for CO_2 were higher on the sympathectomized side although red blood cell counts showed no essential differences on the 2 sides.

As the lactic acid and sugar estimations showed no differences, the changes in blood gas volumes are probably not of metabolic origin. Following lumbar sympathectomy there is a release of normal vascular tonicity. As this tonicity offers some resistance to blood flow normally, the removal, by sympathectomy, of this factor would permit a greater blood flow through the extremity. This has been demonstrated by Britton. Hence with a greater blood flow through the extremity, each unit volume of blood would have to carry less CO_2 and give off less O_2. Physiological readjustments apparently take place after a few months, restoring the sympathectomized side to an essentially normal condition.

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Effect of Sympathectomy on Bone Repair.

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(Introduced by Lester R. Dragstedt.)
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The effect of unilateral lumbar sympathectomy on the healing of bone defect has been studied experimentally in the following manner. Dogs were used throughout. A left lumbar sympathectomy, including at least 3 ganglia, sometimes 4, and the intervening chains, were excised from the sacral promontory upwards. Immediately following this procedure, equal fragments, approximately 1.5 mm. in length, were resected subperiosteally from the upper end of both fibulae. This method for studying bone repair was chosen in preference to simply fracturing the bones, as repair can be studied more satisfactorily by roentgenograms. Also the fibulae were chosen as they are not essential to weight bearing, hence splints and casts were not used. Healing was determined by roentgenograms and was considered complete when callus had completely bridged the gap between the bone ends.

Seventeen dogs were used. Seven developed infection of the fibular wounds and were sacrificed. Six of the remaining 10 presented an unexpected complication of fibular bone absorption rather than healing, and will not be discussed in this paper.

Of the remaining 4 one dog died of pneumonia 7 weeks after

operation. At the time of death there was more callus on the non-sympathectomized side, although the bone defect was not completely healed.

Complete healing occurred in the other 3, the average time being 12 weeks. In each, there was a more rapid healing on the non-sympathectomized side, averaging 3 weeks sooner.

Fibular fragments were excised from another dog, in which only a left lumbar sympathectomy had been done 6 months previously. No difference was noted in the healing time, between the sympathectomized and the non-sympathectomized sides. In this case the effects of the sympathectomy had probably worn off at the time the bone fragments were removed.

These results are in contradiction to the clinical experiences of Colp and Mage.[1] These authors did periarterial sympathectomies, in Scarpa's triangle, in acute and potentially delayed fractures and stated that in these cases compared with a "control" series, the union was more rapid by about 2 weeks. Pearse and Morton[2] concluded from experimental work that if the sympathetic nervous system has any effect on hastening osteogenesis, it is a very slight one.

Experiences, both clinically and experimentally, have shown that more pronounced and longer lasting effects result from lumbar sympathectomy than from periarterial sympathectomy. Yet with the increased arterial hyperemia resulting from lumbar sympathectomy, this has not been shown experimentally to hasten the repair of bone. Consequently there is considerable doubt as to the advisability or the beneficial effect, of doing any type of sympathectomy in an attempt to hasten bone repair in clinical cases.

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[1] Colp, Ralph, and Mage, Sigmund, *J. Am. Med. Assn.*, 1931, **97**, 1069.

[2] Pearse, H. E., and Morton, J. J., *J. Bone and Joint Surg.*, 1931, **13**, 68.