and Sb^{124} were produced in U.S.S.R. tests in late 1962. These tests appear to be the major source of the Mn^{54}, Co^{60}, Y^{88}, Sb^{124}, and some of the other activation products which are included in the study described here.

The Be^7 is produced by cosmic spallation reactions in the atmosphere and its presence was first reported in the atmosphere by Arnold and Al-Salih in 1955 (*11*) who chemically separated it from rain water samples. Measurements of its concentration in the atmosphere at various altitudes and latitudes have since been reported (*8, 12, 13*). Only recently have we begun to study the concentration of Be^7 in the atmosphere. It is interesting that, unlike other fallout radionuclides, Be^7 did not show a large increase in concentration during the spring.

It is extremely interesting and significant that the activation products Y^{88} (105 days) and Sb^{124} (60 days) are at concentrations this year which are comparable with those 1 year ago, while the fission product Zr^{95}-Nb^{95} (65 days) is lower by about a factor of 20. Also, the fission product Cs^{137} (30 years) is at a concentration comparable with that last year and the Ru^{106} (1 year) and Ce^{144} (285 days) are at about half their last year's concentrations. Since there have been no atomic detonations above ground during 1963 and 1964 (*14*), all of these radionuclides entered the atmosphere prior to 1963 and their reservoir in the atmosphere has decreased with their respective half-lives since that time. This points to an obvious difference in the source of Y^{88} and Sb^{124} relative to most of the Zr^{95}-Nb^{95}, and the other fission products, and also allows one to estimate the rate of fallout of the radioactive material which was generated at the time Y^{88} and Sb^{124} were formed. A continuation of these measurements is expected to establish any other differences in the fallout rates and origin of the activation products.

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Component Shapes in Double Radio Sources

Abstract. *High-resolution interferometry at a wavelength of 10.6 centimeters shows that several well-separated double radio sources have small, bright regions near the outward ends of their components. This is consistent with an expanding model for the sources.*

One of the first results to emerge from the study of discrete sources with the Caltech interferometer was a recognition of the predominance of two-component sources (*1*). An initial survey of brightness distributions at 31-cm wavelength gave information about the approximate component sizes and spacings in a number of these objects (*2, 3*). More recent observations, made with the higher resolution available when the Caltech interferometer is operated at 10.6-cm wavelength, have revealed some additional properties which seem to be shared by the well-separated double sources. As is true in many other respects, Cygnus A seems to be a good prototype.

Lequeux (*4*), in 1962, reported high-resolution interferometric observations of Cygnus A which showed that the two components of the source were elongated in the direction of their separation and that they were more or less sharply peaked at their outward extremes. This peaking was evident from a decrease, at large antenna spacings, of the period of the oscillations in the observed visibility amplitude. Thus the effective separation of the two components seemed to increase with increasing resolution. This feature has been found common to three additional sources in the work reported here.

In Cygnus A the situation is further complicated because the relative importance of the bright peaks and the less-bright, bridging emission varies with wavelength, as was pointed out by Lequeux (*4*) and emphasized by Swarup, Thompson, and Bracewell (*5*). Thus the effective separation of the components is a function of degree of resolution and of wavelength, whether measured interferometrically (*2*, Table 3) or with a narrow fan beam (*5, 6*). The only invariant dimension for Cygnus A is the limiting apparent separation, of 115 seconds of arc along the major axis, which must correspond to the separation of the sharp peaks at the outward edges of the two components.

I have recently observed Cygnus A and several additional double sources using interferometer spacings of up to 6500 wavelengths, with baseline azimuths of 0°, 90°, and 135° (Table 1). In each case the components are found to be elongated in the direction of the major axis, and in each case the effective separation increases with higher resolution (*7*).

Because of the small size of its com-

Table 1. Properties of double radio sources.

Position angle of major axis (deg)	Apparent separation of components (sec)		Dimensions of component (sec)
	At low resolution	At high resolution	
	Source: 3C 33		
19	215	250	16 by 8
	*Source: 3C 134**		
175	120		60 by 30
	Source: Hercules A		
101	118	145	51 by 27
	Source: 3C 353		
84	150	230	84 by 42
	Source: Cygnus A		
109	85–100†	115	25 by 15

* Data taken from Maltby and Moffet (*2*).
† Varies with wavelength.

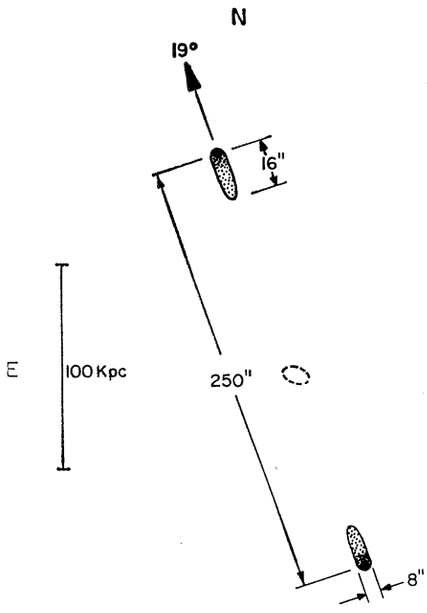

Fig. 1. Schematic structure of 3C 33. The southerly component has an intensity about 2.5 times greater than its companion. The center of gravity of the radio emission thus falls to the south of the parent galaxy, which is indicated by a small ellipse.

ponents compared with their separation, 3C 33 (*8*) is a particularly interesting object. This is shown schematically in Fig. 1. Because of its small size, the peak-brightness temperature in the brighter (southern) component is very high, more than 3×10^5 °K at 1000 Mcy/sec, which is only an order of magnitude less than that for Cygnus A. Because 3C 33 has a high galactic latitude (−49°) as well as a high radio surface brightness, it is perhaps the best double source in which to search for optical emission from the radio components. Accurate radio positions (*9, 10*) may be combined with the brightness distribution information to give the following position (1950.0) for the brighter component:

$$\alpha = 01^h06^m12^s \pm 1.5^s$$
$$\delta = 13°02'30'' \pm 15''.$$

The orientation of the major axis of 3C 353 has not previously been determined. It was measured by tracking the source with the interferometer at an effective spacing of 460 wavelengths N-S. There is an indication from the high-resolution observations (3250 wavelengths N-S) that the major axis defined by the bright peaks in 3C 353 differs by about 7° from that defined by the total emission from two components. For the other sources the brightness distribution seems fairly symmetrical about the minor axis.

In our initial survey (*2*) we reported that the components of Hercules A were nearly circular. This is not correct, but an explanation for the discrepancy in our earlier result will require a sequence of observations with gradually increasing resolution along the minor axis.

High-brightness regions at the outward extremities of double radio sources seem to be characteristic features of these objects. In both Hercules A and Cygnus A (and, to a lesser degree, also in 3C 33), the effective component separation increases with resolution along either the major or the minor axis. If the high-brightness regions were in the form of bright ridges at the extreme edges of the double sources and aligned perpendicularly to the major axis, the effect of changing separation with resolution would only be noticed along the major axis. The effect mentioned comes from the nature of the visibility functions and a detailed explanation is inappropriate here. However, the bright regions do tend to be points rather than ridges. It has been suggested (*4*) that the emission peak represents a shock front of compressed magnetic field formed ahead of an expanding "blob" of energetic plasma. This explanation still seems reasonable, but the shock front is evidently not planar over an area comparable to the minor-axis component diameter.

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Tremorine: Its Peripheral Action on Striated Muscle

Abstract. *Tremorine, injected intraperitoneally into rats, induces the same kind of calcium release in the motor end-plates as that induced by acetylcholine-like agents. Since the same effect results even if the appropriate motor nerve has previously been transected, it is concluded that this myoneural action of Tremorine is not due to a central excitation but rather to a peripheral stimulatory property of the drug.*

Tremorine (1-4-dipyrrolidino-2-butyne) was described in 1956 by Everett (*1*) and is known to produce a Parkinsonian-like syndrome in a variety of laboratory animals. Besides tremor (*1*), hypersecretion of saliva, bradycardia, and transient mydriasis have also been reported to occur in animals treated with Tremorine (*2*). The Tremorine-induced tremors in rats have been employed in the evaluation of drugs for Parkinsonism (*3*).

Recently, however, De Groat and Volle (*4*) found that the active metabolic product, oxotremorine, resulted in ganglionic firing from the cat's superior cervical ganglion, suggesting a peripheral site of action of this drug. Since the myoneural junction shows several characteristics similar to ganglionic synapses, the question arises whether the Tremorine-induced tremor also might be, at least in part, due to some peripheral (myoneural) action of this drug. A convenient way to answer this question is to trace histochemically the release of calcium in the postjunctional cytoplasm of the motor end-plate. It has been shown by Sávay and Csillik (*5*) that both electrical stimulation and the administration of depolarizing drugs (such as cholinesterase inhibitors and carbaminoylcholine) result in the appearance of histochemically detectable calcium in the post-junctional cytoplasm of the fundamental cells right below the nerve terminal. Experiments performed by this technique, as reported here, prove that Tremorine has both central effects and a well-defined peripheral myoneural action.

Twelve normal, 150- to 200-g albino rats were injected intraperitoneally with Tremorine (50 mg/kg). In another 12 animals, the left phrenic nerve was transected intramuscularly 1 to 14 days prior to the administra-