The continuation of figure 12–1 shows the red portion of the composites. Notice the dip blueward of the Mg II BEL which is probably due to many iron lines which cause "bumps" in this region of the spectrum. This dip makes it hard to identify (or set limits on) weak Mg II BALs in high-ionization BALQSOs. The Mg II BEL has about the same strength but may be slightly wider in the BALQSO spectrum. However, the reader is cautioned that this red BALQSO composite represents far fewer objects since Mg II was not usually observed in our program (see §9.3). In fact, for rest wavelengths beyond about 3400Å, the only BALQSO spectrum available was for the low-redshift ($z_e \simeq 0.29$), low-ionization BALQSO PG 1700+518. The strong Fe II emission in this object is unusual for AGNs and high-ionization BALQSOs, but may be common in low-ionization BALQSOs (Boroson & Meyers 1992). The normally strong [O III] lines are noticeably weak and are, in fact, dominated by iron lines at about the same wavelengths. The [O II] line, however, seems rather similar. The possible presence of Ca II $\lambda\lambda$3934,3969 H and K emission lines in PG 1700+518 (marked in figure 12–1) is rare for AGNs (Joly 1989).

12.2 : BALQSO Spectra Averaged over All Epochs

In figure 12–2, we show spectra of each of the 28 BALQSOs in our sample (we rejected the data on 1208+1535 due to very low S/N). The spectra between the rest frame wavelengths of 935Å and 1990Å are shown. The average was initially scaled using the average R_s band magnitudes from the photometry data (see table 8–1), and the formula $m_\nu = -2.5\log(f_\nu) - 48.6$ or $m_{\lambda 6600} = -2.5\log(f_\lambda) - 21.51$, where f_λ is in ergs s^{-1} cm^{-2} Å^{-1}. The vacuum, heliocentric wavelengths were then shifted to the QSO rest frame using the calculated z_e (see §11.3), and the f_λ values were multiplied by 10^{13} and by the rest wavelengths (in Å) to yield λf_λ (ergs s^{-1} cm^{-2}, which is proportional to photons s^{-1} cm^{-2} Å^{-1}). This tends to flatten the spectra since $\alpha \sim -1$ in these QSOs.†

For each object, we chose an epoch with good wavelength coverage and accurate fluxing. The continua from other epochs were scaled to match this epoch, and the spectra

† $f_\nu \propto \nu^\alpha$ or $f_\lambda \propto \lambda^{-(2+\alpha)}$