

acids 17%. In this animal we have observed some indications that the degree of glycosuria is proportional to the adequacy of the cortical hormone therapy of Hartman and Brownell.⁵

We have also carried out a number of observations on the effect of anterior pituitary extracts and epinephrine upon the ketonuria and glycosuria of these doubly operated animals which will be reported at a later date.

7842 P

Further Experimental Lesions of the Pyramidal Tracts.*

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It has been shown (Marshall¹) that a lesion of the pyramidal tracts in the medulla produces on the whole a less severe disorder of motility than does removal of the motor cortex. Evidence has also been presented which would suggest that lesions of the rubro-spinal tracts interfere with 2 groups of reflexes, the "Berührung-reflexe" of Munk and the contact placing reactions of Rademaker, which are dependent upon the integrity of the motor cortex. The conclusions were drawn that the pyramidal tracts do not form the only significant pathways of discharge from the motor cortex, and that other "extrapyramidal" tracts, particularly the rubro-spinal, participate as well.

If these conclusions are correct, then the removal of the motor cortex subsequent to a section of the pyramidal tracts should produce a paralysis, the severity of which might be more or less proportional to the functional importance of the extrapyramidal pathways descending from the motor area. The present experiments attempt to determine this. In 2 cats the left pyramid was sectioned, and 10 months was allowed for the degeneration of the pyramidal system and its cells of origin in the cerebral cortex. The motor area for the limb muscles (area 4 of Brodmann) which includes the

⁵ Hartman, F. A., and Brownell, K. A., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **31**, 834.

*Aided by a grant from the Rockefeller Foundation Fluid Research Fund of Yale University School of Medicine.

¹ Marshall, C., *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **31**, 68; *Am. J. Physiol.*, 1934, **109**, 178; *Arch. Neurol. and Psychiat.*, 1934, **32**, 778.

entire post-cruciate gyrus and the lateral half of the pre-cruciate gyrus was then removed on the left side. On the 16th and 17th day the animals were sacrificed and the brain and spinal cord removed. The gross preparations showed the lesions to be as described. Marchi and Pal-Weigert studies are in progress.

The symptoms following the first operation were similar to those previously reported. There were a number of initial symptoms which gradually disappeared, so that prior to the second operation the defects were hardly noticeable on casual observation. On closer inspection there could be seen a slight defect in the gait of the right hind leg, and occasional slight abnormalities of posture in the same limb. There was no definite extensor hypertonus but when the animal was held off the ground the right hind leg took a more extended position than the left and it was used less in struggling. The "Berührungsreflexe" and the contact placing reactions were underactive in both legs on the affected side, and the capacity to walk along a narrow track was poor.

Following the second operation the animals were again paralyzed to a degree not much less than following the first operation. The anesthetic used was sodium amytal and the animals slept through the day of the operation. On the following day one cat was able to walk with some staggering while the other did not progress until the day after. The capacity to walk improved rapidly, although at the end of the period of observation there was a slight stiffness and an occasional scraping of the toes of the hind leg on the affected side.

The defects in posture also reverted to the condition they were in following the first operation; there were marked spontaneous abnormalities and a failure to correct abnormal postures imposed upon the limbs. As before there was a gradual recovery, and at the end only slight defects were apparent, such as an undue twisting of the pivoting leg on a turn.

The "Berührungsreflexe" of Munk and the contact placing reactions of Rademaker showed no recovery following the second operation. These have previously been shown to be permanently abolished following extirpation of the motor cortex. The visual placing reactions were not abolished but were somewhat reduced on the affected side. The hopping reactions were markedly affected initially but showed considerable improvement with time. The capacity to walk along the rungs of a narrow ladder was seriously and permanently disordered.

The resistance to passive flexion (extensor hypertonus) was

moderately increased on the affected side when the animal was held in certain positions, although it was not enough to interfere seriously with the gait. The degree of hypertonus diminished with time, although the leg still tended to assume an extended posture when its normal fellow would be flexed. The normal active resistance to passive extension was much reduced, and struggling was much less on the affected side.

The results would appear to confirm the thesis that the "extra-pyramidal" descending pathways from the motor cortex form an important functional system in the cat.

7843 C

The Reactions of Rat and Mouse Eggs to Hydrogen Ions.

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The mammalian egg is enclosed by a transparent membrane, the oölemma or zona pellucida, which disappears as the blastocyst implants itself in the uterine wall. Various suggestions, unsupported by experimental evidence, have been advanced as to the factors concerned in the removal of the egg membrane within the uterus. In the course of studies *in vitro* on rat and mouse eggs, it was found that eggs placed in acidified Ringer's solution rapidly lost the zona. No difference was observed between the reactions of rat and mouse eggs but occasionally eggs from the same animal showed marked differences. In one case, the zona of a 4-celled rat egg swelled and disappeared in 10 minutes, while the zona of a second egg (8-celled) remained unaffected after several hours in the same drop of fluid (pH 4.3). Practical use of this method of removing the zonae has been made in the study of the development of the isolated blastomeres of the rat.¹

Rat and mouse eggs, from the 2-celled to early blastocyst stages, were cultured at room temperature by the hanging drop method in depression slides. For aid in these experiments, I am greatly indebted to Dr. J. S. Nicholas, who removed the uterine tubes from the animals and obtained most of the eggs. The eggs were obtained by mincing the uterine tubes in unbuffered Ringer's fluid in an embryological watch glass, and after a few minutes removing the

¹ Nicholas, J. S., and Hall, B. V., *Anat. Rec.*, **58**, 83.