the present investigation. This table shows that the strength of hand preference is approximately equal, and that the proportion of right- and left-handedness is similar in the two species. Finch's more elaborate technique probably provided a more valid measure of hand preference than that of the present study, but there appears to be little evidence for assuming any significant difference in the degree of lateral dominance found in the rhesus monkey and the chimpanzee in so far as the experiments provided accurate measures of handedness in the two species.

Kounin (*3*) has criticized observations of the hand used for picking up food as a test of handedness, since "unnoticeable posturing and situational expediencies" render this task too unreliable for demonstrating the existence of handedness in monkeys. The results of the present investigation, however, suggest that Kounin's conclusion, based on very small samples, may perhaps have been prematurely pessimistic.

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Regeneration of Resected and Crossed Sciatic Nerves in Parabiotic Rats

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It is possible successfully to unite animals surgically in parabiosis. In the mammal such parabiosis will occur only if the animals are littermates. Even in the latter instance, it is found that a successful union is obtained in only 25% of the cases. Successful parabiosis is characterized by complete healing of the tissues, common circulation of the blood, and elimination of the skin suture line. By virtue of the compatibility of the tissue of these genetically similar, united animals, the suggestion was raised by Morpurgo (*1*) that resected nerves from one parabiont may regenerate into the distal sheath of the other parabiont. He claimed that there was functional connection of the newly formed nerve fibers of one rat with the muscles and skin of the other. However, his experiments did not include a study of the extent of regeneration as compared to controls, nor did he elaborate on the rate of recovery and cross-sectional fiber counts.

This series of experiments was intended to assess the phenomenon of cross nerve regeneration in a parabiotic host, to study the rate of regeneration and number of regenerating fibers, and to compare these data with that from nerve regeneration in single control animals.

TABLE 1

FIBER COUNTS OF THE SECTIONED ALBINO RAT SCIATIC NERVE

	Period of regeneration, days		Proximal nerve count		Distal nerve count	
	Av	Range	Av	Range	Av	Range
Normal	—	—	6497	6103–6864	6497	6103–6864
Control	81	50–113	7937	7817–8056	4406	3960–5272
Parabionts	56	29–91	7176	6802–8582	6317	4532–8102

The right sciatic nerves of 4 single albino rats (Wistar) were resected and reunited with tantalum wire (6-0 gage). Animals were tested daily for signs of functional recovery. At varying periods of time, these animals were sacrificed and the proximal and distal segments of the regenerated nerve were prepared for nerve fiber counts. Four littermate pairs of rats of the same strain were placed in lateral parabiosis (*2*). At the same time the sciatic nerves of the adjacent limbs were severed. The proximal nerve stump of the left leg of the right animal was sutured with 6-0 tantalum wire to the distal sciatic nerve stump of the right leg of the left animal. The united nerve was covered with a .0025-gage tantalum foil sheath. The remaining proximal and distal resected trunks were similarly treated. These animals were observed for functional recovery and sacrificed at varying times. Fiber counts were made of the distal and proximal segments of the regenerating nerves.

The first sign of sensory recovery, as elicited by pinching the toes of the involved extremity, was noted in 35–40 days in the control animals and 28–42 days in the parabionts. Motor recovery followed this period by 4–7 days.

At the time the animals were to be sacrificed, electrical stimulation of the proximal segment of the regenerated sciatic nerve of one parabiotic animal showed the same intensity of response in the opposite member as was observed in control animals of the same postoperative period.

The number of fibers in the distal segment of the crossed sciatic nerve in parabiotic animals was at no time less than in the distal segments of the controls with the same regeneration time (Table 1).

In summary the following points may be stated: (*a*) the proximal segment of a severed sciatic nerve can be made to regenerate into the distal sheath of the sciatic nerve of a littermate in parabiosis; (*b*) time of functional recovery, response to pain, and response to electrical stimulation is significantly similar to that found in single uncrossed control animals; and (*c*) the number of fibers in the distal segment of the regenerating nerve in parabionts consistently shows a higher count than in the controls.

The phenomenon of crossed nerve regeneration in parabiosis adds further support to the belief that the

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control of regeneration is central rather than peripheral. It would seem unlikely that a nerve would regenerate as rapidly and to the same degree into foreign tissue as into its own if it were dependent upon a chemotactic influence exerted by the peripheral end organs.

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Failure of Atropine to Produce Pupillary Dilatation

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In a recent series of experiments the authors (*1*) had occasion to administer atropine sulfate to anesthetized dogs and observed that under the conditions of the experiments, atropine did not produce the usual pupillary dilatation. This finding seemed so unusual that it was deemed worthy of recording in the literature.

The experiments in question involved the measurement of intraocular pressure by use of the Hamilton optical manometer (*2*). This was accomplished by anesthetizing the dogs with 30 mg of pentobarbital sodium/kg of body weight intravenously and passing a sharp, short 24-gage needle through the cornea near the limbus. The needle was attached to a length of lead tubing which was connected in turn to the manometer for photographic recording. Within a few minutes after passing the needle through the cornea, the pupil became tightly constricted in all the dogs used and failed to respond to rather large doses of atropine.

The presence of miosis in these experiments may be attributed to a reflex originating in the cornea, since it is well known that injury to the eye will produce pupillary constriction. In general, sensory stimuli to the eye and iritis will produce constriction of the pupil (*3*). Additional evidence in this direction is offered by the fact that pupillary constriction occurred only in the experimental eye and not in the opposite eye. Thus, after the administration of atropine, the control pupil was fully dilated while the experimental pupil was tightly constricted. Therefore, it is postulated that passing a needle through the corneal membranes sets off impulses that activate the constrictor fibers of the pupil either via the central reflex route or by an axon reflex. That this constriction was not due to other procedures used in these experiments was shown by the fact that miosis refractory to atropine was obtained in animals where cannulation was the only procedure.

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The effect of electrical stimulation of the cornea was tested in the pentobarbitalized, atropinized dog by applying a mild electrical stimulation (Harvard inductorium, 3 v input, coil setting 9) to the cornea for 2 sec. No change in the pupil size developed. However, stronger, more prolonged stimulation (duration 30 sec, coil setting 2), which caused a small burn of the cornea, did cause miosis. This miosis, however, did not appear until 15–20 min after discontinuing the electrical stimulation. This type of injury, as well as needle puncture, cause a delayed miosis in the atropinized eye.

In an effort to overcome this miosis various drugs were tried. A 1% atropine sulfate solution was instilled in the eye, 2 drops every 10 min, for a period of 1 hr without producing any appreciable effect on the pupillary constriction. Atropine sulfate was then administered intravenously beginning with a dose of 1 mg and continuing to a total dose of 5 mg/kg of body weight with the same negative results. As further check 0.25 ml of a 1% solution of atropine was injected directly into the anterior chamber. Since none of these procedures produced dilatation, it is obvious that atropine was of no value in overcoming this miosis.

Other drugs that were tested included tetraethylammonium chloride, a ganglionic blocking agent, in a dose of 10 mg/kg body weight; Mytolon, a muscle relaxant, in gradually increasing amounts until complete respiratory paralysis occurred; and Regitine, an adrenergic blocking agent, in a dose of 5 mg/kg. All these drugs, given intravenously, were found to be ineffective in the doses used in preventing the above described miosis.

Since ganglionic blockade was without effect, it seemed likely that the miosis was due to an axon reflex. The only group of autonomic drugs that was found to be effective was the sympathomimetics. By intravenous administration, epinephrine hydrochloride, 10 μg, or ephedrine sulfate, 3 mg/kg of body weight, gave a prompt mydriatic action.

On the assumption that the constriction was due to a reflex originating in the cornea, a local anesthetic, tetracaine hydrochloride, was instilled in a concentration of 0.5%, using 2 drops every 30 min, and beginning 30 min prior to cannulation of the cornea. Thirty to 45 min after this procedure atropine would produce near maximal pupillary dilatation. This dilatation, however, was limited in duration. In spite of continued use of tetracaine, within 1.5–2 hr after the first appearance of mydriasis, the pupil began to constrict again, and a few minutes later a state of maximal constriction was obtained. When this point was reached, further doses of atropine or tetracaine were without avail.

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