Sault Ste. Marie area by R. G. McConnell as follows: "The young granite clearly cuts the whole of the Huronian, including the latest Cobalt rocks. It also cuts certain quartz-diabase dikes in the Huronian, but is older than the olivine diabase dikes of the region. It is lithologically similar to the Killarney and is correlated with it. This appears to settle the question of the relation of the Killarney granite to the Cobalt series and proves its post-Cobalt age."[4]

Just what is the proper use of the term Algoman is another question which may be left to others better qualified to judge. Dr. Lawson himself proposed the name Algoman and first applied it to the post-Seine granites in western Ontario.[5] He believed it to be post-Huronian in age and has since referred to it as post-Huronian "by definition." Unfortunately the post-Huronian age of the granites in the Seine River area is based on the assumed equivalence of the Seine and the Huronian—an unproved supposition. Perhaps ultimately it may be found advisable to avoid confusion by adopting new names in the place of one or more of the three now so commonly used, or by redefining the present terms. Whichever granite Dr. Lawson prefers to call Algoman, there seems to me sufficient justification for the contention that there are at least three granites in the Canadian Shield of widely different age.

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TRANSFORMATION OF COORDINATION AFTER CROSSING THE ACHILLES TENDONS IN THE FROG

In 1934 W. Manigk[1] reported observations which, if confirmed, would overthrow the accepted theories of reciprocal innervation. He found that frogs whose hind legs had been sewn together in such a way that only the feet were movable, walked with a characteristic front-leg–hind-foot rhythm. This rhythm persisted after excision of all the extensor muscles of the feet except the gastrocnemii. He then crossed the distal ends of these muscles to the opposite feet in such a way that contraction of the right gastrocnemius would extend the left foot, while contraction of the left gastrocnemius would extend the right foot. The flexors of the feet were left unchanged.

Manigk stated that there was no difference between the walking of frogs so operated and frogs with uncrossed gastrocnemii. Both groups of animals walked with the same front-leg–hind-foot rhythm. From this fact he concluded that the crossing of the gastrocnemii in some way brought about a transformation in the innervation rhythm of these muscles, which caused them to cease acting as the antagonists of the flexors of the same side and to take on the function of antagonists of the flexors of the opposite side.

The writer repeated Manigk's experiments and obtained the same results. However, further investigation failed to substantiate his conclusion that the transposition of the gastrocnemius muscles occasions a change in their innervation rhythm. It was found that *denervation* of the crossed gastrocnemii does not affect in any way the walking behavior of the frogs. Since this is the case, we must conclude that the crossed un-denervated gastrocnemii do not produce foot movement. In view of this fact, it is obvious that no conclusion as to a change in the innervation rhythm of the extensors can be drawn from Manigk's experiment. Extensive studies of the movement mechanism revealed that the observed foot extension was produced by other muscles in the leg and thigh acting through a lever system introduced by the crossing operation.

Further evidence against Manigk's conclusions is furnished by the following experiment. In a number of frogs all the muscles moving one hind foot, except the gastrocnemius, were excised and the two legs were sewn together. The distal portion of the gastrocnemius was transposed in such a way that contraction of the muscle now produced flexion of the foot instead of extension, as is normally the case. The righting response of animals so operated was compared with that of control animals whose legs had been sewn together. If a control frog is placed on its back, both hind feet extend as the animal turns over. If now a frog with one of its legs operated in the manner just described is placed on its back, the operated foot is seen to flex strongly when the unoperated foot extends in the righting reaction. These results show that, in spite of its transposition, the gastrocnemius still contracts when it would have contracted had its location not been changed. This experiment furnishes positive evidence that under certain conditions at least, the transposition of the distal end of the gastrocnemius does not affect its innervation rhythm.

On the basis of these observations we must conclude that Manigk has not demonstrated any change in innervation rhythm of the gastrocnemii as a result of their transposition and that such a transformation is extremely unlikely. There, therefore, seems to be no necessity for a revision of the existing theories of reciprocal innervation.

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[4] Andrew C. Lawson, *Bull. Geol. Soc. Amer.*, Vol. 40, p. 366, 1929.

[5] Andrew C. Lawson, Geol. Surv. of Canada, Mem. 40 (1913), pp. 103–109.

[1] Wolfgang Manigk, *Pflüger's Arch.*, 234: 176–181, 1934.