peutic purposes. Quinine treatment was instituted, and on November 2 only a few parasites were present. She had no further relapses and no more parasites were found.

Case II

A police commissioner was first seen on December 9, 1935, fourteen days after his arrival in England. He had served for seventeen months in Nigeria, where he had suffered from insomnia and loss of energy, and had complained of pain in the left side, which was attributed to a renal calculus. His spleen was slightly enlarged, but prolonged search revealed no malaria parasites in his blood. On January 15, 1936, he complained that during the three previous weeks he had had several mild attacks of fever; they always occurred at night, and were accompanied by pain in the lumbar region. The spleen was now found to be hard and large, and examination of blood films disclosed a heavy *P. ovale* infection in all stages of development. Atebrin treatment was begun, and on February 1 the spleen was normal again, the blood free from parasites, and he had had no further pyrexial attacks.

Case III

The wife of a company official had been two years in Stanleyville (Belgian Congo), where she had had one attack of malaria in March, 1935. She had a second attack in the following December, which lasted for five days and necessitated hospital treatment. She returned to England on July 14, 1936, and eight days later had an attack of fever with rigor, which began at 6.30 p.m. and was associated with pain in the centre of the abdomen. Atebrin treatment was commenced, but was interrupted by the removal of the patient's appendix on July 24. Two days afterwards the pyrexia returned, the temperature reaching 103° F.; she vomited, and had pain in the back. The spleen was slightly enlarged, and examination of blood films showed numerous half-grown *P. ovale* parasites. Atebrin treatment was recommenced, and the patient made an uninterrupted recovery.

Case IV

An engineer had served one and a half years in Sierra Leone, during which time he had had several mild attacks of fever. In September, 1935, his appendix was removed. When seen first on April 3, 1936, he complained of pain over the gall-bladder area, and was neurasthenic. The spleen was then not enlarged, and no parasites were found in the blood. On May 27 he stated that he had suffered from daily attacks of fever in the evenings, with aching in the bones and lumbar region. The spleen was now much enlarged, and blood films showed a fairly heavy infection with half-grown and gametocyte forms of *P. ovale*. He reacted immediately to atebrin treatment, the aches and pains disappearing on the second day. On August 28 the neurasthenic symptoms had subsided, the spleen was normal, and the blood showed no further evidence of infection.

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"RACHI-RESISTANCE" AND SPINAL ANAESTHESIA

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The term "rachi-resistance" has no exact counterpart in the English language. It is used to describe a condition in which an intrathecal injection of an average or a greater than average dose of spinal anaesthetic fluid produces little or no effect. The great majority of failures to produce adequate spinal anaesthesia are due to errors of technique, of which the commonest are inaccurate punctures and faulty postural arrangement of the patient. Failure may also be due to the use of inactive solutions, or very rarely to some pathological lesion such as a cord tumour (Thompson, 1934). However, we are not concerned with these cases here, but only with those where there is no doubt that the anaesthetic has reached the nerve roots without the subsequent production of anaesthesia.

Case Records

In a series of 657 cases of spinal anaesthesia, 300 of which have been recorded elsewhere (Walters, 1932), we have encountered two cases of "rachi-resistance," particulars of which are given below.

Case 1.—A woman aged 33 underwent hysterectomy for multiple uterine fibroids on June 27, 1935. In the left lateral position a smooth puncture was made between the third and fourth lumbar vertebrae, and 1.5 c.cm. of decicaine was injected. The patient was then placed in the ventral decubitus. No anaesthesia resulted. Ten minutes later another 1 c.cm. was given without effect. Lastly, a further 1.5 c.cm. was administered, this time between the second and third lumbar vertebrae. Beyond a slight loss of tactile sensation in the perineum no anaesthesia was produced, and the operation was proceeded with under a general anaesthetic.

N.B.—Decicaine is a powerful anaesthetic solution. In a short series of 104 cases we have had no other failures, and have not exceeded a dose of 2.5 c.cm. even for such major procedures as abdomino-perineal excision of rectum. Decicaine is manufactured by Bayer Products Ltd., and until recently was known as pantocaine, with which preparation it is identical. Chemically it is *p*-butyl-amino-benzoyl-dimethyl-amino-ethanol hydrochloride; its viscosity is 1.8-2, and its specific gravity 1.0009. On an average a dose of 2.5 c.cm. of this drug will give slightly over two hours' anaesthesia.

Case 2.—A man aged 44 was admitted to hospital with thrombo-angiitis obliterans (Buerger). As part of the investigation spinal anaesthesia was used. On July 26, 1935, a smooth puncture was made between the third and fourth lumbar vertebrae; 1.5 c.cm. duracaine was injected. No anaesthesia resulted. Our interest now aroused, we gave 2.5 c.cm. of decicaine on July 29; no anaesthesia ensued. We were by this time convinced that we were dealing with a case of "rachi-resistance"; but in order to exclude all errors so far as possible we decided to try again with yet another drug. On August 1 18 c.cm. of percaine solution, 1 in 1,500, was given, employing the Howard Jones technique (1930). (This is a large dose. Franken (1935) states: "Experience has proved that the dose of 18 c.cm. exceeds the limit of safety.") After ten minutes the patient complained of some tingling and numbness in both legs. After fourteen minutes there was no loss of sensation, but the legs felt heavy. After thirty minutes there was a slight loss of epicritic sensation in the perineum. There was no loss of sensibility to pain in any region, whilst thermal sensibility, tactile sensation, and

In view of the commonness of oligomenorrhoea or amenorrhoea in women with Graves's disease, V. Jonas and E. Markalous (*Zbl. Gynäk.*, October 31, 1936, p. 2614) estimated, by injections into castrated mice, the folliculin content of the urine of eighteen patients with well-marked signs of thyroid hyperactivity. The amount found was on the average about one-seventh of that in normal females, and was less than in patients examined during a remission of the ailment. Of the eighteen women one had normal menses, four oligomenorrhoea, and the rest secondary amenorrhoea.

deep sensation were unimpaired. The patient showed no evidence of any toxic effect from the drug, except for slight nausea about one hour after administration. In order to complete the investigation a subcutaneous injection of novocain was given, with the production of normal local anaesthesia.

We concluded that this was a definite case of "rachi-resistance," and finally performed lumbar ganglionectomy by the transperitoneal route under general anaesthesia with excellent results.

Rachi-resistance and Rachi-sensibility

Cases which appear to be hypersensitive to spinal anaesthetics are said to be "rachi-sensible." This condition is uncommon, but not excessively rare. Pathological states such as toxæmia from acute intestinal obstruction, increase in urea content of the blood, and jaundice render patients more susceptible to spinal anaesthetic drugs; the physiological state of pregnancy renders women more sensitive to this form of anaesthesia.

On the other hand, "rachi-resistance" is apparently a very unusual phenomenon. After a thorough search of the available literature we are unable to find a reference to it in the English language other than in a direct translation (Sebrechts, 1934a). Sebrechts (1930), however, has paid a good deal of attention to the subject, and the following facts emerge from a perusal of his works.

He states that the cases belonging to the group "rachi-resistant" are found to be predominantly sympathetico-tonic in type, whereas those grouped as "rachi-sensible" are vagotonic in type (1932). This author has also observed that the cases of "rachi-resistance" which have come under his notice have belonged to the same family (one, a father and son; the other, a mother and four sons), and he is convinced that the phenomenon is of a familial distribution. Elsewhere (1934b) he goes so far as to say that it may be a racial property, stating that the Anglo-Saxons appear to be more resistant than the Belgian population.

Discussion

L. J. Witts (1936) in a recent contribution draws a distinction between idiosyncrasy and susceptibility. He states that "idiosyncrasy is a peculiarity of constitution whereby the individual reacts differently from the majority of mankind. . . . In some cases of idiosyncrasy a mechanism akin to anaphylaxis is present, an initial dose being necessary to sensitize the patient."

An idiosyncratic patient thus exhibits a reaction peculiar to himself, and which cannot be predicted unless the family is suspect. For instance, if one of a family is found to be "rachi-resistant"—for example, a father—and the sons resemble him in type (sympathetico-tonic), then one might predict that the sons will be "rachi-resistants." Thus we venture to suggest that the phenomenon of "rachi-resistance" can be classed as an idiosyncrasy.

On the other hand the susceptible person requires a smaller than average dose of a drug to produce the standard effect. This is what obtains in those cases which are termed "rachi-sensible," a condition sometimes produced by pathological states, as already mentioned.

Is it possible to find an explanation for "rachi-resistance"? The production of anaesthesia by cocaine and its derivatives is attained by a local depression of nerve fibrils or nerve trunks. In the case of the nerve trunks there is a permeation of the drug through the sheath in order to reach the fibrils, and Sebrechts (1930) points out that this permeation is more rapid and intense

in the spinal nerve roots than in the peripheral nerves on account of the less permeable nature of the sheaths of the latter. If one assumes a variation in permeability of the nerve sheaths, then those cases of greater permeability will obtain more intense anaesthesia than those in which permeability is present to a lesser degree. Toxic products circulating in the system might conceivably increase the permeability of the nerve sheaths, thus rendering the subject "rachi-sensible." If, on the other hand, an undue resistance to the permeation of cocaine peculiar to the nerve sheaths of the individual is assumed, this might account for him being "rachi-resistant."

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Clinical Memoranda

Typhoid Abscess 57 Years Later

The typhoid bacillus is well known as a pyogenic organism and one which may be long in producing this effect; in the present case the interval was fifty-seven years.

CLINICAL AND BACTERIOLOGICAL REPORT

A man of 68 and a clear witness was admitted to hospital on May 30, 1936, with a swelling in the left popliteal fossa which had been present for six months, and with a history of some sweating at night for about two weeks before admission. His only previous illness was typhoid fever at 11 years, and this was fixed in his mind, as it came on very soon after a Sunday school outing.

There was no history of injury, and x rays revealed no bony lesion. The swelling was incised and drained of its yellow creamy contents. Direct film of this pus showed no *B. tuberculosis* or other organisms, but on aerobic cultivation at 37° C. for eighteen hours a pure growth of *B. typhosus* was obtained. The patient's blood serum agglutinated *B. typhosus* to a dilution of 1 in 50, but no further—a technical "positive." *B. paratyphosus* A and B were not agglutinated. The patient's own organism was agglutinated to a dilution of 1 in 125.

No pathogenic organisms were obtained from the faeces and urine at two examinations. *B. typhosus* was again isolated from the abscess two days later, but not subsequently; the wound healed slowly under antiseptic treatment.

LITERATURE

E. N. Wardle (1935) reported the isolation of *B. typhosus* from a bone abscess at the mid-length of the right tibia, opened at operation in August, 1934, on a man aged 34 with a history of typhoid fever ten years previously. There was a remote history of trauma. The man's serum agglutinated the organism to a dilution of 1 in 125. Wardle also quoted Keen as mentioning a case reported by Buschke, in which the organism was obtained in pure culture from a tibial abscess seven years after the fever.

Brock (1935) described a case of "Post-typhoid Chondritis with Abscess Formation" in a medical practitioner aged 32. Here a pure growth of *B. paratyphosus* B was obtained from