to believe that an animal with these sensory restrictions could attain an "auditory familiarity" with an area of 50 or 60 miles' radius.

Our preliminary experiments thus indicate that bats possess a well-developed ability to orient and to home over long distances by sensory means other than vision. Audition has not been eliminated as a possible mechanism, but it appears to hold little promise of providing a complete answer. Further studies are in progress.

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Ethylenediaminetetraacetate and Mitochondrial Adenosine Triphosphatase Activity

The adenosine triphosphatase activity of isolated mitochondria is variable and is influenced by many factors (*1, 2*). We have observed, as is shown in Table 1, (*3*), that the inclusion of ethylenediaminetetraacetate in the sucrose used for tissue homogenization results in marked changes in the adenosine triphosphatase activity of mitochondria isolated from these homogenates.

Mitochondria were isolated from 0.25*M* sucrose homogenates with and without ethylenediaminetetraacetate, 0.01*M*, *p*H 7.4 (*4*). After 10 minutes' centrifugation at 600*g*, the supernatant solution was centrifuged for 10 minutes at 8500*g* to sediment the mitochondria. The particles were then resuspended in sucrose of the same composition as that used for homogenization and, after resedimenting, were suspended in sucrose without ethylenediaminetetraacetate. All operations were performed at 2°C. Adenosine triphosphatase activity was measured using a 10-minute incubation at room temperature in a volume of 1 ml containing, in micromoles, the following: adenosine triphosphate (Pabst), 8; $MgCl_2$, 4; tris(hydroxymethyl)aminomethane hydrochloride (*p*H 7.4), 20; and sucrose, 176. Reactions were initiated by addition of mitochondria and were terminated by addition of 0.02 ml of 70-percent perchloric acid. These solutions were immediately cooled to 0°C. Inorganic phosphate was determined by the Fiske-Subbarow procedure (*5*) on an aliquot of the supernatant solution.

Table 1. Adenosine triphosphatase activity of mitochondria isloated from sucrose and sucrose-ethylenediaminetetraacetate (EDTA) homogenates. Adenosine triphosphatase was measured at two enzyme concentrations ranging from 40 to 200 μg of protein N. Activities are expressed as micromoles of phosphate hydrolyzed per 10 minutes, per milligram of mitochondrial nitrogen at room temperature. Average activity values are reported except for two cases where wide variation in the ratio, activity/enzyme concentration, occurred. This may result from inhibition of the adenosine triphosphatase by accumulated adenosine diphosphate, for addition of the latter to the incubation mixture yields a marked inhibition of the adenosine triphosphatase (*8*).

Source of mitochondria	EDTA added	Δ Inorganic phosphate (μmole)			
		Fresh mitochondria		Aged mitochondria (30 min, 38°C)	
		No addition	Dinitrophenol added ($2.5 \times 10^{-4}M$)	No addition	Dinitrophenol added ($2.5 \times 10^{-4}M$)
Rat liver					
1	–	0.6	9.6	6.3	9.0
1	+	1.3	6.6	1.4	1.6
2	–	0.3	12.2	6.9	
3	+	3.4	3.7	2.4*	
Rabbit heart					
1	–	10.1	21.9	5.2	6.3
1	+	15.3	(33.0, 23.4)†	18.4	19.1
2	–	2.7	8.3	1.7	2.1
3	+	8.7	(18.8, 10.3)†	7.7	11.5

* Aged 2 hours at room temperature. † Values were not averaged because of large variation in activity with variation in the amount of mitochondria added.

When ethylenediaminetetraacetate is used, the supernatant solution from the mitochondrial pellet is redder and the final mitochondrial suspension is more cream-colored than when sucrose alone is used for homogenization. Differences in the adenosine triphosphatase activity are clearly evident even though the final mitochondrial pellet isolated by both procedures is suspended in sucrose without ethylenediaminetetraacetate.

Rat liver mitochondria isolated from sucrose-ethylenediaminetetraacetate homogenates have a higher initial adenosine triphosphatase activity and a lower "latent adenosine triphosphatase" (*1*) activity than do mitochondria isolated from sucrose alone.

The adenosine triphosphatase of rabbit heart mitochondria isolated from sucrose decreases on aging, while that of heart mitochondria isolated from sucrose-ethylenediaminetetraacetate does not. Although the activity of aged preparations may be increased slightly by addition of dinitrophenol, the amount of phosphate released from adenosine triphosphate is below that obtained with fresh preparations in the presence of dinitrophenol.

These data show that isolation of mitochondria in sucrose containing 0.01*M* ethylenediaminetetraacetate alters the adenosine triphosphatase activity pattern from that observed with mitochondria isolated from sucrose alone (*6*). On the other hand, we find that ethylenediaminetetraacetate yields heart muscle mitochondrial suspensions which have a uniformly more dependable oxidative capacity. This is in conformity with reports of other investigators (*4, 7*), who have noted an increased stability of mitochondria that have been isolated in the presence of ethylenediaminetetraacetate.

The data presented here show the marked variation of an enzymic activity that can result from a modification commonly employed in the isolation of mitochondria. While it is well known that the source of mitochondria and the nature of the isolation procedure may modify the enzymatic spectrum of the particles, the effect of a small change in procedure may pass unrecognized in many instances. When the rate of adenosine triphosphate turnover is an important factor, these changes may assume a primary significance.

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Some New Whiskers

Filamentary crystals have been known for many years (*1*), but the recent discovery of spontaneous filamentary growths of several metals by Compton, Mendizza, and Arnold (*2*), and the subsequent observation by Herring and Galt (*3*) that these filamentary growths are many times stronger than massive crystals, have resulted in intensified interest in their growth and properties. Several methods of growing "whiskers" (as these crystals are now called) have been developed. Growth by condensation from vapor (*4*), electrolytic deposition from solution (*5*), and chemical reactions (*6*) have been reported. During the course of a current study of the growth kinetics and physical properties of whiskers, whiskers of palladium, β-manganese, and an intermetallic compound, manganese silicide (Mn_5Si_3), have been obtained. Whiskers of these three materials have not been reported previously.

The palladium whiskers are produced by the thermal decomposition of liquid palladium dichloride at 960°C and are between 1 and 10 mm in length. The β-manganese whiskers, about 0.25 mm long, are grown by the hydrogen reduction of liquid manganous chloride at 940°C in alumina reaction vessels. The salt was distilled prior to reduction to remove moisture and other impurities. The manganese silicide whiskers are formed during the hydrogen reduction of the manganous chloride in the presence of silicon dioxide at 940°C and are also about 0.25 mm long. All these whiskers are in the neighborhood of 2 μ in diameter. The reactions are carried out in gastight refractory tubes through which argon or hydrogen flows at a linear velocity on the order of 1 cm/sec.

Whiskers produced by the thermal decomposition of palladium dichloride nucleate on a substrate consisting of massive crystals of palladium metal. In contrast, the β-manganese whiskers grow at isolated sites on the bare aluminum oxide refractory. Equiaxed crystals are also present in the reaction product. The manganese silicide whiskers grow from the refractory wall and are found immersed in pools of a fused salt that flows over them as they grow. Figure 1 shows some of these whiskers after dissolution of the salt with absolute alcohol. However, it is not certain in this case whether growth takes place from the liquid or from the vapor phase (*7*).

The palladium whiskers occur in the form of seemingly straight rods, corkscrewlike helices, and twisted wires (see Fig. 2). Both right- and left-handed helices are observed. Frequently the pitch of the twist and the diameter of the helix or whisker change gradually along the length, and, often, abrupt changes from straight to helical form occur. The filaments growing as helices are occasionally formed from regularly connected straight segments, as illustrated by the two short helices near the center of Fig. 2. X-ray diffraction data show that the growth axis of the spiral whiskers studied is a <111> crystallographic direction. The axial direction in the straight whiskers is a high index direction varying within 12 deg around the <211> direction (*8*, *9*).

The β-manganese whiskers studied have a <100> growth direction, and the whiskers of manganese silicide, which crystallize in a hexagonal lattice, have been observed with both <10·0> and <00·1> growth directions—that is, with growth directions either perpendicular or parallel to the basal plane.

All the palladium and manganese silicide whiskers tested could be repeatedly bent elastically to at least 2.0-percent strain, while none of the β-manganese specimens could be bent beyond about 1.5-percent elastic strain. The strains observed correspond to failure stresses of between 10^{10} and 10^{11} dy/cm² (1.5×10^5 to 1.5×10^6 lb/in.²). Massive crystals of these materials fail at stresses smaller by several orders of magnitude.

Fig. 1. Cluster of manganese silicide crystals after extraction from the remaining manganous chloride salt with ethyl alcohol. The fine isolated whisker at the lower left is 75 μ long.

Fig. 2. Portion of a cluster of palladium whiskers. Note the helices of slowly varying pitch and the abrupt transitions of pitch. Several helices are composed of connected straight segments. The length shown of the long helix is 0.8 mm.

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9. A detailed report of the dislocation configuration in whiskers (including the more complex forms) is in preparation.

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