attention having been paid to the habits and customs of the particular variety of rat against which war was being waged. This is a matter of very considerable importance. As in so many other matters, chief reliance has been placed in traditional methods, which are by no means always the most efficient. It is commonly stated, for instance, that rats are omnivorous and thrive best on a varied diet. Some go so far as to advocate that the baits of traps and the vehicle for poisons should consist of substances not readily obtainable by the rat. It is true that rats will eat almost anything if driven by hunger to do so; they will become cannibalistic in captivity if deprived of water; but *R. rattus*, at any rate, is for choice almost incredibly conservative in its diet, dislikes variety, and is a strict vegetarian. As a result of some most interesting observations carried out in Poona by Dr. Chitre, in an investigation started by Major Kunhardt, I.M.S., it was shown that rats from various parts of India exhibited a marked preference for the food grain, or dough made from the food grain, which formed the staple food of the human population of their place of origin. In comparison with this all other foodstuffs were comparatively unattractive. Moreover, the rats displayed an astonishing aptitude for detecting dough made from the grain to which it had been accustomed, when several varieties were offered to it in exactly similar form. For example, the Poona rats are "bajri" eaters, the Madras rats chiefly rice eaters, and so on. The experiments were most carefully carried out on a very large scale and under conditions as natural as the limitation of such an experiment permit; the results were confirmed time and again and are beyond dispute. The addition of such substances as cheese, for which rats are popularly supposed to have a marked predilection, sugar, various essential oils, and numerous other substances were tried, with the result that none of the flavoured baits were as attractive as the plain dough baits. Even butter and other fats and oils detracted from the attractive value of the plain dough bait; such substances are commonly recommended as desirable ingredients of poison baits.

The bearing of such observations on the efficient prosecution of a rat campaign, be it by means of trap or poison, needs no elaboration.

A comprehensive knowledge of the habits of rats is likewise essential to the designing of "rat-proof" dwellings and buildings if such are to be kept rat-free. *R. rattus* is unable to jump higher than 2½ ft.; it is unable to circumvent a horizontal ledge of 9 in. provided this be smooth on the under surface; it cannot live on dry grain without a certain amount of water to drink; such points are all important. I am unable to quote similar facts about *R. norvegicus*; they could, however, easily be ascertained experimentally.

All the commonly recommended rat poisons, and several others, were subjected to investigation, with the result that none were found as efficient as barium carbonate, which is one of the very few poisons that the rat fails to detect. It is safe to handle, and in the amounts necessary for use it is not dangerous to children. It was found that 15 grains were necessary to kill a cat, 20 grains to kill a chicken, and that dogs could withstand a dose of 140 grains. Phosphorus poisons are relatively distasteful however offered.

In India poison baits are recommended to be made as follows:

One pound of barium carbonate is mixed thoroughly with three pounds of flour made from the grain which forms the staple food of the human population of the locality in which operations are to be carried out. The mixture can conveniently be made in an enamelled basin. Sufficient water is added to make the whole into a fairly firm paste. The resulting mass is sufficient for some 2,300 baits each containing 3 grains of barium carbonate. Clean hands and dishes are necessary to avoid the addition of extraneous taste and odour which might diminish the attractiveness of the baits.

Baits should be made fresh each day or at most every second day; a hard stale bait is very rarely eaten by a rat. The baits are distributed in groups of four in such parts of a building as are frequented by rats; this is best done in the evening. A record should be kept of the number of baits so distributed and the number taken. During poisoning operations special efforts should be made to keep all food usually available for rats covered up.

I make no reference to the use of bacterial viruses for the destruction of rats. I imagine such means of rat destruction have but a limited vogue at the present day. Quite apart from any possible dangers attending their use, experience of plague makes one sceptical of their effecting anything but a very temporary reduction in the rat population. No bacterial infection of which we have knowledge is more readily communicable from rat to rat or more fatal to rats than is plague. Plague has flourished among the rats of India for twenty-three years; nevertheless there were sufficient rats in India in 1917-18 to determine the fourth worst plague epidemic on record.

HERPES ZOSTER OF THE GLOSSO-PHARYNGEAL NERVE.

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THE following case presents several points of interest bearing on the pathology of herpes:

On July 12th Miss M., aged 57, complained of sore throat, which she attributed to a long and cold motor drive two days previously. She was first seen on July 14th. She had that day vomited, was feeling ill, and complained of vague pains behind the left ear and in the back of the neck on the left side. The temperature was 100°, there was paralysis of the left facial nerve (peripheral type), the tongue was furred, especially on the left side where it presented a patchy appearance, the soft palate and fauces were reddened, the former presenting a herpetiform eruption, the vesicles being covered with sodden epithelium. One of these vesicles was just to the right of the mid-line. Taste was normal. The skin of the auricle was unaltered.

On July 17th the temperature had fallen to normal, and the tongue was nearly clean; vesicles were still present, though less marked. For two days she had noticed that she was deaf on the left side. The mæstus and membrana tympani appeared normal, but there was marked deafness of the inner ear type, the acoumeter being heard at two inches only.

The facial paralysis was treated by the interrupted current, and on August 1st there was slight though definite return of voluntary power in all the facial muscles. The hearing was much improved, though still a little dulled, acoumeter being now heard at twelve inches. The palate was now normal and the general health fair.

In brief the symptoms presented were: (1) fever and vomiting, (2) facial palsy of peripheral type, (3) an auditory nerve affection, (4) on the mucous surface supplied by the glosso-pharyngeal nerve an eruption resembling that of herpes zoster, (5) pain felt behind the ear and down the left side of the neck posteriorly.

Ramsay Hunt in 1907¹ put forward the view that herpes auricularis, in which the eruption is limited to the tympanum, external auditory canal, and auricle, is due to herpetic inflammation (posterior poliomyelitis) of the geniculate ganglion. He describes four varieties:

- (1) Herpes auricularis.
- (2) Herpes auricularis with facial palsy.
- (3) Herpes auricularis with facial palsy and hypoacusis.
- (4) Herpes auricularis with facial palsy and Ménière's complex.

These complications sometimes occur in herpes facialis, occipitalis, and cervicalis, and he explains this fact upon the theory that while the inflammation may predominate in one ganglion, others near by may participate in a milder form, the zones here named being controlled by the Gasserian, geniculate, and cervical ganglia.

In the case here described there was facial palsy and hypoacusis, but not the herpes auricularis. In its place there was herpes of the palate. Was this due to herpetic inflammation of the ganglion of the glosso-pharyngeal nerve?

With regard to the possibility of this occurrence, Ramsay Hunt² says: "If the Gasserian and geniculate ganglia, by virtue of their unipolar type, belong to the series of ganglia liable to the inflammation of zona, the same would also be true of the ganglia of the glosso-pharyngeal nerve and of the vagus nerve. These ganglia are also regarded by histologists as belonging to the unipolar or spinal type, and therefore cannot be excluded from the realm of herpes zoster." Hunt does not describe any cases in which he has found evidence of involvement of the ninth nerve, though he describes one case of herpes auricularis in which stiffness of neck, frequent vomiting, and slow irregular pulse suggested that the vagus might be affected.

Sequeira (*Diseases of the Skin*, 1919) mentions buccal

herpes as a variety of herpes simplex, and as essentially different from herpes zoster; he says: "Buccal herpes is very rare. The mucous membrane of cheeks, palate, and tongue may be involved." He makes no mention of an association with facial palsy or deafness. Osler mentions herpes auricularis, quoting Ramsay Hunt, but makes no mention of buccal herpes.

If the eruption on the palate was, as seems probable, due to an affection of the ninth nerve ganglion, perhaps the pain felt behind the ear and the vomiting were due to an involvement of the tenth nerve ganglion, and the pains

in the neck to involvement of those of the second and third cervical. The case would thus present a pathological picture of posterior poliomyelitis of a succession of ganglia, the geniculate ganglion affecting both the seventh and eighth nerves, the ganglia on the ninth and tenth cranial nerves, and the posterior root ganglia of the second and third cervical, the infection being most acute in the upper ganglia, and less acute below.

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TWO CASES OF SO-CALLED GYNAECOMASTIA IN YOUNG BOYS.

BY

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HYPERTROPHY of the male breast is not a very uncommon condition in individuals over the age of puberty. The natural growth and development which occurs in the male breast at this time may become exaggerated after inflammation or trauma, or as a consequence of derangement of the internal secretions—for example, after atrophy of the testes from any cause. Enlargement of the breast due to mastitis in newborn children is also often met with, but in the majority of cases it leaves no sequelae. In boys below the age of puberty hypertrophy of the breast appears to be rare. Doubtless many cases have passed unrecorded, but in a search through the literature of the last fifty years I have only been able to find one instance. The following cases may therefore be of interest.

CASE I.

Thomas Y., aged 7, was admitted to St. George's Hospital, under Sir Crisp English, on August 24th, 1918, for enlargement of the left breast. According to the parents, the left breast had been slightly larger than the right since birth, but had recently increased considerably in size. There was never any pain nor had there been any discharge from the nipple. The disfigurement was, however, commented on by other boys at school, and the parents were anxious to have the organ removed.

On admission, there was seen to be a general enlargement of the whole left breast (see Fig. 1). There was no tenderness, no dimpling of the skin, and no retraction of the nipple. The breast was freely movable on the deeper structures. It was soft, and felt as though affected with a slight degree of chronic mastitis. Some small freely movable glands were palpable in the left axilla. In other respects the child was healthy. The right breast was normal, and there were no other congenital defects.

On August 27th Sir Crisp English removed the breast, leaving the nipple *in situ*. The boy made a good recovery.

Pathological Examination.—The excised organ measured 2½ in. across and ¾ in. in depth. It felt firm and appeared to be composed of fibrous tissue in which small cysts were visible. Pieces were fixed in formalin and in Zenker's fluid, embedded in paraffin and stained in various ways. Microscopically these sections show a dense fibrous tissue stroma in which ducts can be seen running in various directions. These latter have a normal structure—that is, their wall consists of a membrane lined by two rows of cells, the outer cubical, the inner columnar.

They are, however, as a rule, wider and more branched than in the normal gland. Some are considerably dilated. The lumen sometimes contains granular debris. In places the mucous membrane has proliferated and forms little buds which project into the lumen of the duct (Fig. 2). The ducts appear to end in a sort of cul-de-sac. No true acini can

FIG. 1.—Case I. Enlargement of left breast. The stain under the breast is due to iodine.

FIG. 2.—Longitudinal section of breast. Case I.

be distinguished in any of the sections. The connective tissue fibres are arranged sometimes around, sometimes parallel with the ducts. Near the latter the fibres are finer and take on a blue colour with Mallory's connective tissue stain. Away from the ducts the fibres are coarse and stain deeply with acid fuchsin. Where Mallory's stain is used without acid fuchsin the fibres, as a whole, are blue, but a few of the coarser ones take on the orange G. stain. With van Gieson the fibres are red, but those nearest the ducts are not so deeply stained. Fat is present here and there between the fibrous tissue bundles. The blood vessels are small and inconspicuous. A small-celled infiltration is present round many of the ducts, the cells being chiefly lymphocytes with an occasional plasma cell.

CASE II.

Ernest V., aged 9, was admitted to St. George's Hospital under Mr. C. H. S. Frankau on September 14th, 1912, for a gradually increasing swelling of the right breast of nine months' duration. On examination the right breast was found to be occupied by a fibro-cystic swelling the size of a farthing bun. There was no attachment to skin or to deeper structures. The left breast was normal, as also were the genital organs. Amputation of the right breast was performed on the following day, the nipple being left *in situ*. The patient made a good recovery.

Microscopically the organ showed precisely the same characteristics as in the first case, with the exception that round-celled infiltration was exceedingly slight.

Hypertrophy of the male breast is described by Paulus Aegineta, or has long been known under the title of gynaeconomastia. But what is gynaeconomastia?

The microscopical features have been described by Gruber, E. Israel, Scheiber, Stieda, Schuchardt, and Anna Kasimir. Their accounts agree very closely with each other and with the findings in the present cases. The characteristics of the condition are the excess of fibrous tissue, the large number of ducts, and the rarity of the acini.

Fat may be found in the interstices between the layers of fibrous tissue surrounding the ducts; round-celled infiltration may be present or absent. Very similar appearances are found in fibro-adenoma which occasionally appears in the male breast, but this condition is easily distinguished, as there is then a circumscribed tumour localized to one portion of the organ, not a diffuse enlargement of the whole breast. The accounts of gynaeconomastia in current textbooks are, however, decidedly contradictory. For instance, Sampson Handley, in his article in Choyce's *Surgery*, says: "Histologically the breast resembles that of the virgin female"; whereas in Rose and Carless the statement is made that "the organ is usually functionless since the overgrowth mainly affects the stroma, although lactation has been known to occur." The statement

that a male breast may secrete milk recurs in most textbooks, and appears to have its origin in the story, quoted by many authors, of the man who, on the death of his wife after childbirth, reared his infant by putting it to his own breast. The story is picturesque, but the occurrence of