have been added to the spectrum published by Low and Johnson (1965). Dent (1965) has reported a small but significant increase in flux at 3.75 cm over a 3-year interval. The apparent decrease in the 1-mm flux by a factor of 10 in a 5-month interval occurred simultaneously with the increase at 3.4 mm reported by Epstein (1965*a*). Observations of the flux at 2.2 μ (Johnson 1964) were begun in March, 1964. The flux quoted by Low and Johnson (1965) has not varied at 2.2 μ by more than ± 20 per cent over a 15-month interval. Thus the wavelength dependence of the slowly varying component is not yet established, whereas the rapid, large-scale variations appear to be confined to the millimeter wavelengths. The release of energy at 1 mm, the subsequent apparent shift of the peak in the spectrum to lower frequencies, and the observed increase in the spectral index of the almost flat microwave spectrum suggest the sudden injection of high-energy particles that decay in energy on an exceedingly short time scale.

If further observations confirm these results and a unique physical interpretation can be made, it may become possible to place unambiguous limits on the distance of 3C 273. Flux densities as large as 300 units combined with light-travel times of months will be difficult to reconcile with a distance as large as 400 Mpc.

The positive spectral index for 3C 279 at frequencies above 1.5 Gc/s (Dent and Haddock 1965), the possible decrease in flux with time at 3.75 cm (Dent 1965), and the large flux at 3.4 mm (Epstein 1965*b*) suggest a behavior not unlike 3C 273. The observation at 1 mm on June 6 implies a flux significantly less than the value $(30 \pm 10) \times 10^{-26}$ W/m^2/(c/s) at 3.4 mm. This also is similar to the spectrum of 3C 273 as measured in June.

The use of the Hale Telescope at 1 mm was made possible by the co-operation of the staff at the Mount Wilson and Palomar Observatories.

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IDENTIFICATION OF SIX FAINT RADIO SOURCES WITH QUASI-STELLAR OBJECTS

We wish to report the identification of six faint radio sources with quasi-stellar objects. The identifications have resulted from an examination of the 48-inch Palomar Sky Survey plates in the positions of some four hundred sources from the Parkes catalogue for declinations 0° to 20° (Day, Shimmins, Ekers, and Cole 1965). Possible quasi-stellar objects, i.e., starlike images of abnormally blue color, were found close to a number of the source positions. Six of these have now been confirmed by three-color photoelectric measurements with the 200-inch reflector. Precise optical positions have been determined from centered 48-inch plates for five of the six objects. Subsequent radio observations of higher precision have shown that the radio positions for these five agree with the

optical position to within 10″, the accuracy of the radio measurement. The radio position for the sixth (0106+01) is about 1.5s earlier in right ascension than the optical position given in Table 1; however, this position was only estimated from the survey plates. Relevant optical and radio data for the six sources are given in Table 1 and finding charts in Figures 1 and 2.

The most interesting of the six objects is 1252+11. A single spectrum of low dispersion taken by M. Schmidt (private communication) suggests that its redshift is 0.87, thus its absolute luminosity is somewhat greater than that of 3C 48. However, its radio flux density at the high-frequency end of the radio spectrum is lower than that of 3C 48 by a factor of 20. This indicates the existence of a somewhat larger range in absolute radio luminosity than previously known for the quasi-stellar objects. Because the radio spectrum probably has a maximum near 1000 Mc/s, the discrepancy at 160 Mc/s, where radio luminosities are usually reckoned, is even greater.

Furthermore, had 1252+11 been noted by its abnormal color on the 48-inch plates prior to its discovery at high radio frequencies and had the position been compared

TABLE 1

RADIO AND OPTICAL DATA FOR SIX QUASI-STELLAR OBJECTS

Source	Optical Position		Photoelectric Data				Flux Density [$\times 10^{-26}$ W m^{-2} (c/s)$^{-1}$]			Radio Spectral Index
	(1950 0)	(1950 0)	Date (1965)	V	$B-V$	$U-B$	408 Mc/s	1410 Mc/s	2650 Mc/s	
0106+01	$01^h06^m04^s$*	01°19′ 0*	Feb. 14–15	18 39	0 15	−0 70	3 5	1 4	0 9	−0 7
0922+14	09 22 22 27	14 57 26″.2	Mar. 28–29	17 96	54	− 52	2 8	0 7	0 4	−1 0
0957+00	09 57 43 84	00 19 50 0	Jan. 9–10	17 57	47	− .71	3 1	1 0	0 6	−0 9
1116+12	11 16 20 79	12 51 06 3	Mar 28–29	19 25	14	− 76	5 2	1 9	1 6	−0 6
1217+02	12 17 38 35	02 20 20 9	Mar. 28–29	16 53	02	− 87	1 7	0 8	0 5	−0.9
1252+11	12 52 07 86	11 57 20 8	Jan. 9–10	16 64	0 35	−0 75	..	1 2	1 1	−0 1

* Approximate

with positions of sources in low-frequency surveys, it would have been classed as an "interloper." In high galactic latitudes such interlopers, i.e., objects with colors similar to quasi-stellar objects, are found on two-color plates with a frequency of perhaps four per square degree. The observations of 1252+11 raise the interesting possibility that at least some of these interlopers may be quasi-stellar objects with no radio emission or with radio emission restricted to the very high-frequency end of the spectrum.

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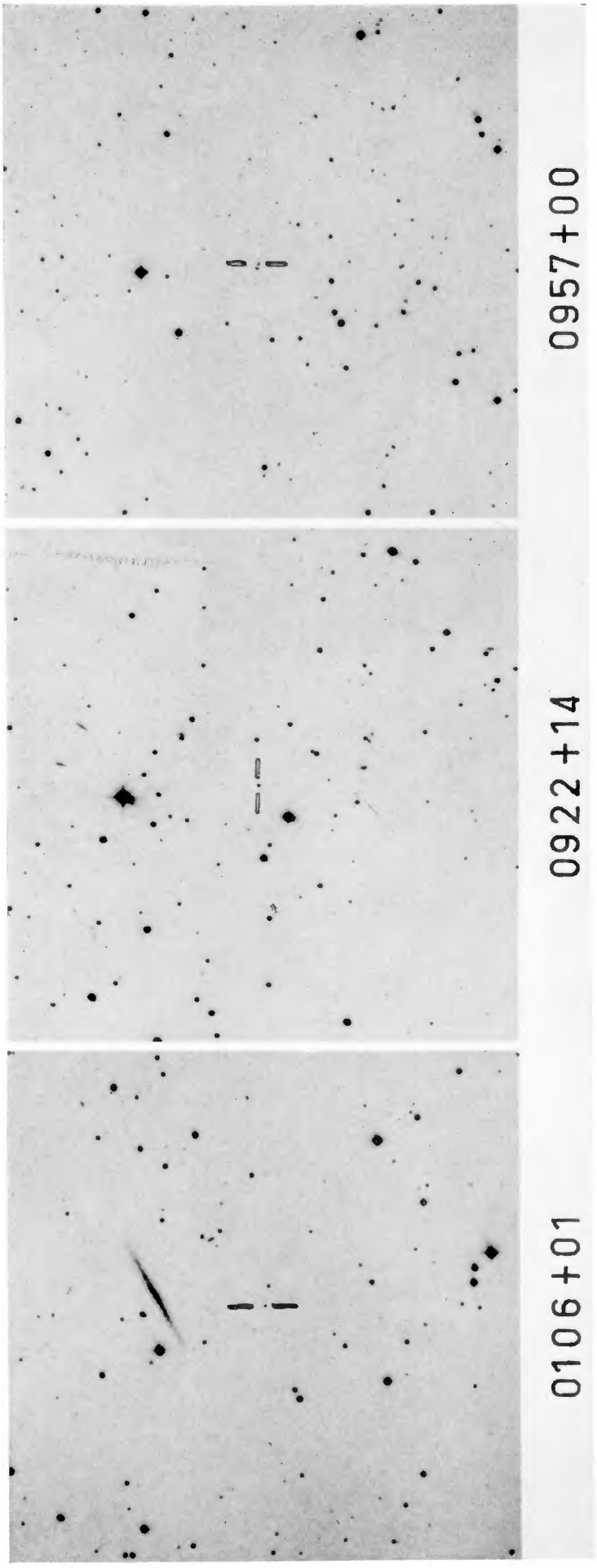

FIG. 1

FIGS. 1 AND 2.—Finding-charts for six quasi-stellar objects made from the Palomar Sky Survey prints. Northeast is the top left-hand corner, scale: 5 mm ≈ 1′

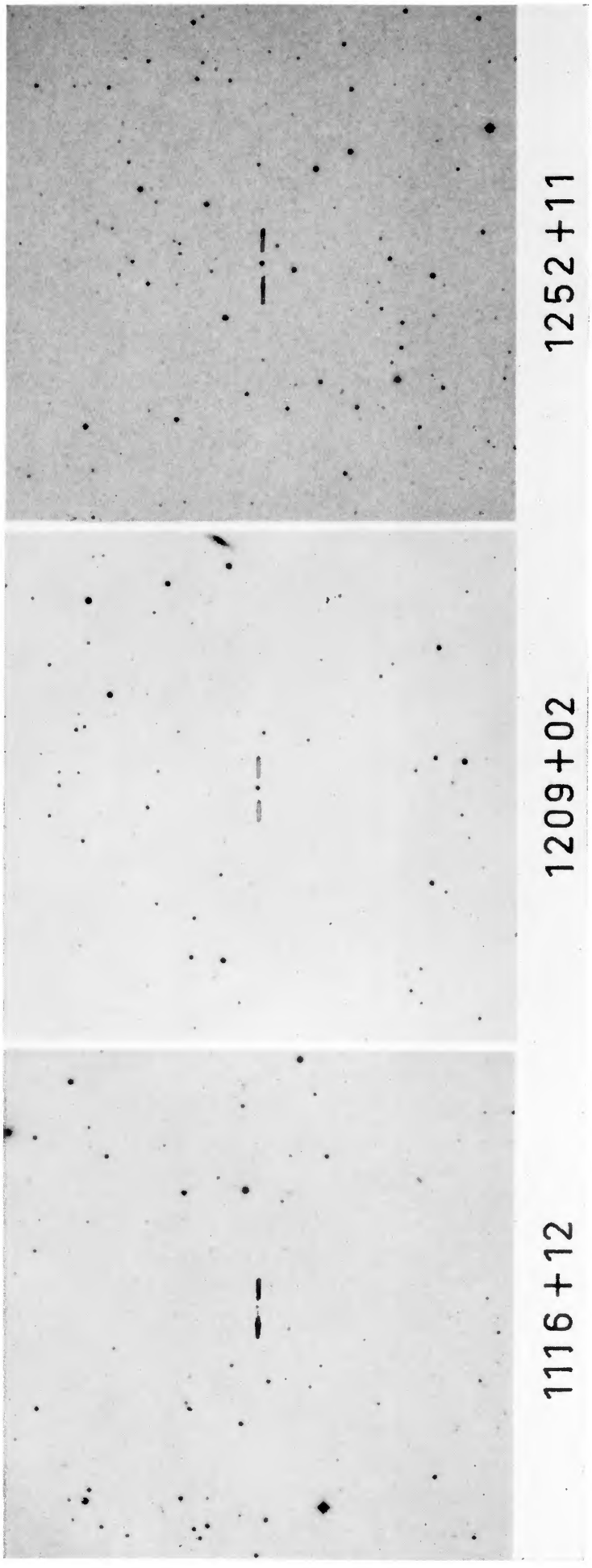

FIG. 2