polarization of the motoneuronal membrane occurs during desynchronized sleep. This phenomenon, which is likely to arise from inhibitory postsynaptic potentials, would account for the tonic depression of the monosynaptic and polysynaptic reflexes which occur during desynchronized sleep¹.

Another mechanism must be postulated, therefore, to account for the striking phasic depression of the same reflexes that one sees in conjunction with the bursts of rapid eye movements¹. The following evidence indicates that presynaptic inhibition, acting on the central endings of primary afferents, may cause the phasic depression of the spinal reflexes at the time of the rapid eye movements. No further depression of the response of the motoneurons to antidromic³ or direct stimulation (this report) was observed to parallel the bursts of rapid eye movements. In addition, during the bursts of ocular movements there is a phasic enhancement of the group I *a* antidromic volley⁴, as tested in both flexor and extensor nerves following Wall's method⁵.

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Central Effects of β -N-Oxalyl- α,β -diaminopropionic Acid and other *Lathyrus* Factors

ALTHOUGH an association between β -aminopropionitrile derivatives and osteolathyrism of experimental animals seems well established¹, there is less certainty concerning the nature of toxic substances present in *Lathyrus* species responsible for human neurolathyrism². Acute neurological manifestations are produced in some laboratory animals by L- α,γ -diaminobutyric acid (present in numerous *Lathyrus* species, but not in *L. sativus*)^{3,4}, by β -cyano-L-alanine (present in *Vicia sativa* and *V. angustifolia*, possible contaminants of *L. sativus*)⁵ and by β -N-oxalyl-L- α,β -diaminopropionic acid (recently isolated from *L. sativus*)⁶. The degree of susceptibility to these toxic agents varies between different animal species, and it has yet to be demonstrated whether these substances do, in fact, produce human lathyrism. Nevertheless, in view of the potent effects of many relatively simple amino-acids on mammalian central neurones⁷, these lathyrus factors are of considerable interest. Consequently an investigation has been made of the action of these and related compounds on single nerve cells of cats anaesthetized with pentobarbitone.

Action potentials were recorded extracellularly from spinal interneurons and Betz cells by means of the centre barrel of five-barrel glass micropipettes of overall tip diameter 4–5 μ , while the compounds under investigation were administered electrophoretically into the immediate extracellular environment of single neurones from the other barrels⁷. Previously this technique has been used to demonstrate that certain acidic amino-acids related to glutamic acid are excitants of nerve cells, whereas struc-

turally similar neutral amino-acids of the γ -aminobutyric acid group are depressants⁷.

β -Cyano-L-alanine, β -cyano-D-alanine, α -cyanoglycine and γ -cyano-L- α -aminobutyric acid neither excited nor depressed spinal interneurons when administered as cations from aqueous solutions of pH 2.8–3.4. When similarly administered, L- α,γ -diaminobutyric acid depressed the synaptic responses of these cells, but had a much weaker action than γ -aminobutyric acid or β -alanine⁷. In marked contrast, however, β -N-oxalyl-L- α,β -diaminopropionic acid, administered as an anion from a pH 7.5 solution of the sodium salt, was a powerful excitant of spinal interneurons and Betz cells. This substance was more potent than D,L-homocysteic acid, and was only slightly less active than N-methyl-D-aspartic acid, the strongest amino-acid excitant of feline nerve cells yet reported⁷. When injected intraventricularly into 4-week-old mice⁸, β -N-oxalyl-L- α,β -diaminopropionic acid caused flexor convulsions and hyperactivity in doses of 25–50 μ g. Related amino-acids, γ -N-oxalyl-L- α,γ -diaminobutyric acid, N-oxalylglycine and N-oxalyl- β -alanine were without effect on spinal interneurons.

β -N-Oxalyl-L- α,β -diaminopropionic acid is thus the most powerful excitant L-amino-acid yet tested. It is tempting to speculate that a direct action on central neurones accounts for the effects which follow intraperitoneal administration to immature chickens⁹, and that the lack of action on mice and rats⁸ is associated with the failure of the amino-acid to penetrate the blood-brain barrier. If this barrier is relatively impermeable in adult animals, then difficulties may arise in explaining the relationship between the oxalyl derivative and human lathyrism, unless of course the diffusional barrier is altered by severe nutritional deficiencies. Presumably the toxic effects produced by β -cyano-L-alanine⁵ and L- α,γ -diaminobutyric acid³ are not produced by a direct action on nerve cells, and may be associated with disturbances of the metabolism of L-glutamic acid, γ -aminobutyric acid and related substances.

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Rate of Intracisternally Injected 5-Hydroxytryptamine in the Rat Brain

THE uptake of 5-hydroxytryptamine (5-HT) by brain tissue *in vitro* and *in vivo* has been investigated by many workers^{1–4}. The present experiments investigate the fate of 5-HT in the brain tissue after administration into cerebrospinal fluid.