general it is impracticable to render these uniform. However, the conditions pertaining to a particular service may be maintained sufficiently constant for different patients and at repeated examinations of the same case. It is essential that heart-rates should be regarded broadly, and particular emphasis is to be laid upon consistency of separate readings. Thus, a patient who reports himself as disturbed by a given drill, will usually show uniform high readings after that drill if distress is genuine; and these high readings will be foreshadowed by raised rates after drills of lower grade. Equally important is consistency between these drill rates, the routine ward rates, and the rate obtained by test exercises.*

Giddiness.

This is a common complaint, but one which is given for the most part in the initial stages of treatment. It consists of transient dizziness or dimness of vision, and is often described as a cloud before the eyes. Rotation of surrounding objects is not experienced. Giddiness may be felt after the patient has stood quietly for some while, immediately at the cessation of effort, or on rising to the upright position abruptly. As a prognostic sign it has little value.

Fainting.

Although nearly 3,000 patients sent to us with diagnoses of "D.A.H." or "V.D.H." have now been submitted to graded drills, there has been no single accident of consequence. Where several hundred men are drilled each day, a fainting attack on drill is less than a monthly incident. The chief form of attack, and one which may always be regarded as genuine, is that accompanied by a feeble and slow heart action (30-50). It may be preceded by a short interval of giddiness, by a sense of weakness or unsteadiness. Consciousness is lost, and the fall is sudden, but rarely heavy. Pallor and sweating are present. Involuntary movements are slight, and usually confined to the face and arms; a general rigidity may be developed; the tongue is not bitten, neither is the urine passed. Nausea or vomiting may be present. The attack lasts from a few seconds to a few minutes, and is followed by lassitude and headache. A history of earlier attacks is common; these are associated usually with emotion (sight of blood, etc.), long standing at attention or the cessation of sudden effort; they do not occur in recumbency. Recovery is always complete, and an attack should not break the routine of drill for more than forty-eight hours. Attacks which are inconsistent with this picture are to be viewed with suspicion unless they may be ascribed to epilepsy.

A complaint of *fatigue* or *exhaustion* is rarely unaccompanied by other complaints, and may be disregarded unless often repeated and accompanied by signs, such as pallor, or by uncontrollable tremor of lips or limbs, or by signs of breathlessness, as the grade of exercise is raised. Stiffness of the limbs or trunk muscles, accompanied by tenderness, is experienced by some unpromising cases to an unusual degree as an after-effect of short exercise. Pain in the axillary region, back, or limbs is usually related to a particular action during drill, and as a general rule does not endure.

Simulation.

If it were wise it would be impossible to hide the meaning of the exercises or their use for sorting purposes from the patients, and they come to understand the significance of any deliberate special examination. We believe that complaints of distress, where absolutely no distress exists, are on the whole rare. Such complaints do not deceive; the manner of their presentation awakens doubt; they are unaccompanied by objective signs or the signs are incompatible with the complaint.

The over-emphasis of symptoms actually experienced is somewhat more difficult to recognize and is undoubtedly common; it is recognized by the same careful comparison of the objective and subjective. Medical officers will be well advised to guard against wilful efforts to produce or to exaggerate signs of distress. A man returning from exercise to the medical officer's room will from time to

*The test exercise is employed in all patients on admission as part of the routine examination, and consists of walking briskly up forty steps. The pulse-rate is taken before, immediately after, and two minutes after this test. As an alternative test, we have suggested hopping twenty times on each foot, raising the shoulders approximately nine inches at each hop. In health the pulse will rise to 110 or 120 per minute, but will fall to normal usually within one minute.

time sprint on the flat, dash upstairs, or perform vigorous exercises before opening the door and presenting his wrist for examination. But such attempts are not easy to maintain, and repetition is essential to their success. The man must repeatedly risk detection by a member of the staff, or, maybe, fails to find his opportunity; in the last case his observed reaction is out of harmony with former reactions. The genuineness of a sudden increase in the reaction to exercise is to be tested by visiting the man while he is at drill, or by imposing simple exercise tests in the examination room or ward. The constant supervision of drill by medical officers has been abandoned as both unnecessary and inexpedient; the men work better and more uniformly when left to the drill instructor. No doubt the voluntary production of distress is overlooked from time to time in individual cases, but it cannot long be concealed from the man's comrades, and many of these at once resent the deception. If less gross, the deception may be contagious, and comes to be practised by small groups of men; its early discovery is from that time certain. When discovered, it is met at once by placing the man upon a higher grade of drill without comment.

The other and brighter side of the picture is the man or men who steadily refuse to complain; these tax the medical officer's power of discrimination most of all. Medical officers who get to know their men, who can win their confidence, who treat them tactfully and fairly, experience little difficulty. By far the larger part of our patients desire only full examination and consideration, and recognize the justice of the final decision, understanding for themselves that they are judged for grade of service according to their proved tolerance for work.

REFERENCES.

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NOTES ON RHEUMATOID ARTHRITIS.*

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I FIRST had the opportunity of making a special study of rheumatoid arthritis and allied conditions when working at Buxton several years ago. Much has recently been done in investigating its nature, and means for its relief or cure. It is in reference to these sides, and to the differential diagnosis, rather than to the clinical types, that I wish now to allude.

Rheumatoid arthritis has been defined as a progressive degeneration of joints of a special kind, accompanied by atrophy of some structures and hypertrophy of others, but it is really no more than a name given to a number of conditions the exact cause of which is unknown. It is probable that there is more than one disease to account for the different types. The course is variable, but is usually towards irrevocable damage to structures involved. It is a disease of great antiquity, and although it has long received much attention, there is perhaps no other disease in which such confusion exists as to its pathology and place in medicine.

During the last few years bacteriological researches have to a great extent modified former ideas and given light from a new direction. Joints have been aspirated and the fluids so obtained examined microscopically and by cultivation, and it is stated by some observers that a specific organism has been isolated.

Crowe considers that in the majority of cases one particular organism, which he calls the *Staphylococcus deformans*, is concerned; he states that he is able to cultivate it from the urine in about 90 per cent. of all cases of the disease, and that the same organism is recoverable from the urine in many cases of obscure neuritic trouble; he holds that there is a close connexion between neuritis and acute rheumatoid arthritis. Fuller believes that many cases are due to a streptococcus, and that in a very large number of male cases this streptococcus is derived from post-gonorrhoeal infection of the

*An extract from the Presidential Address on "Some of the affections connected with the war ('shell shock,' 'trench fever,' and 'rheumatoid arthritis')." delivered before the Gloucestershire Branch of the British Medical Association at Cheltenham.

genito-urinary tract; he has operated upon a great many cases of chronic arthritis deformans by opening up and draining the infected seminal vesicles, and although improvement after the operation may be delayed for several months, he says that the ultimate benefit has been, without exception, considerable. Symes considers that it is a disease derived from an intestinal cause, an auto-intoxication of unknown origin.

The general idea seems to be that several micro-organisms have the power of producing the characteristics of the disease; it is extremely probable that in many cases rheumatoid arthritis is an infective disease, and that it is due to micro-organisms settling in the joints or dwelling elsewhere, and elaborating toxins, which cause a progressive inflammatory condition.

Owing to the symmetrical nature of the affection, it was at one time believed to be of nervous origin, and it is likely that some cases are so.

DIAGNOSIS.

The affections for which this disease is most liable to be mistaken are rheumatism, gout, and sciatica. It is in the early and slowly progressive chronic cases in which there is not any very marked enlargement of bone apparent, and in subacute attacks, that the chief difficulty arises in distinguishing rheumatoid arthritis from rheumatism. The points which may serve as a guide to diagnosis are:

1. From Rheumatism.

(a) In the chronic form, invasion of the small joints first (notably the proximal phalangeal joints of the first and second fingers and the metacarpo-phalangeal joint of the first finger and thumb), fusiform swelling, symmetry of the affection, prevalence in women, affections of the temporo-maxillary articulation and those of the cervical spine, pain along the clavicle, crepitation or grating felt in the joints on movement, muscular atrophy (especially interossei), clamminess of extremities, tendency to spread from small to large joints, anaemia always present, family history of phthisis. Sometimes the first indications to the patient are numbness and tingling in the limbs.

(b) In subacute attacks it may be for the first few days impossible to decide. The small joints are attacked first, without any tendency to rapid migration; the swelling is circumscribed; the symptoms persist, although under treatment; there is little tendency to high temperature curve; there is very little (if any) tendency to endocarditis and pericarditis. Garrod went so far as to consider the absence of cardiac inflammation as one of the most important diagnostic features of rheumatoid arthritis, and said he had never traced either endocarditis or pericarditis in this disease.

2. From Acute Gout.

In gout there is a tendency to commence by sudden pain and swelling, especially of the great toes, with oedema and redness. Rheumatoid arthritis has an insidious onset; it is more common among the poor and ill nourished. Gout is comparatively rare in women: it may be more difficult

to distinguish from chronic gout, but the history will help. The deformities of chronic gout may resemble to some extent those of advanced rheumatoid arthritis, but in gout definite attacks occur from time to time, and usually deposits of sodium urate will be found near the articulation or in other parts, such as the ears or hands. It occurs more frequently in men, and there is little or no tendency to emaciation. In rheumatoid arthritis the temporo-maxillary joint is often affected, and also the joints of the cervical vertebrae, as evidenced by pain and stiffness, and there is symmetrical involvement of the small joints of the hand. In gout these conditions are not present. It is of great importance to distinguish between the two conditions because the treatment is essentially different. A case of rheumatoid arthritis must not be subjected to a régime so necessary in certain forms of gout. There are some cases in which, I believe, the diseases coexist.

3. From Sciatica.

Where the hip-joint alone is affected there is often a resemblance in the symptoms to those of sciatica. A diagnosis can usually be made by careful examination of the part. In rheumatoid arthritis the affected leg cannot be crossed over the other without causing great pain. If the foot is jarred pain is felt in the joint. There may be considerable thickening, due to bony outgrowths, and grating may be felt on rotation. The general pain is referred more to the joint than to the region of the sciatic nerve and down the limb. Charcot's joint disease is thought by some to have the same pathology as rheumatoid arthritis, the suggestion being that the affection is rheumatoid arthritis occurring in a patient debilitated by the cord disease. There is in Charcot's disease no pain in the joint, although there is so much degenerative change that the functions are in abeyance. Monarticular rheumatoid arthritis, usually in one of the larger joints, may simulate a tuberculous affection, and the distinction is at times extremely difficult. The vertebral column is sometimes involved to such a degree that the pain and rigidity may lead to the belief that spinal caries is present, and great care is needed in distinguishing these affections.

Still's disease in children, which occurs mostly in young girls, closely resembles rheumatoid arthritis, and is, possibly, a modified form of the disease; its nature is uncertain. It differs from rheumatoid arthritis, however, in that the spleen is enlarged and also the liver. The lymphatic glands are increased in size, at first near the joints, and later throughout the body. There is defective development, the eyes may be prominent. It is usually a fatal disease, although it may last for years.

TREATMENT.

Although rheumatoid arthritis is a progressive disease, and by some considered incurable, much can be done in the early stages to arrest, and in the more advanced cases

FIG. 1.—Acute case in a boy aged 14. During the first two weeks of treatment the temperature in the evening was usually between 101° and 103°, with morning falls to normal. All the joints more or less affected, and muscular wasting pronounced.

FIG. 2.—Subacute case: boy aged 8. Seven and a half months' duration.

to relieve. It is a disease which seems to attack a constitution debilitated from some cause, and it is of great importance, therefore, to refrain from any kind of lowering treatment, either in the acute or chronic forms. In acute and subacute cases the patient should be in bed, and an endeavour made to relieve pain by soothing applications, such as lint wrung out of lead and opium lotion. The joints should be kept at rest while acute symptoms last, but as soon as they subside gentle movement should be begun, as there is great tendency in this affection for the joints to become stiff. Splints, if used, should not be kept on continuously. The pain may sometimes be lessened by painting the joints with guaiacol and tincture of iodine in the proportion of 1 of guaiacol to 6 of iodine. Mesotan with olive oil, or a 25 to 50 per cent. ointment with lano-

the swelling. Sometimes extension with weights is soothing and helps to counteract the tendency to flexion so often present; it is specially useful when the pain is severe, as is often the case in the knees, apparently from rubbing of the ulcerated cartilages one upon another; the weights should not be heavy and should be applied continuously. Fingers which are becoming flexed can be rendered considerably straighter by a suitable splint on the palmar aspect; this should be applied at night and taken off in the morning, so that the fingers may be moved during the day. Patients should be told to use their joints as much as they can short of giving rise to pain afterwards, also to take exercise in the open air. If the affection is in the joints of the lower limbs, walking is rendered less painful and difficult by the use

FIG. 3.—Chronic case; male. Dislocation, pigmentation, wasting, and deposits.

FIG. 4.—Chronic case; female, aged 45. Marked ulnar deviation, dislocation at metacarpophalangeal joints. Twenty-five years' duration.

FIG. 5.—Chronic case; male, aged 19. Seven years' duration.

line, may be used. Methyl salicylate with three parts of olive oil, or with six parts of tincture of iodine, may be thickly painted over the painful articulation, which should then be covered with lint and oilsilk and lightly bandaged. I have known an icebag give relief when other methods had failed. In chronic cases there is, perhaps, no more generally useful application to affected joints than blisters, which seldom fail to relieve pain and stiffness so often complained of, and in no joint more successfully than the temporo-maxillary; they should be small, and may be repeated. Sometimes bathing with hot water does good. Middleton advocates the use of continuous counter irritation over the spinal cord, even in the most advanced cases where all treatment may appear to be hopeless, believing that nervous changes are an important factor. The principal methods he uses are (1) blisters followed by savin ointment; (2) acupuncture with counter-irritant drugs such as cantharides, croton oil, or oil of mustard; and (3) the galvano-cautery. When joints are more stiff than painful olive oil may be used for rubbing instead of liniments, especially in children, where weakness of joints is a symptom; or if there are soft swellings, adhesive strapping gives support and comfort and tends to reduce

of an apparatus so constructed with adjustable crutches on wheels that part of the weight of the patient can be transferred from the lower limbs to the axillae and arms. Adhesions are occasionally broken down under an anaesthetic, but the results I have seen have not been

encouraging as most of the joints again became stiff (possibly in some cases owing to neglect by the patients themselves in after-treatment).

Excision, scraping of joint tissues, or merely washing out the joint, in the acute stages, have been tried with a view to arrest the spread of the disease; it is stated that by the removal of the diseased cartilage and synovial membrane of one joint, not only is that joint improved (if not cured) but the other affected joints are also improved.

Diet.

In acute cases the diet should be light, easily assimilated, and nourishing—milk, raw meat juice, broth, eggs, etc.—

and increased to more solid food as the febrile symptoms subside; stimulants may be required. Chronic cases should not be on low diet; this, like phthisis, is a disease in which good feeding is essential. Attempts have been made to discover whether the nature of the food has any bearing upon the severity of the joint symptoms.

FIG. 6.—Chronic case; female, aged 49. Interosseal much wasted, and knuckles thickened. Five years' duration.

The conclusion is that diet has little relationship to the disease; no advantage is to be gained by excluding red meats from the diet; fruits and salads may be taken. Meals should be arranged at regular intervals and should be varied. No hard and fast rule can be laid down, and probably the most generally successful diet is a mixed one. Fats are needed, cod-liver oil, and also milk and cream.

Woollen clothes should be worn at all seasons of the year, and any exposure to cold and wet avoided; the most suitable climate is one which is dry, warm, equable, and sunny. Residence at the seaside is not generally recommended and sometimes seems to aggravate the symptoms of the disease.

Drugs.

In febrile cases antiseptics are indicated, as also in many chronic cases. Guaiacol, creosote, quinine, salol, or salicylates, should be given; they often relieve pain. Sodium salicylate is of most use when there is a history of rheumatism, and if combined with twice as much bicarbonate can be given freely. Aspirin and phenacetin often relieve the pain. Anaemia is always a symptom of the disease and requires treatment. Iron and arsenic are probably the most useful of all drugs for improving the general health. They are best given in combination; the syrup of the iodide of iron is one of the most suitable forms. Potassium iodide is often given for pain at night. For cramps, hyoscyamus or cimicifuga is worth trying. Morphine and opium should be avoided if possible. I have not found it necessary to prescribe either, and their routine use is to be deprecated.

Constipation, which is common, and other digestive troubles require attention. Sulphocarbolate of soda and the antiseptics already mentioned are serviceable. If the stomach is dilated it should be washed out. It is important to remedy any oral sepsis; the teeth must be attended to, but I strongly deprecate indiscriminate extraction. Antiseptic washes should be used freely. Paraldehyde, phenacetin, and bromide may be given for sleeplessness. Where gout is present colchicum and alkalis should be prescribed; an alkaline mixture of quinine is also of service.

The chief advantages claimed for treatment by passive congestion appear to be relief of pain, which is often very marked, and the prevention of stiffness. Pain gives rise to muscular spasm, and this causes stiffness. The relief of the pain by congestion enables the joint to be moved, and this counteracts the tendency to the formation of adhesions. It is also said to promote the resolution of thickening in joints and tendons.

Massage is of value for the relief of pain and in keeping up the nutrition of muscles; it also relieves or prevents stiffness and fixation of joints.

Electricity, in the chronic conditions where there is atrophy and debility and the disease is not in an active state, in the form of a weak continuous current, may be of service. I have used galvanism with some benefit to nutrition and lessening of pain. Electric baths are also useful in certain stages.

Heat almost always relieves pain, and the most efficacious form appears to be the dry radiant heat; the diaphoretic effects of the combination are greatly superior to those of the same degree of non-luminous heat, and the body can bear with this form much higher temperatures than by any other application; a whole body bath can be used at a temperature as high as 300° or 400° F.; with a local bath it may be raised to 500° F. Besides relief to pain, other important changes are effected. Free perspiration is induced over the whole body even although the rays are applied locally, local arterial pressure is diminished, and metabolic processes are increased. Light has the effect of tending to increase the haemoglobin and in this way the anaemia is benefited; the appetite is also improved. The effects of the baths are enhanced if they are followed by massage and the free use of iodex or some other ointment or application of the same kind; adhesions and muscular contractions around joints are softened and relaxed and can be more easily broken down, and in this way some of the most chronic forms can be relieved.

Vaccines have been used, and acute infective cases have been treated by hypodermic injections of antistreptococcic serum. Crowe has found much benefit from the use of vaccine prepared from the *Staphylococcus deformans* in acute rheumatoid arthritis, and in obscure neuritis where

the micro-organism has been shown to be present in the patient's urine. It is at times very difficult to distinguish true rheumatoid arthritis from septic arthritis (gonorrhoea, pyorrhoea, etc.).

If a local suppurative active centre, such as endometritis, erosion of cervix, or possibly a similar condition in the nose or mouth, be present, a culture should be made and a vaccine given. Stock so-called rheumatic vaccines should be avoided.

Wallace and Child advocate the use of an extract of the pituitary body of the ox, prepared in a particular way; 1 c.cm. is given by intramuscular injection, generally every other day. The reports were that the patients so treated were practically crippled before the treatment was begun, all put on weight, the swellings around the joints disappeared, and they could be moved without pain after two or three months of treatment. Roberts also is in favour of the use of glandular extracts in chronic cases, whatever other treatment may be adopted at the same time; he uses, in particular, the thyroid, thymus, and pituitary. The thymus, it is said, acts very slowly, and should be continued for six months before it is given up; it is unsuitable if there has been a rapid increase of weight, because it sometimes stimulates nutrition to an unusual extent.

Baths have long been held in repute; they are chiefly indicated when the disease is in an early stage and the patient in fair general health; they are not advisable in the old or debilitated. The chemical properties of the water used is not a matter of vital importance, the chief point is the mode of application. The objects aimed at are: decrease of pain and stiffness in the joints, a general improvement in the patient's strength and nutrition, increased elimination by the skin, and absorption of the swelling around the joints. My experience convinces me that bathing, with its accompaniments, is a form of treatment which in suitable cases is of the utmost value, and there is not a doubt that, even in some of the most chronic and advanced cases, great relief or permanent benefit is a frequent result. The good effect is greatly enhanced by the internal administration of a mineral water properly prescribed, and although the use of any pure water may be of advantage, it is well known that if a water prepared according to the formula made out from the analysis of a mineral water be drunk, the effects are not at all the same as those obtained by drinking the original water in its natural state.

The advantages of a course at a mineral water spa do not consist only in the special medicinal virtues of the waters used but in the fact that the treatment is carried out with care and skill. The change of air, the modification of diet, and freedom from home cares and worries, are all important adjuncts, and patients should be recommended to visit year after year some health resort where such a régime can be provided. We have in Cheltenham the facilities necessary to carry out such treatment. Especially are we well off in regard to the mineral waters for internal administration, which have been shown by analysis to be superior to most and surpassed by none of their kind at any health resort either in England or abroad. Now is the time, when the foreign spas which have hitherto been so greatly in demand are closed, to make known in every legitimate way the many special advantages offered by our own town.

A great deal has already been accomplished, and efforts are still being made, to advertise the place and render it attractive and wholly efficient for the comfort and entertainment of patients and visitors. Much depends on the medical profession generally to help the undertaking by sending patients here to drink the waters and to undergo the usual courses of treatment which are expected at a spa, and which they can obtain in Cheltenham quite as well as they can at some of the health resorts which are much farther away.

THE Carnegie Foundation has given £200,000 to McGill University, Montreal, in recognition of that institution's "devoted service and sacrifice towards Canada's part in the war." The gift is intended as an expression of the appreciation and sympathy with the people of the Dominion felt by their allies in the United States. A part of the work which has earned this tribute is the maintenance of a general hospital in France with more than 2,000 beds.