

## Reports of Societies.

### THE ANTITOXIN TREATMENT OF SCARLET FEVER.

At a joint meeting of the Section for the Study of Disease in Children and the Section of Medicine of the Royal Society of Medicine on February 25th, with Dr. J. D. ROLLESTON (President of the former Section) in the chair, a discussion was held on the antitoxin treatment of scarlet fever.

Dr. F. W. GOODALL, opening the discussion, did not claim to speak authoritatively, but would assume that the haemolytic streptococcus described by the Dicks was the cause of scarlet fever. Clinicians were not so favourably placed with regard to the antitoxin for scarlet fever as were those who had been called upon to express an opinion on antidiphtherial serum thirty-two years previously, for the type of scarlet fever was very mild at the present day, and the case mortality rate had not been above 2 per cent. in London since 1910. There was not much scope for the saving of life by anti-scarlet fever serum, and in addition the septic complications of scarlet fever removed it at once from the pure toxæmias, such as diphtheria. Dr. Goodall said it was difficult to ascertain if antitoxin treatment caused any improvement in case mortality rates even in parts of the world with high rates. In Montreal, for example, a rate of 5 per cent. became lowered to 3.2 per cent. Then convalescent serum was used, and the rate was 2 per cent., and finally, with the introduction of antitoxin, it had become 1.2 per cent. Mostly, however, the efficacy of scarlet fever antitoxin was judged on other grounds. It was found to produce a rapid fall in temperature, disappearance of delirium, fading of rash, and more rapid improvement in the general condition of the patient. Just occasionally cases did not respond. The earlier the serum was given the better the results, and if not employed until the fifth day or later favourable effects were not obtained. Dr. Goodall then dealt with 56 cases in which he had personally employed antitoxin. He pointed out that he had selected his cases, the more severe types receiving serum, and that the number was too small for definite conclusions to be drawn. Four patients died: one from bronchitis, one from septic complications, one from endocarditis, and one from pyæmia occurring in the puerperium. In 35 cases considerable improvement resulted in a couple of days; the bulk of these patients had received antitoxin on the first or second day of the attack. Dr. Goodall had come to the conclusion that a *prima facie* case had been made out for the efficacy of the serum, and that better results were obtained the earlier it was given. The good results obtained with multivalent antistreptococcal serum in the past were probably due to the fact that such serum contained antitoxin from the scarlet fever organism. With regard to dosage, methods of standardization were uncertain. He usually gave about 50 c.cm. of unconcentrated serum, preferably intramuscularly in one dose. He had had 24 cases of serum sickness in his series.

Dr. R. A. O'BRIEN mentioned reports by fever hospital medical officers outside London. Concentrated serum in doses of 10 to 20 c.cm. had been stated to have a definite beneficial effect in the mild and moderate cases of scarlet fever, but did not seem to touch the septic type of the disease. Serum treatment was thought to be well worth while, and seemed to have an indirect effect on the septic element of the disease, reducing complications. Dr. Rundle of Liverpool had reported the use of serum in 100 toxic cases in which the patients would probably have succumbed without it. Five deaths occurred, all in a group of twenty-five of the septic type. Dr. O'Brien then described five methods of standardization. In the first toxin and antitoxin were mixed until no reaction was obtained in a Dick-positive subject; there was too wide a margin of error in this method. A second method involved the use of goats, but had not received much attention. The third method was to test the amount of antiserum required to blanch the rash of scarlet fever. The fourth method involved determining the quantity of serum necessary to

turn a "Dick-positive" person into a "Dick-negative," and keep him so. The fifth method was the outcome of recent work by Parish and Okell, who found that a culture of the scarlet fever streptococcus injected into rabbits killed them in two to three days. Concentrated anti-scarlet fever serum protected these rabbits, and the action was probably specific, although polyvalent antistreptococcal serum protected in 50 per cent. of cases, probably owing to the amount of anti-scarlet fever serum it contained. Dr. O'Brien discussed the polyvalent serum, which many years ago gave good results in scarlet fever cases, and then appeared later on not to be so efficacious. This he believed was due to the fact that whole-broth cultures were at first used for injecting horses, while later washed cultures of streptococci grown on solid media were employed. The broth in the early cases would contain scarlet fever toxin. Lastly, Dr. O'Brien mentioned the close relation of all the haemolytic streptococci to each other. The toxins of the streptococcus responsible for tonsillitis, for puerperal sepsis, and for erysipelas would kill rabbits, but these could be protected by scarlet fever antiserum in percentages far outside any chance result. It was therefore to be hoped that other forms of streptococcal infection might be combated by scarlet fever antitoxin.

Dr. F. FOORD CAIGER said that with the low case mortality of scarlet fever at the present day there could not be much indication of saving of life. He referred to attempts made in the past by pathologists to produce a serum against scarlet fever, and thought that the results of the present day did not greatly exceed the success of the older workers. In particular some work in Warsaw in 1894 with multivalent serum was worth remembering, and it closely anticipated more modern researches. Dr. Caiger inquired if in septic cases there was no other organism responsible; he thought that it was not the Dick streptococcus which was found in the circulation in these cases. It would probably be wise to use multivalent serum in addition in these septic cases. Dr. Caiger finally referred to some serum supplied to him by Besredka thirty-two years previously, which he had used in cases of scarlet fever which he thought would prove fatal. In 44 such cases the mortality was 36 per cent., and he was convinced that the serum was valuable if used early.

The PRESIDENT emphasized the fact that scarlet fever had become progressively milder in type in this country of recent years. He referred to certain figures published in the *Bulletin Internationale d'Hygiène Publique*, which showed that scarlet fever still had a high mortality rate in south-eastern Europe. He agreed that antitoxin should not be given to mild cases, for in addition to the question of expense there was the danger of serum sickness and of a troublesome hypersensitiveness. He had used the serum in a few cases in doses of 10 to 30 or 40 c.cm. He thought that even if serum was used cases could not be discharged earlier without a bacteriological examination of the throat, since some observers had said that the organism persisted for even six weeks.

Sir FREDERICK ANDREWES had been much interested in the "overlap" of antitoxic serum prepared against scarlet fever and other streptococcal infections. It raised the question as to whether there really existed a sharply defined disease which was called scarlet fever. Cases occurring after burns and after operations aroused the gravest doubts as to where streptococcal infection began and scarlet fever left off. The bacteriological evidence presented similar difficulties, since there appeared, from serological evidence in this country, to be three varieties of streptococci found in the throats of scarlet fever patients. It was probable that different races of streptococci produced the same common toxin, as occurred in the case of the tetanus and diphtheria organisms.

Dr. A. JOE compared his experience in Edinburgh and in London, emphasizing the mild nature of the disease in the south. He had not seen one septic case in five months in London, and, on the other hand, serum sickness had been much more troublesome. He referred to the use of the older multivalent serums, and pointed out that blanching of the rash in scarlet fever had been obtained with such serums in pre-Dick days. He agreed as to the "overlapping" of the streptococcal serums.

Dr. J. McCARTNEY mentioned the difficulties associated with examining throats for organisms before discharge of scarlet fever patients. He also had observed the "overlapping" of the streptococci. He thought that much could be learnt by studying the organisms responsible for the cases in which anti-scarlet fever serum failed to produce any effect.

Dr. E. J. PARISH referred to his experiments with rabbits injected with scarlet fever toxin intravenously. Toxins from the organisms causing erysipelas and puerperal fever had not given such satisfactory results. After neutralization of the scarlet fever toxin by injections of antiserum the rabbits nearly all developed joint lesions with pus formation later. Haemolytic streptococci were obtained from this pus. In the rabbits injected with puerperal toxin joint lesions occurred earlier.

#### TREATMENT OF CANCER OF THE BLADDER.

A MEETING of the Urological Section of the Royal Society of Medicine was held on February 24th, with the President, Mr. W. GIRLING BALL, in the chair; Mr. HENRY WADE (Edinburgh) read a paper on the treatment of malignant disease of the bladder.

Mr. Wade, in a preliminary survey of the surgical treatment of carcinoma elsewhere in the body, deduced certain principles which he considered should be applied to the treatment of malignant disease occurring in the bladder. He deplored the failure of radium and deep x-ray therapy, and insisted that at present the only rational line of attack was by means of the knife. The ideal was excision of the growth with as much of the surrounding tissue as possible. It was not always possible to estimate with any degree of accuracy the size and extent of the growth during the preliminary examination of the patient. Frequently when a bladder was opened carcinoma was found to extend further than had been suspected by cystoscopic examination. Moreover, histological examination of excised papillomata often showed that what had appeared clinically to be an innocent growth contained an area of malignancy at its base. This did not, however, necessarily mean that treatment of such papillomata by diathermy would fail. The lesson to be drawn from the observation was rather that in dealing with papillomata, whether by diathermy or by excision, the treatment must be exceedingly thorough if recurrence was to be avoided. Mr. Jocelyn Swann had shown in his presidential address to the Section that no sharp line could be drawn between non-malignant and malignant growths of the bladder, and for this reason innocent growths should be treated by free excision where possible, as though they contained elements of malignancy. In this procedure resection of the ureter was a common necessity and presented no particular difficulties. It was indeed surprising how rapidly a mutilated bladder recovered, and how soon the remaining portion compensated for what had been lost. A more difficult question to decide was the treatment of malignant disease of the bladder of such an extent that removal required the transplantation of both ureters. Many surgeons thought that total cystectomy was unjustifiable; he, however, believed that this operation had a very definite place in genito-urinary surgery. Before removing the bladder it was necessary to make provision for removing the urine by transplantation of the ureters, either into the bowel or to the surface. Work at the Mayo Clinic had shown that if both ureters were transplanted into the bowel at the same operation there was some danger of suppression of urine caused by post-operative oedema at the site of operation. It was seldom possible, however, in the case of malignant disease of the bladder to carry out transplantation in two stages, since the patient was in a precarious condition and time an all-important consideration. In his own cases Mr. Wade had brought the ureters to the surface of the abdomen and had relied on various mechanical devices for keeping the patient dry. In achieving this the chief difficulty arose from the fact that an appliance which kept the patients dry when standing generally failed when the patient assumed a sitting or recumbent posture. Much ingenuity had been exercised in attempting to overcome

this difficulty, but the ideal method of collecting urine from a ureter implanted on the surface of the body had yet to be found. The operation of total cystectomy presented very few technical difficulties once the ureters had been satisfactorily transplanted. In the four cases in which he had employed it he had removed the prostate and vesicles as well as the whole of the bladder, since he had found that it was easier to include these structures than to leave them behind. Moreover, it not infrequently happened that growths in the bladder extended into the prostate. Of the four patients treated by total cystectomy two were still alive, and two had lived for a period of two years. Even though the operation had not been curative in these two patients their end had been far more comfortable than if no operation had been performed. For this reason he believed that total cystectomy was justified even when the extent of the growth was such that a complete cure was unlikely or impossible. In conclusion, Mr. Wade said that he was aware that he might be accused of holding heroic views on the subject of total cystectomy when he urged that it should be employed, not only in cases in which there was a reasonable hope of extirpating the growth, but also in those in which this was clearly impossible. No one, however, could view the sufferings of a patient dying from malignant disease of the bladder and the failure of all palliative measures to mitigate these without being prepared to go to any length in his attempt to find a remedy. The technique of total cystectomy was capable of great improvement, and he could foresee the time when with improved methods surgeons would carry out total removal of the bladder as a routine measure. He could even imagine the operation being resorted to either as a palliative proceeding in inoperable cases or as a measure of security in those cases which at present were dealt with by subtotal excision.

In the ensuing discussion the following took part: Mr. GIRLING BALL, Mr. SWIFT JOLY, Mr. KENNETH WALKER, Mr. CYRIL NITCH, Mr. MORSON, Mr. MACALPINE, Mr. FOWLER WARD, and Mr. R. OGIER WARD.

#### ORAL SEPSIS AND SKIN DISEASE.

At a meeting of the Section of Odontology of the Royal Society of Medicine on February 28th, Dr. H. W. BARBER read a paper on the relationship of dental infection to diseases of the skin, discussing the subject under two heads: (1) the coincident surface infection of the skin and of the oral and naso-pharyngeal mucous membranes, and (2) the secondary effects of such infection upon other organs of the body—that is, focal sepsis and its results.

Both the skin and the oral mucous membrane had, he said, what might be regarded as a natural flora of microbial organisms, but in health the various species of organisms occurred as isolated units, not in a state of active growth; they were, therefore, saprophytic, not parasitic. Under certain conditions they took on active growth, invaded the tissues of the host, thus becoming parasitic, and (to a varying degree, according to the species) pathogenic. In the skin the common organisms were the "bottle-bacillus" (probably a yeast), which grew in the horny layer, producing dandruff; the acne bacillus, which flourished in the pilosebaceous follicles; and staphylococci, particularly *Staphylococcus albus*. In the oral mucous membranes the most important were various strains of streptococcus. Dr. Barber suggested that the underlying conditions which favoured the active growth of these different species of organisms in the skin and mouth were metabolic or biochemical in origin. As regards the skin, seborrhoea—or rather the seborrhoeic state, of which seborrhoea was one of the manifestations—predisposed to the active growth of these three types of organisms. This state was an index of faulty metabolism, apparently associated with the excessive formation and inadequate excretion of acids of the fatty-acid series. It was presumably the excretion of these acids through the sebaceous and sweat glands, and probably through the skin as a whole, that favoured the active growth of organisms which were either not present, or existed as isolated units only on normal skin. The chief etiological factors considered to be responsible for the seborrhoeic state were: (a) heredity, (b) diet, (c) faulty

hygiene—for example, insufficient muscular exercise, lack of fresh air, excessive clothing, insufficient fluid intake—(d) the stresses of sexual evolution. Of these the most important were (b) and (c), particularly a want of correlation between diet and physical exercise. Excessive intake of carbohydrate, especially of soft fermentable starchy foods and concentrated sweetstuffs, and, to a less extent, of fats, was the chief dietetic error responsible, combined with an insufficient intake of fresh vegetables and fruit. The same dietetic faults were also held largely responsible for the active growth of micro-organisms in the mucous membranes of the mouth and naso-pharynx, and the invasion of the tissues by them, and clinically a liability to seborrhoeic infections of the skin was found to be associated with a similar low resistance to infection of these mucous membranes, resulting in dental caries, gingivitis, pyorrhoea, and naso-pharyngeal catarrh. Dr. Barber therefore suggested that measures ought to be taken, in the interests of national health, to reverse the present economic policy as regards foodstuffs, which, on the whole, rendered the most harmful articles of diet the cheapest, whereas fresh fruit and green vegetables were relatively among the dearest.

Once active microbial invasion of the tissues had taken place there resulted, not only the local, but also the remote, effects of such invasion, owing to the absorption of toxins or the escape of micro-organisms into the lymphatics and blood stream. The most important pathogenic organisms concerned in so-called focal infection or sepsis and its secondary complications belonged to the streptococcal group. With regard to oral sepsis, the effects of gingivitis, pyorrhoea alveolaris, and apical infection had to be considered. Of these probably the last was the most potent as a cause of systemic disease. The diseases of the skin which might be caused directly or indirectly by oral sepsis could be classified as follows:

1. Diseases due to direct spread of infection from the oral mucous membrane to the skin—for example, impetigo contagiosa, streptococcal fissure, perlèche, and relapsing streptococcal lymphangitis.
2. Diseases in which oral sepsis by its effect on the digestive processes, by setting up an infective gastritis and by causing a secondary infection of the intestinal tract with acid-producing organisms (such as streptococci), thus favouring fermentation, might play a causative part—for example, rosacea.
3. Diseases in which the presence of an infective focus in the mouth lowered the resistance of the patient to pyogenic infection of the skin—for example, boils.
4. Diseases in which the epidermis became sensitized to toxins absorbed from the mouth and teeth—for example, eczema.
5. Diseases which might be regarded as true anaphylactic reactions due to systemic sensitization to bacterial protein—for example, urticaria, angio-neurotic oedema, certain mixed erythematous-urticarial eruptions.
6. Diseases in which the toxins from an infective focus acted on the nervous or endocrine-sympathetic systems, the changes in the skin being secondary to such involvement—for example, herpes zoster, alopecia areata, vitiligo, scleroderma, Raynaud's disease, and some forms of prurigo.
7. Diseases due to inflammatory reactions produced in the skin as the result of bacterial embolism in the dermic or subcutaneous vessels, or by the action of bacterial toxins carried to the skin in the blood stream—for example, erythema multiforme, erythema nodosum, lupus erythematosus.

Professor J. W. EYRE said that seeing, as he did, the results of treatment instituted by Dr. Barber, where so much of the primary sensitization had been due to some bacterial source, he had been impressed by the close association between sepsis in the mouth and these skin lesions. Dr. Barber did not speak of sepsis attacking a live tooth and being a cause of skin disease; it was a kind of superstition that living teeth could not have apical suppuration associated with them, but many of the cases they had seen together showed this to be a fallacy. In most instances of skin affections the bacterial side could be divided into one of two groups: the patient had either oral sepsis or intestinal sepsis, and the latter might be secondary to the former. Thus the conclusion was enforced that the dental surgeon played the biggest part in preserving the nation as a whole from skin diseases. He agreed with practically all Dr. Barber said.

Mr. A. T. PITTS suggested that there was considerable doubt about the apical lesions of which Dr. Barber spoke so certainly; the dental profession was still much in the dark as to their nature. The  $x$  rays had shown that areas of apical rarefaction were very common, and it was usual for medical men to refer to them as abscesses. He asked whether it was safe to assume that all these apical conditions were such pathological constants as they were assumed to be. Sometimes the same appearances were observed in connexion with living teeth, but radiological technique might be defective. In some of those cases abscesses were found, in others masses of granulation. The granuloma might not be so much an evidence of infection as something in the nature of quarantine, thrown up by the body as a defence against infection in the tooth.

Mr. J. G. TURNER asked whether it was contended that a healthy person did not suffer from skin disease. He did not see the force of associating seborrhoea with dental disease, seeing that the latter might start in earliest childhood. The question of dental disease in Britain seemed to be summed up in the fact that we ate bread. With regard to the question of calcium deficiency, most people who were supposed to have this deficiency had an ample quantity of tartar on their teeth. Decomposing food was always to be found in close association with ordinary teeth, and this decomposing product must either be swallowed or absorbed, and so was a possible source of detriment to health. He also asked what was the value of reflex irritation as a cause of skin manifestation.

Dr. E. W. FISH said one would imagine that sensitization of the skin would take place as easily from a carious tooth as from an apical abscess. He saw no reason why the toxins from a carious cavity should not be absorbed by the lymph stream from the dentine of a tooth which was normal except for the caries. He would be interested in a further exploration of the association of dental caries with skin diseases. In both apical abscesses and dental caries it was a question of ulceration of epidermal tissues, and when the ultimate pathology of skin disease and that of dental caries had been fully worked out it was likely there would prove to be many points of similarity. At present there was somewhat of an obsession that the causation of dental caries was purely saprophytic.

Mr. F. N. DOUBLEDAY spoke of the possibility of the bone being a source of skin and other troubles in patients who were edentulous. Sometimes if bone was cut down upon in the areas which  $x$  rays showed were rarefied it would yield a pure growth of streptococcus.

Mr. W. A. BULLEID said he had seen many of the patients referred to in Dr. Barber's paper, and he was able to speak of the remarkable results which had ensued from a combination of the efforts of the dental surgeon, the dermatologist, and the bacteriologist. The most satisfactory results seemed to have been achieved in cases in which the infection was of the closed type, rather than the open. Usually one was quite safe in condemning apical sepsis as being responsible for some systemic disturbance in the patient. He mentioned a remarkable case of urticaria of ten years' standing, the patient being a woman 45 years of age, with, in addition, hypertrophic gingivitis. A pure culture of *Streptococcus viridans* was obtained. Following treatment, the urticaria disappeared for four months. When it returned, cultures having been kept of the case, she was vaccinated. That took place six years ago, and there had never since been any return of the trouble.

Dr. BARBER, in reply, said that Professor Eyre and he had had many cases together in which not the teeth but the tonsils, the naso-pharynx, or the sinuses were the seats of the septic trouble. He had an objection to advising removal of people's teeth if there was any means of conserving them, for, however skilful the dental surgeon might be, there was something definitely lacking about a plate. Even with all the aid now given by  $x$  rays the problem was not always solved. In answer to Mr. Turner, he (the speaker) did not mean to contend that everybody who had dental decay or dental sepsis was necessarily seborrhoeic; what he meant was that the lowered resistance to infection in the mouth very often caused a lowered resistance in the skin too, and vice versa. He could scarcely recall a patient with really bad chronic seborrhoea who had not also

a severe infection of the mouth, and dental decay from early years. With regard to the bearing of calcium deficiency on the problem, he remembered a remark made by one of the Mayo brothers when in this country, to the effect that it would be found that practically the whole of medicine would be found to be a question of calcium metabolism. He had himself been investigating a number of cases from that standpoint, and with very interesting results. The recent or mild cases of seborrhoea did not usually show any calcium deficiency. He thought it quite possible that absorption of toxins could take place from carious teeth, but he had no experimental evidence to support it. Infection from dental plates was probably a question of the person swallowing the material and setting up a focal infection in the intestine secondarily.

### DISEASES CARRIED BY MILK.

At a meeting of the Section of Comparative Medicine of the Royal Society of Medicine on February 23rd, with the President, Sir D'ARCY POWER, in the chair, Mr. G. P. MALE read a paper on cow's milk as a factor in the transmission of certain diseases to man (excluding tuberculosis).

Mr. Male said he did not propose dealing with all the diseases which might be contracted by man as a result of drinking cow's milk. The danger from tuberculosis was so thoroughly established that there was now no doubt of its seriousness, but many other diseases were not so well demonstrated, and there was still room for further investigations. Now that the Milk and Dairies Consolidation Act (1915) was in operation the subject was of importance to both medical and veterinary practitioners. The powers conferred on medical men to stop the supply of milk from suspected dairies was not confined to tuberculosis, but also included acute mastitis, anthrax, foot-and-mouth disease, actinomycosis of the udder, any comatose condition, and septic condition of the udder or teats which might cause disease. The Milk and Dairies Order of 1926 required notification of any infectious disease in persons engaged in handling milk. Veterinary surgeons were required also to examine cows to ascertain whether any disease liable to infect man was present. Unfortunately this inspection had not been made universal, and so some of the benefits of the Act were lost.

*Anthrax* was usually so fatal that the bacilli were as a rule not present in the milk before death. Sometimes, however, animals did not die from the disease, and so fever in cows should cause careful observation of such animals to be made. Very few deaths had been recorded from anthrax conveyed by milk, but dangers from this source did exist.

*Actinomycosis* of the udder was relatively rare, and could often cause infections.

*Foot-and-mouth disease*, though common in this country, had only rarely been reported as affecting man here. Many outbreaks had been reported from the Continent, however, from infected milk.

*Acute mastitis* and suppuration of the udder were conditions which should always cause the withdrawal of milk. There was, however, great difference of opinion as to the pathogenicity to man of many of the organisms found in less severe cases. Streptococci were the most frequent organisms found, although others were also implicated; and in this way septic sore throat, scarlet fever, and other conditions had been traced to disease in cattle. There seemed to be general agreement that it had yet to be proved that the common streptococci found in milk were the same as those causing septic sore throat. The causal organism, however, of this condition might be carried passively by the milk from one person to another.

*Cow-pox* was very common in Britain. This eruptive disease affected chiefly the teats and udder, the general health of the cow being usually unaffected. Eruptions formed locally, became elliptical vesicles, which about the tenth day matured and became pustules. These fell off in about three weeks and left a scar. These might become infected with secondary organisms, and the primary changes, not having been noticed, confusion with other conditions might result. The disease was easily transmitted to man, and Mr. Male had seen severe eruptions due to this cause, in some cases leading to septicaemia. Children were sometimes infected by drinking milk, but without serious results.

*Contagious abortion* was very common in this country, and after abortion the organisms appeared in the milk. The organism had recently been shown to be closely related to that

causing Mediterranean fever, and it had been found in several human cases. It had also been suggested that it might cause abortion in women; personally, Mr. Male thought that the bacillus was not pathogenic for the human female.

Many different diseases of human origin were carried by milk, but he proposed only dealing with two—diphtheria and scarlet fever.

*Diphtheria* had in several cases been reported from milk in circumstances which (it had been suggested) implicated the cow as an actual carrier. The organism, however, was very common in healthy carriers, and Mr. Male thought that this fact had not been taken into consideration when those investigations had been made. In one outbreak investigated by him the cow had been suspected, and he found that she had been suffering from cow-pox, and that the organisms had come from a human carrier. Although it was possible that the organism could live in sores in cows' teats, there was no disease caused by the Klebs-Loeffler bacillus existing in cattle.

*Scarlet fever* was in a similar position. The disease was not uncommonly spread by milk, but proof was lacking that the organisms ever originated in the cow.

With the extra facilities given by the Milk and Dairies Acts and Orders, with the improvement in methods of sterilizing or pasteurizing milk which enabled the medical officer to stop or sterilize the supply at the first sign of disease, and with the rapid improvement in methods of handling and producing milk, Mr. Male believed that the menace to human health from that source would soon be considerably lessened and ultimately eliminated.

Professor WOOLDRIDGE recalled an instance of eight people drinking milk for several days from a cow which proved to be suffering from a streptococcal mastitis all the time. None showed any symptoms at all. Foot-and-mouth disease might, he thought, be conveyed by milk, especially in the early stages of the disease when the infection was present in the blood. Mr. PUGH said that a month ago he had drunk a glass of milk from a cow which a few hours later died from anthrax. He had antiserum administered and his stomach and rectum were irrigated with creosote solution within forty-eight hours. A week later he suffered from a rash due to the serum. He was only now recovering from the effects of an anaphylactic shock due to eating a beef sandwich.

Dr. H. H. SCOTT mentioned that several cases of undulant fever had been reported from districts in Italy where the caprine organism was absent.

Mr. DALLING pointed out that he had found the bacillus of diphtheria in sores on horses, and that it could live in similar sores on the udders and teats of cattle, and in this way enter the milk.

Dr. T. CAMERON stated that a peculiar set of outbreaks had recently been reported from France. Children had developed a series of symptoms of a gastro-intestinal nature, and in every case, within forty-eight hours, foot-and-mouth disease had occurred in the cow from which the milk had come. This had occurred so frequently and so regularly that there was little doubt that Professor Wooldridge's suggestion was correct—namely, that the milk was infective before the appearance of symptoms in the cow. Dr. Cameron suggested a possible explanation of the relative immunity of persons in this country to the disease. There were two strains of foot-and-mouth disease; (a) from Germany mainly (the region where most of the human outbreaks had occurred), and (b) from France. It had been shown that the latter was far more common in this country than the (a) strain, and he suggested that it might prove that only one strain—the (a) strain—was infective to man. There were, of course, a few human cases in Britain, but none had proved serious.

### ORGANIZATION OF A FACTORY CLINIC.

At a meeting of the Section of Epidemiology of the Royal Society of Medicine, on February 25th, a description of the ideal factory clinic was given by Dr. N. HOWARD MUMMERY. It was based upon a clinic actually in existence in the largest industrial establishment of its kind in this country.

The factory clinic, Dr. Mummery said, must be considered to be part of the "welfare" department, and its medical officer should be an expert adviser to the superintendent

of that department; he should not be an administrative or executive official. The premises for the clinic should be in the factory itself, preferably on the ground floor, and should include a waiting-room, first-aid surgery, and doctor's consulting-room equipped with the necessary appliances for a thorough examination. Other rooms which might conveniently be situated in the same block were a dental surgery, a rest and recovery room, and rooms for massage and manœuvre and pedicure. A house telephone system was essential, and in a large establishment a motor ambulance was very useful. The extent of the factory would determine the size of the clinic staff, and whether the medical officer and the dental officer should give whole-time or part-time service. A weekly visit from an ophthalmic surgeon enabled employees to be examined for errors of refraction, and another useful service was that of a trained masseuse with knowledge of the simpler forms of galvanic and high-frequency treatment, working under the factory doctor's supervision. A sufficient number of trained nurses should be employed to ensure that one at least was always on duty day and night during working hours. Dr. Mummery gave a long list of the uses of such a clinic: immediate treatment of minor injuries, and first-aid treatment in major accidents; diagnosis and treatment of minor illnesses and of medical emergencies; after-care and remedial treatment of operation cases and serious injuries with impaired function; recommendations as to change of occupation or light duty; medical examination of applicants for employment, including some vocational selection; examination of workers returning after illness or disablement; periodic re-examination of young or under-developed workers, and of those exposed to special occupational risks; domiciliary visiting of sick and injured employees; the establishment of co-operation with hospitals and private and insurance practitioners; general advice to the management and to individual workers on health questions and on the lighting and general sanitation of the premises, and, finally, the keeping of records concerning the health of the staff and the incidence of disease and accident. Great economy of time could be effected by treating at the factory all injuries not involving absence from work, and many of those causing temporary incapacity, as well as cases of skin disorders. He had found that the various skin eruptions common among industrial workers—seborrhoea, tinea, and the like—were slow in recovering under ordinary methods of treatment until a "skin corner" was started in the clinic surgery where patients could sit, under the nurse's observation, and for ten minutes at a time rub in simple preparations. The building and equipment of the clinic should be a capital charge on the firm, and maintenance costs and salaries of the clinic should be shown in the accounts of the whole "welfare" department of which it was a part. On the credit side must be entered the cash results of the saving of working time, lessened absenteeism, and other values not readily translatable into figures. Dr. Mummery gave some records from the clinic. One of these showed how the incidence of accidents corresponded with the speed of production; a speeding up of 10 per cent. resulted in an increase of accidents equivalent to from 50 to 100 per cent., an indication, of course, not of fatigue, but simply of increased and unaccustomed working activity; the accident rate varied inversely with the experience of the workers. He also quoted some statistics relating to the recent influenza epidemic. The staff at the factory numbered just upon 6,000, and of this number during January—the most severe period of the epidemic—329 employees were absent owing to this cause. Of these, 92 were away from one to six days, 171 from seven to fourteen days, and 66 for more than fourteen days, while 4 relapsed and had to take further leave. The attendances at the clinic during 1926 numbered 37,139, of which minor injuries accounted for 11,444, illness for 5,566, dental treatment for 3,376, massage treatment for 2,258, and medical examinations for prospective employment 2,689. He recalled Mr. Warren Low's recent presidential address to the Section of Surgery in which he had *ad*, dealing with the subject of workmen's compensation, that another kind of hospital was needed, or, more properly, an after-care industrial centre, where, by constant personal supervision and encouragement, men who had suffered from

injury or illness might be induced to overcome their diffidence with regard to their returning powers. That was exactly the work that he and others had for years past been trying to do in factory clinics.

### VACCINE THERAPY.

At a meeting of the Medico-Chirurgical Society of Edinburgh on February 2nd in the Scottish House of the British Medical Association, with Professor RUSSELL in the chair, a discussion on vaccine therapy was introduced by Dr. GLEN LISTON.

Dr. Liston said that, in spite of the fact that vaccines for the prevention and treatment of disease had been before the profession for more than a quarter of a century, there were still some who hesitated to use them. On the other hand, others treated all manner of ailments by vaccines. The cause of this divergence in practice was probably due to the absence of any systematic instruction in vaccine therapy. There was also generally a lack of co-operation between the clinician and the bacteriologist. The efficiency of vaccine therapy could be estimated in three ways, the first being examination of the immunological response produced by injecting a particular vaccine into a healthy man or animal. The second way was to inject the vaccine prophylactically into men and animals, and, in the case of men, after exposure to infection making a statistical inquiry comparing the progress of the disease among the inoculated and uninoculated respectively. In the case of animals resistance to infection was tested by injecting into them graduated doses of a virulent culture of the organism used in preparing the vaccine, and comparing the mortality among the vaccinated with the mortality among untreated animals injected with the same dose. Efficiency could also be estimated by employing a vaccine in the treatment of specific infections, and observing the rate of recovery in these cases when compared with untreated cases. Certain fundamental principles governed the practice of vaccine therapy. A vaccine must be made from a particular species of organism which had been ascertained to be the cause of the disease under consideration. It must be so prepared that when injected into an animal it would stimulate the tissues to produce substances and mechanisms antagonistic to the living microbe. The general principles of the dose of vaccine to be used for the prevention and the treatment of a disease must be thoroughly understood and mastered. In treating a disease by a vaccine the way in which micro-organisms protected themselves against destruction in the tissues, especially in an ephylactic nidus, must be understood and suitably countered. It must be recognized that vaccine therapy had definite limitations, which could not be overcome by inventing new vaccines or special antigens. Vaccine therapy would always have its chief and most successful application in the treatment of disease, in the treatment of local infections, and in the earlier stages of acute infections. In the later stages of acute infections immuno-transfusion possibly afforded some prospect of success.

In the discussion which followed much emphasis was laid on the importance of care in the collection of specimens, and also on the value of co-operation between the clinician and the bacteriologist. Several speakers referred to the varying results in vaccine therapy. Prophylactic inoculation was generally considered the more satisfactory, but many disappointments were confessed in therapeutics.

### *Ague in Scotland in the Past.*

Dr. JAMES RITCHIE (Royal Scottish Museum), in a communication on the former occurrence of ague in Scotland, said that while the distribution of ague in England had been investigated in detail, this was not so in Scotland. It could be shown that in early days, as late as the middle of the eighteenth century, ague was a common and widely spread disease, affecting most severely the agricultural section of the populace, and interfering with their activities. Examinations of old hospital records indicated that the disease was endemic. By the middle of the nineteenth century native ague was almost unknown. The diet which was available for man and beast in certain

districts of Scotland at that time was very restricted. Turnips and such foods were not grown, and so the winter food was very deficient. In the spring the farmers gathered at one farm and helped to move the cattle to the pasture. Some of the cattle might have to be lifted owing to their weak state. The conditions, therefore, for man were very poor, and infection by the mosquito was very likely. The mosquito found ideal conditions for hibernation in the heated farmhouses, and became active in the early months of the year. Thus it was found that ague occurred in the spring.

Dr. GLEN LISTON referred to another explanation of the peculiar seasonal prevalence of malaria in spring in this country. There were three types of anopheles—*maculipennis*, *bifurcatus*, and *plumbius*. *Anopheles maculipennis* passed the winter as an adult in places where animals lived, obtaining warmth and food by continually sucking blood. In the spring, therefore, they were ready to transmit malaria to the uninfected. Dr. ANGUS MACDONALD said that a temperature of 60° was necessary for plasmodial development and the passing of malaria to man. The temperature records showed that a period of high temperature was associated with an epidemic of malaria.

### HISTORY OF MEDICINE IN EUROPE.

At a meeting of the Devon and Exeter Medico-Chirurgical Society on February 17th, Dr. R. EAGER in the chair, Dr. WILLIAM GORDON read a paper entitled "The periods of European medicine: a study of the reaction of an intellectual industry to variations in its environment." In view of the general interest of the subject members of the Historical Society of Exeter were present by invitation.

Dr. Gordon defined three main periods—namely, (1) the rise, from the first recorded Greek medical discoveries about 600 B.C. to the death of Galen in 202 A.D.; (2) the pause, from the death of Galen to the beginning of the sixteenth century; and (3) the reascent, from the beginning of the sixteenth century to the present day. In each of these periods he distinguished three subperiods. The rise included a pan-Hellenic subperiod from about 600 B.C. to the establishment of the first recorded school of human anatomy at Alexandria about 300 B.C.; an Alexandrian subperiod from that date to the establishment of Greek medicine at Rome by Asclepiades about 91 B.C.; and a Roman subperiod from then to the death of Galen. The pause began with an interval of chaos following the murder of Commodus, and might be held to last, as far as medicine was concerned, for about a century and a half, until the writings of Oribasius, the first Byzantine writer. This was treated not as a subperiod but as a "gap." The first subperiod of the pause was the Byzantine and Persian subperiod, the Byzantine portion beginning with the foundation of Constantinople and closing in the eighth century, when its important writings ceased, while the Persian portion dated from the establishment by the exiled Nestorians in the fifth century of the school of Jondisabur, which in the eighth century became the starting point of Arabic medicine. The second subperiod of the pause was the "Arabic," beginning with the translators of the eighth century and maintaining its vigour until the middle of the thirteenth century, thus somewhat overlapping its successor. The third subperiod of the pause was "The age of pointed architecture," the only title which sufficiently defined the thirteenth, fourteenth, and fifteenth centuries, of which it was composed. The reascent period contained a north Italian subperiod lasting about a century, the workers living round Padua; a "trans-European" subperiod of about two and a half centuries, so named from the workers extending over an area comprising Italy, Switzerland, France, the Rhineland countries, and the British Isles; and a pancosmic subperiod from 1840 to the present day, in which the title was justified by the distribution of the workers. The points to which attention was chiefly directed were: the liberty of thought, to which medicine seemed to be even more sensitive than art and letters; the lateness of medicine to mature in each succeeding civilization as compared with art and letters; the curious movement polewards of the

main seats of medical activity during the march of time—a movement shared by other evidences of human energy; and the influence of nationality.

Professor HART expressed the appreciation of the Historical Society, and noted with interest that many persons whose names were found in the science of medicine had also won honour in other fields, as for example, Aristotle and Rabelais. He had observed through the lecture that, whereas medical lore had been ripe along the Nile, sterility had seemed to have been the case along the Euphrates.

Dr. JONAS remarked that submission to authority had often proved a deterrent in medicine, and he gave as an example the era controlled by Galen. Conversely, progress in Great Britain had resulted from freedom of thought. Dr. Jonas added that at the time of Susrata India was far in advance of Greece, and in allusion to the skill of Susrata quoted his aphorism, "The best instrument is the hand of the surgeon."

Dr. GORDON, in his reply, said that the medical profession had indulgence and liberty in Egypt, and the science of medicine was treated with dignity and honour. On the other hand, in Babylonia medicine flourished empirically, and punishment followed failure in treatment on the lines of the code "an eye for an eye." Herodotus had stated that there were no physicians in Babylon, and that the sick were exhibited in the street with the hope that those passing by might be able to offer suggestions in diagnosis and treatment. With regard to the small part played by India in the diffusion of knowledge, Dr. Gordon said that the position held by India in the pioneer period of medicine must be acknowledged, but unfortunately that position had been isolated, and had been of negative value to the world at that time owing to lack of communications.

Mr. RUSSELL COOMBE, alluding to the discoveries in Mesopotamia, said that further investigation would show some day that medicine there had not fallen short of the high grade of civilization in that country in ancient times.

### JAMES MACKENZIE INSTITUTE.

ON February 15th, at the James Mackenzie Institute for Clinical Research, St. Andrews, Dr. MCKERROW read a paper on skin hyperalgesia in abdominal disease. He pointed out that this symptom was almost entirely ignored in surgical textbooks, although Mackenzie, Head, Sherren, Hurst, Cope, Ligat, and others had demonstrated its importance. Mackenzie was among the first to realize the value of this viscerosensory reflex in localizing abdominal disease, and to point out that if the reflex path was traced back to its origin it would lead us inevitably to the organ at fault, since the hyperalgesic skin received its nerve supply from the same segment of the cord as the diseased viscus causing it. Ligat's work was fully reviewed, and the lecturer quoted several cases supporting Ligat's findings. It was obvious, he said, that the circumscribed areas figured by Ligat would be enlarged in cases complicated by extension of inflammation to the subperitoneal tissue, which was richly endowed with cerebro-spinal nerves; this probably explained, in part at least, the difference in shape and size of hyperalgesic areas figured by Cope and Ligat. As regards the adequate stimulus required to induce pain and hyperalgesia, Mackenzie held that since mechanical stimuli such as heat, cutting, etc., produced no sensation when applied to viscera supplied from the sympathetic system, the adequate stimulus must be provided by a vital activity, and he considered that abnormal contraction of non-striped muscle was the source of this stimulus. Other authors suggested increased tension or imperfect drainage of the tissues as the cause, but the lecturer pointed out that tension and obstruction were just the conditions that led to overactivity of the muscular coat. Ligat's view that the mucosa contained the receptors for the viscerosensory reflex was capable of a similar explanation, since stimulation of the mucosa resulted in peristaltic activity. He drew attention to the cases quoted by Ligat, which showed that the area of hyperalgesia was constant no matter what displacement of the related viscus was present. He concluded that Ligat's contention that "in a typical case the hyperalgesic area found accurately indicates the organ at fault" was true and of great diagnostic value.