1064	13803.0	2-0960	13850.0	2-0856	13897.0	2-0752	13944.0	2-0648	13991.0	2-0544	14038.0	2-0440	14085.0	2-0336	14132.0	2-0232	14179.0	2-0128	14226.0	2-0024	14273.0	2-0000	14320.0	2-0000	14367.0	2-0000	14414.0	2-0000	14461.0	2-0000	14508.0	2-0000	14555.0	2-0000	14602.0	2-0000	14649.0	2-0000	14696.0	2-0000	14743.0	2-0000	14790.0	2-0000	14837.0	2-0000	14884.0	2-0000	14931.0	2-0000	14978.0	2-0000	15025.0	2-0000	15072.0	2-0000	15119.0	2-0000	15166.0	2-0000	15213.0	2-0000	15260.0	2-0000	15307.0	2-0000	15354.0	2-0000	15401.0	2-0000	15448.0	2-0000	15495.0	2-0000	15542.0	2-0000	15589.0	2-0000	15636.0	2-0000	15683.0	2-0000	15730.0	2-0000	15777.0	2-0000	15824.0	2-0000	15871.0	2-0000	15918.0	2-0000	15965.0	2-0000	16012.0	2-0000	16059.0	2-0000	16106.0	2-0000	16153.0	2-0000	16200.0	2-0000	16247.0	2-0000	16294.0	2-0000	16341.0	2-0000	16388.0	2-0000	16435.0	2-0000	16482.0	2-0000	16529.0	2-0000	16576.0	2-0000	16623.0	2-0000	16670.0	2-0000	16717.0	2-0000	16764.0	2-0000	16811.0	2-0000	16858.0	2-0000	16905.0	2-0000	16952.0	2-0000	16999.0	2-0000	17046.0	2-0000	17093.0	2-0000	17140.0	2-0000	17187.0	2-0000	17234.0	2-0000	17281.0	2-0000	17328.0	2-0000	17375.0	2-0000	17422.0	2-0000	17469.0	2-0000	17516.0	2-0000	17563.0	2-0000	17610.0	2-0000	17657.0	2-0000	17704.0	2-0000	17751.0	2-0000	17798.0	2-0000	17845.0	2-0000	17892.0	2-0000	17939.0	2-0000	17986.0	2-0000	18033.0	2-0000	18080.0	2-0000	18127.0	2-0000	18174.0	2-0000	18221.0	2-0000	18268.0	2-0000	18315.0	2-0000	18362.0	2-0000	18409.0	2-0000	18456.0	2-0000	18503.0	2-0000	18550.0	2-0000	18597.0	2-0000	18644.0	2-0000	18691.0	2-0000	18738.0	2-0000	18785.0	2-0000	18832.0	2-0000	18879.0	2-0000	18926.0	2-0000	18973.0	2-0000	19020.0	2-0000	19067.0	2-0000	19114.0	2-0000	19161.0	2-0000	19208.0	2-0000	19255.0	2-0000	19302.0	2-0000	19349.0	2-0000	19396.0	2-0000	19443.0	2-0000	19490.0	2-0000	19537.0	2-0000	19584.0	2-0000	19631.0	2-0000	19678.0	2-0000	19725.0	2-0000	19772.0	2-0000	19819.0	2-0000	19866.0	2-0000	19913.0	2-0000	19960.0	2-0000	20007.0	2-0000	20054.0	2-0000	20101.0	2-0000	20148.0	2-0000	20195.0	2-0000	20242.0	2-0000	20289.0	2-0000	20336.0	2-0000	20383.0	2-0000	20430.0	2-0000	20477.0	2-0000	20524.0	2-0000	20571.0	2-0000	20618.0	2-0000	20665.0	2-0000	20712.0	2-0000	20759.0	2-0000	20806.0	2-0000	20853.0	2-0000	20900.0	2-0000	20947.0	2-0000	20994.0	2-0000	21041.0	2-0000	21088.0	2-0000	21135.0	2-0000	21182.0	2-0000	21229.0	2-0000	21276.0	2-0000	21323.0	2-0000	21370.0	2-0000	21417.0	2-0000	21464.0	2-0000	21511.0	2-0000	21558.0	2-0000	21605.0	2-0000	21652.0	2-0000	21699.0	2-0000	21746.0	2-0000	21793.0	2-0000	21840.0	2-0000	21887.0	2-0000	21934.0	2-0000	21981.0	2-0000	22028.0	2-0000	22075.0	2-0000	22122.0	2-0000	22169.0	2-0000	22216.0	2-0000	22263.0	2-0000	22310.0	2-0000	22357.0	2-0000	22404.0	2-0000	22451.0	2-0000	22498.0	2-0000	22545.0	2-0000	22592.0	2-0000	22639.0	2-0000	22686.0	2-0000	22733.0	2-0000	22780.0	2-0000	22827.0	2-0000	22874.0	2-0000	22921.0	2-0000	22968.0	2-0000	23015.0	2-0000	23062.0	2-0000	23109.0	2-0000	23156.0	2-0000	23203.0	2-0000	23250.0	2-0000	23297.0	2-0000	23344.0	2-0000	23391.0	2-0000	23438.0	2-0000	23485.0	2-0000	23532.0	2-0000	23579.0	2-0000	23626.0	2-0000	23673.0	2-0000	23720.0	2-0000	23767.0	2-0000	23814.0	2-0000	23861.0	2-0000	23908.0	2-0000	23955.0	2-0000	24002.0	2-0000	24049.0	2-0000	24096.0	2-0000	24143.0	2-0000	24190.0	2-0000	24237.0	2-0000	24284.0	2-0000	24331.0	2-0000	24378.0	2-0000	24425.0	2-0000	24472.0	2-0000	24519.0	2-0000	24566.0	2-0000	24613.0	2-0000	24660.0	2-0000	24707.0	2-0000	24754.0	2-0000	24801.0	2-0000	24848.0	2-0000	24895.0	2-0000	24942.0	2-0000	24989.0	2-0000	25036.0	2-0000	25083.0	2-0000	25130.0	2-0000	25177.0	2-0000	25224.0	2-0000	25271.0	2-0000	25318.0	2-0000	25365.0	2-0000	25412.0	2-0000	25459.0	2-0000	25506.0	2-0000	25553.0	2-0000	25600.0	2-0000	25647.0	2-0000	25694.0	2-0000	25741.0	2-0000	25788.0	2-0000	25835.0	2-0000	25882.0	2-0000	25929.0	2-0000	25976.0	2-0000	26023.0	2-0000	26070.0	2-0000	26117.0	2-0000	26164.0	2-0000	26211.0	2-0000	26258.0	2-0000	26305.0	2-0000	26352.0	2-0000	26399.0	2-0000	26446.0	2-0000	26493.0	2-0000	26540.0	2-0000	26587.0	2-0000	26634.0	2-0000	26681.0	2-0000	26728.0	2-0000	26775.0	2-0000	26822.0	2-0000	26869.0	2-0000	26916.0	2-0000	26963.0	2-0000	27010.0	2-0000	27057.0	2-0000	27104.0	2-0000	27151.0	2-0000	27198.0	2-0000	27245.0	2-0000	27292.0	2-0000	27339.0	2-0000	27386.0	2-0000	27433.0	2-0000	27480.0	2-0000	27527.0	2-0000	27574.0	2-0000	27621.0	2-0000	27668.0	2-0000	27715.0	2-0000	27762.0	2-0000	27809.0	2-0000	27856.0	2-0000	27903.0</
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Table 6-6 (Cont'd)

[illegible]

Table 6-7 $\int A(\nu) d\nu$ [illegible]

Table 6-7 $\int_2^7 \tilde{A}(v) dv$ (cont'd)[illegible]

SECTION 7

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