

be called the Brücke effect, though we used flashes instead of the revolving discs.

The significance of the Brücke effect is that a series of momentary stimuli is more effective for sensation than steady stimulation of the same strength. In order to account for this, the responding system must act very different from what would be expected of photoreception in the sense cells. Since the nervous system is capable of rhythmicity and periodic facilitation, we might look immediately to it. And since the maximum Brücke effect occurs at flash rates of 8 to 10 per second, such a periodicity should be sought to account for it.

The alpha rhythm in the human is of this order, and the alpha rhythm has been shown (in the cat by Bishop and O'Leary,¹ and in the rabbit by Bishop² and Bartley³ to be directly connected with the periodicity of elicitation of maximum cortical response from peripheral stimulation. Stimuli given at rates not corresponding with it are able to evoke either no responses or very small ones.

There is every reason to suppose that the enhancement in the sensory effect of properly timed flashes is due to the same mechanism as underlies enhanced cortical responses from direct optic nerve stimulation after the removal of the eye, where there is no possible retinal involvement. Thus, we have here a definite case in which *brightness discrimination* is determined by a central mechanism in just as true a sense as that ascribed to photoreception.

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Spirochetes in Gastric Glands of *Macacus rhesus* and Humans without Definite History of Related Disease.

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The observation of spirochetes in the gastric glands of *Macacus rhesus* by Cowdry and Scott¹ prompted the study of the incidence of these organisms and reaction associated with or caused by their presence in the sections of the gastro-intestinal tract of the animals used in their study. Sections of human stomach taken at necropsy in the

¹ Bishop, G. H., and O'Leary, J., *Am. J. Physiol.*, 1936, **117**, 292.

² Bishop, G. H., *Arch. Ophthalm.*, 1935, **14**, 992.

³ Bartley, S. H., *J. Cell. and Comp. Physiol.*, 1936, **8**, 41.

¹ Cowdry, E. V., and Scott, G. H., *Arch. Path.*, 1936, **22**, 1.

Department of Pathology of Washington University School of Medicine were made available by Dr. H. A. McCordock.

As early as 1884 Escherich² observed and reported spirochetes in the stools of patients with cholera. Spirochetes were described by Bizzozero³ in the gastric glands and parietal cells of dogs in 1893.

In spite of the many reports of spirochetes in the stools of normal humans as well as in cases of so-called "spirochetel dysentery" which had been cured in many cases by treatment with arsenicals, a review of the literature fails to reveal observations or studies of these organisms in the human stomach. Mühlens⁴ and Luger and Neuberger⁵ have reported spirochetes in ulcerating carcinomas of the stomach but reports of spirochetes in the gastric glands or parietal cells of humans were not found.

Kasai and Kobayashi⁶ experimented with lower animals which showed a definite tendency of these spirochetes of cats to become pathogenic to rabbits. Hemorrhagic erosion and ulceration of the mucosa about masses of spirochetes was described.

Edkins⁷ described what he considered a granular phase of these spirochetes in cats when the cats were not fed for several hours.

In all the observations reactions to these organisms are not reported.

In *Macacus rhesus* the spirochetes were observed in the gastric glands and parietal cells (hematoxylin and eosin stained sections) in 100% of 24 control animals and 19 test animals. The marked tendency for these organisms to invade the parietal cells was noted. In most cases a few spirochetes were also seen in the neck chief cells.

In the parietal cells varying degrees of destruction ranging from mere blurring of cellular configuration to fragmentation of the nucleus and complete destruction of the distal cell margin with cytoplasmic degeneration in areas about the spirochetes were observed. Moderate degrees of cellular reaction on the part of the leukocytes have been observed about areas of massive invasion. No difference was noted between test and control animals. It is seen that even in animals that are considered normal the presence of these organisms is not always innocuous. No spirochetes were observed in the glands of the duodenum, jejunum, ileum, or colon of the same animals.

² Escherich, Th., *München med. Wochenschr.*, 1884, No. 54; 1885, No. 36; 1886, No. 46; *Arztliches Intelligenz Blatt.*, 1884.

³ Bizzozero, G., *Arch. f. Mikr. Anat.*, 1893, **42**, 82-152.

⁴ Mühlens, P., *Z. f. Hyg. u. Infektionsk.*, 1907, **57**, 414.

⁵ Luger, A., and Neuberger, H., *Z. f. klin. Med.*, 1921, **92**, 54.

⁶ Kasai, K., and Kobayashi, R., *J. Parasitol.*, 1919, **6**, 1.

⁷ Edkins, J. S., *Parasitol.*, 1920, **15**, 296.

From 3,400 necropsies 312 stomach sections, hematoxylin and eosin stained, were chosen in order as they were found. Of the 242 remaining sections, after discarding 70 on account of autolysis, 103 or 43% were found to contain spirochetes. Only 11 showed great numbers of organisms, the usual finding being a very few spirochetes after long and careful search of the entire section. These spirochetes are shorter than those in monkeys and the spirals are less sharp and few in number. The usual number of spirals was 2 or 3. Autolysis made it impossible to attach any significance to the presence of these organisms in the human stomach. Suggestive granules were observed in parietal cells in a small number of these sections.

A remarkable feature, noted by several investigators, is that such spirochetes in gastric glands are readily seen in ordinary preparations and do not require silver impregnation for their demonstration. This may be due to the special physico-chemical properties of the environment.

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Mental and Behavioral Changes Following Male Hormone Treatment of Adult Castration, Hypogonadism and Psychic Impotence.

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(Introduced by Edgar Allen.)

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Previous work indicates that the administration of male hormone substance produces behavioral as well as organic changes. In baby chicks, aggressiveness, strutting and crowing have been induced.¹ In man, greater capacity for penile erection² and increased aggressiveness, energy and self-assurance have been noted.³ This paper reports additional data on mental and behavioral changes during treatment with testosterone propionate* of 2 adult castrates, 2 cases of hypogonadism and 2 cases of apparently psychic impotence. Tes-

¹ Hamilton, J. B., *Proc. Am. Soc. Physiol.*, 1937, 88.

² Hamilton, J. B., *Endocrinology*, 1937, **21**, 744.

³ Hamilton, J. B., *Endocrinology*, 1937, **21**, 649.

* Furnished by the Ciba Company under the trade name Perandren.