tubular structures divided transversely or obliquely. These were lined by subcolumnar epithelial cells like some tubular glands. In some parts the tubules were surrounded by looser submucous tissue. These structures were scattered through the nodule, always fairly defined and not infiltrating surrounding parts. The patient was not seen again until January last, when she reappeared, saying that she had for some time felt a small nodule of the size of a pea inside the left anterior iliac spine, which was occasionally slightly painful. On examination this was felt to lie in the subcutaneous fat, but to produce a little puckering of the skin when lightly pinched. It was removed shortly after by Dr. Frank Hinds, of Worthing, who was kind enough to send the specimen to Mr. Barker. A section showed the structure to be practically the same as that of the original nodule except that there was more fibrous tissue around the tubules. The relation of the secondary nodule to the primary seemed therefore to be established by the microscopic examination and the clinical history. That the original nodule was a neoplasm arising in a remnant of either the urachus or vitelline duct seemed beyond doubt. That it had recurred in the abdominal wall some 3 inches distant after free removal of the original growth of course aroused the suspicion of malignancy. Growths in or about the umbilicus derived from these fœtal remnants, though rare, were well known and had been recorded. The only other one which Mr. Barker had seen occurred about the same time. It was much larger and attached to the transverse colon which was excised with it. The patient made an excellent recovery. The tumour on section contained a white, firm mass of sebaceous material, about the size of a large grape, in dense fibrous tissue. The specimen after being exhibited on several occasions was lost at hospital, and no microscopic sections had been preserved. In the enormous surgical material of London it seemed probable that similar cases had been met with, and it was hoped that this short note of two cases might lead to their being mentioned.

Mr. L. E. C. NORBURY showed a case of Malformations of Head and Face. The patient, aged 3 months, exhibited (1) accessory auricles, (2) left macrostoma, (3) complete occlusion of the anterior fontanelle with an irregular bony formation in this region, (4) deformity of the nose, and (5) corneal opacity of the left eye. There was no history of other malformations in the family.

HUNTERIAN SOCIETY.

The Uses of Tuberculin.

A MEETING of this society was held on April 9th at St. Bartholomew's Hospital, Mr. A. H. TUBBY, the President, being in the chair.

Dr. NATHAN RAW (Liverpool) opened the resumed discussion on the Varieties of Tuberculin and their Value in Treatment.[1] He had treated 1036 patients suffering from the various forms of tuberculosis in the wards of Mill-road Infirmary and elsewhere, and his general impression was most favourable. The localised forms of tuberculosis responded more readily to tuberculin than cases of pulmonary tuberculosis with a general systemic infection, and many localised cases were completely cured by its use. He thought that all cases of pulmonary tuberculosis in the first and second stages should be treated with tuberculin in addition to ordinary sanatorium measures. He invariably treated his cases by cross-vaccination. In his experience, pulmonary tuberculosis, being most frequently an infection by human tubercle bacilli, was best treated by a tuberculin prepared from bovine bacilli; and *per contra* the localised forms of tuberculosis, being frequently due to bovine bacilli, showed better results with human tuberculin. Bovine tuberculin was less toxic and less irritating, and was not inclined to produce general reaction, so that even the most sensitive patients could tolerate injections of bovine tuberculin, where the other injections cause reactions and discomfort. As to dosage, immunity should be established very slowly and with moderate doses. His practice was to commence treatment with 1/10,000th mg. by weight of dried bacillary substance, slowly increasing the dose week by week to a maximum dose of 1/100th mg., this maximum dose being repeated as long as need be. He never exceeded it, and found the results most satisfactory. He emphasised the need of the greatest possible care and watchfulness, and held that the treatment should be employed only by a physician of experience and special knowledge of tuberculin. He considered it a remedy of the greatest value, especially in early cases and where the deposit of tubercle was localised, as in one apex or a lymph gland or single joint, but where tuberculosis was disseminated and complicated by secondary infections little good was to be expected. It ought, however, to be tried in every suitable case, as it certainly limited the spread of the disease.

Dr. HINGSTON FOX had used tuberculin for some years among private patients, in coöperation with their medical attendants. He at first gave it by the mouth, but the results were uncertain. The largest dose he had as yet given subcutaneously was one half mg. of T.R. The tuberculin inoculation test was now commonly used, but the inflamed condition set up in a latent lesion did not always subside easily. He related two cases in illustration of this test; in one of them the temperature remained above normal for three months, and a still longer period of rest in bed was needed. There were many other means of diagnosis, and he submitted that the inoculation test, on account of its risk, should be used only in exceptional and obscure cases. He hoped there would be a pronouncement on this point in the profession, else the valuable tuberculin treatment might be discredited by its association with the test. Moreover, in his experience the therapeutic doses provided a test in themselves; beginning with a minute dose, we could increase this until a perceptible reaction appeared, local, general, and focal; if this was repeated, it afforded good evidence that a tuberculous lesion was present. Dr. Fox asked the experience of others in the use of tuberculin for affections of the larger joints. He had found the treatment in a case of early hip-joint disease in an adult difficult and slow; a very small dose only was tolerated and only at long intervals.

Dr. R. A. O'BRIEN, speaking purely as a laboratory worker, had always failed to understand the differences in action of P.T. and T. in the treatment of tuberculous disease, because the two preparations were tested against the same standard and their toxicity for the tuberculous guinea-pig was the same. The outcome of a severe reaction was really to desensitise. If a lethal dose of tuberculin—e.g., 0·1 c.c.—were injected into a tuberculous guinea-pig it might die in, say, 24 hours, and post mortem the foci of disease would be in a condition of extreme congestion, but if the dose were just sublethal the animal would survive the very violent reaction and would probably live as long afterwards as other members of the same batch of tuberculous guinea-pigs. In other words, the severe reaction caused by a sublethal dose of tuberculin did not seem to induce any exacerbation of the tuberculous process or shorten the animal's life. Moreover, it would now be able to stand a dose considerably larger than the original lethal dose without fatal result. The practice of "cattle-faking" against tuberculin injections depended on this principle. There were three great problems facing the clinician. The first was—Can we immunise against tuberculosis? The answer was in the negative. There was no form of tuberculin, or of anything else, which could confer complete immunity against tuberculosis except actual infection with living bacilli of moderate or low virulence. A cow might be immunised against bovine tubercle by infection with the human bacilli. And, more than this, the production of tuberculous disease in one eye by infecting it with living bacilli caused a definite degree of immunity to a subsequent inoculation into the other eye. The second question, whether we could diagnose the existence of tuberculous disease by specific tuberculin tests alone, must also be answered in the negative. In sensitive animals, such as the guinea-pig, a reaction of tuberculin was, it was true, diagnostic of active disease, but in comparatively insensitive animals, such as the horse, goat, or man, a reaction only meant that the subject then had, or had previously had, tuberculosis. Speaking with all deference in a gathering of clinicians, he would say that in the absence of definite clinical signs, a positive tuberculin test in man meant active tuberculosis only when supported by persistent rise of rectal temperature following energetic exercise. As to whether we could prevent or foretell the existence of

[1] THE LANCET, April 5th, 1913, p. 965.

hypersensitiveness in a patient under treatment, this, he feared, was impossible. The determination of complement-binding antibodies in the serum was no criterion, because they were found also in cases that were improving. Agglutinins and precipitins certainly occurred in the serum, but we were not able to control the course of treatment by estimating them. He would not refer to the much-debated question of the opsonic index further than to remark that it was rare to find a phagocytosed bacillus in the natural course of tuberculous disease. Serum containing complement-binding antibodies robbed tuberculin of its power of killing a tuberculous guinea-pig and of producing a von Pirquet reaction, and these might occur in the disease due to natural infection, either progressing or being arrested, and whether tuberculin had been administered or not. The suggestion that the phenomena of anaphylaxis were analogous to those produced by tuberculin was not, he believed, borne out by investigation. The phenomena differed widely both in their clinical manifestations and in the post-mortem picture. A guinea-pig sensitised by an injection of protein and killed a fortnight later by anaphylactic shock following the injection of a second dose of the protein, died within a few minutes or in one to two hours owing to such a constriction of the bronchi that air could not pass to or from the alveoli. A tuberculous guinea-pig injected with tuberculin did not die for at least three to four hours and did not show the characteristic distension of the lungs. Moreover, as Dale had recently demonstrated, the uterus of a protein-sensitised guinea-pig when suspended in a bath of Ringer solution contracted if a very small quantity of the sensitising protein was added to the solution and was thereby desensitised to a further dose of the protein. The speaker had recently tried to obtain similar reactions with the uterus, but whether the guinea-pigs were sensitised with tuberculin, bacillary emulsion, or various bacillary extracts he could get no definite contraction of the uterus followed by desensitisation after the addition of old tuberculin or bacillary extracts, nor did the uterus of the tubercular guinea-pig show any such response, so that here again there was a wide divergence between the phenomena of protein anaphylaxis and those of the tuberculin reaction.

Dr. J. K. PATRICK gave his experience in a tuberculosis dispensary. It agreed with Dr. Raw's experience, that bovine tuberculin gave the best results in pulmonary tuberculosis, and *vice versâ*. He had treated lupus by tuberculin, and had found the results of diagnosis by von Pirquet's reaction pretty good in this disease. He had had good results of treatment in early cases of pulmonary tuberculosis.

Dr. A. BUTLER HARRIS discussed the treatment of tuberculous joints by tuberculin. He believed that if the joint was put at rest in an early case the tuberculin treatment helped.

Dr. ARTHUR LATHAM, in replying, feared that Dr. Butler Harris's hope was not to be realised in the immediate future. He agreed that dispensary treatment with intensive doses was overdone, but every method should be tried adequately, so that under the sanatorium benefit sufficient data could be obtained for comparison. He was surprised that Dr. Raw used only doses varying in size from 0·0001 to 0·01 mg. He would have supposed that an initial dose of 0·0001 mg. would have caused a reaction in many of the cases described. His impression was that immunity became greater and relapses less frequent as larger doses were used. He was not convinced by Dr. Raw that human tuberculin should be used for infections with the bovine bacillus and *vice versâ*, or that tuberculin often diminished the necessary length of treatment, although it certainly gave the necessary stimulus in a few cases merely holding their own. He emphasised the fact that it was of no value in cases where auto-inoculation was frequent, irregular, and uncontrollable. He did not believe in using the subcutaneous test wholesale. A focal reaction was the only one of clinical value, but even it held sources of error. It could not be relied upon in itself, and the deductions drawn from its effects should always be considered side by side with any evidence obtainable by other means. As to the value of the therapeutic test—of noting, for diagnosis, the effect of working gradually upwards from a small dose—he had treated with tuberculin certain cases, chiefly of anæmia with slight fever in young women, in which there was a strong suspicion, but no absolute proof, of tuberculosis, and had found a more rapid fall of temperature and improvement in the condition of the blood than was usually obtained by the ordinary remedies. In such cases the marked improvement under tuberculin suggested that the condition was tuberculous. Referring to the supposed differences in toxicity of human and bovine tuberculin, he was not convinced that they differed as much as some authorities held. With the exercise of sufficient care he had found that reactions seldom followed the use of T.R., even when doses as large as 5 mg. were eventually injected. The length of time that dilutions of T.R. had been made greatly influenced their toxicity and therapeutic efficiency.

Mr. FRANK CURRY demonstrated the preparation of the various tuberculins and their characteristics.

The PRESIDENT, after thanking those who had taken part in the debate, spoke of cases of tuberculous spine treated by tuberculin. He now knew that the reason why this treatment was unsuccessful was that these cases were purulent and caseous from the very first.

LIVERPOOL MEDICAL INSTITUTION.—A meeting of this society was held on April 10th, Mr. Robert Jones, the President, being in the chair.—Dr. Edward Malins, of Birmingham, presented to the society a portrait of his father, Samuel Malins, who died in 1843, and who had been a lecturer in midwifery in the Liverpool School of Medicine, and one of the earliest members of the society.—On the proposal of Sir James Barr, seconded by Mr. T. H. Bickerton, the thanks of the meeting were cordially given to Dr. Malins for his most interesting donation.—Mr. R. W. Murray read a note on an Operation for Undescended Testicle. At least ten different methods of treating the condition were described by various authorities. There was always much difficulty in keeping the organ in the scrotum. Mr. Murray opened the canal, exposed the testicle, hernial sac, and vas deferens at the level of the external ring; the sac was transfixed and cut across, but the lower part was left attached to the testicle. Then all the structures attaching the testicle were cut across between two ligatures and the testicle and sac were placed in the scrotal bed. The immediate result was satisfactory, the testicle lived though its blood-supply was cut off; it possibly supplied an internal secretion.—Mr. F. T. Paul said he had treated these cases by suturing the tissues in the canal across the cord to prevent it from being drawn up. He did not sacrifice the duct.—Dr. Sydney M. Whitaker showed a woman who had suffered from Rheumatoid Arthritis for 15 years. All treatment proved useless except a 14 day fast, during which all pain left the joints. A coliform autogenous vaccine also produced slight benefit. As X rays showed intestinal stasis an ileo-colostomy was performed, with marked improvement in the joints and general condition.—Dr. Walter C. Oram read a paper entitled, "The X Rays as Therapeutic Agents." The theories with regard to the production of the rays in the focus tube were briefly reviewed, and the difference between hard and soft rays in their physical properties pointed out. The measurement of the dosage by Sabouraud's pastilles was described and methods of ascertaining the penetrating power indicated. Three essentials were laid down as necessary for efficient X ray treatment of any tissue: first, that the rays must reach the tissue to be treated in sufficient quantity; secondly, that they must be absorbed by the tissue; and thirdly, that the tissue must be susceptible to their action. It was pointed out that the denser tissues of the body—the spleen, the thyroid, and the ovary—were far more susceptible to X ray treatment than those of less density, such as the muscles, the kidney, and the brain. Although the variation in density between one tissue and another might seem small, it was shown experimentally that these small variations caused considerable differences in the absorptive power for the rays. Tissues varied much in their susceptibility; thus X ray exposures over the ovarian regions could bring about the suspension of activity of the ovaries, while the overlying skin, which had in the interval received a considerable dose, was not affected. The use of radiotherapeutic applications in malignant diseases, eczema, psoriasis, leukæmia, goitre, and other diseases was discussed.—Dr. F. H. Barendt thought the X rays a valuable adjunct to treatment of skin diseases. In some cases of tubercular disease good results were obtained, while in others the results were not satisfactory—the knowledge of the susceptibility of the tissues was wanting. In cases of hypertrichosis X rays were inadvisable, and in ringworm this treatment

should be left for the rebellious cases. In patches of localised eczema with intense pruritus X rays were of signal benefit.—Mr. C. Thurstan Holland thought the methods of measurement should be more accurate. In the treatment of malignant disease the method was of use if started early after a surgical removal; it then prevented recurrence, and secondary malignant nodules often disappeared. In menorrhagia the loss could be checked without risk. Pruritus was in many cases cured very rapidly.—Dr. R. W. MacKenna also spoke of the rapid action in cases of pruritus. He did not think the expectations with regard to malignant disease had been fulfilled.—Sir James Barr had used X ray treatment in cases of leukæmia, and had had rapid and striking improvement. Unfortunately, this had not been maintained, and when symptoms again appeared the X rays had no effect and all his cases had died.—Dr. Oram replied.

Reviews and Notices of Books.

Collected Studies on Typhus. Hygienic Laboratory, Treasury Department, United States Public Health Service, Bulletin No. 86. October, 1912. Washington: Government Printing Office.

THE Hygienic Laboratory of the United States Public Health Service has issued a bulletin containing collected studies on typhus. These papers, by Assistant-Surgeons Joseph Goldberger and John F. Anderson, discuss among other questions the etiology of "Tabardillo," the typhus fever of Mexico, and the conclusions which are arrived at are for the most part based upon results obtained by the inoculation of monkeys. At least two species of monkey, the Macacus rhesus and Cebus capuchinus, were found to be susceptible to direct inoculation with the blood from human cases of tabardillo, and blood taken from the monkey Macacus rhesus, thus infected, was used for the successful inoculation of a second monkey of the same species. Moreover, one attack of the disease in the monkey, produced by blood inoculation, induced a definite immunity to a subsequent inoculation with virulent blood, and when blood serum from a human case of tabardillo was passed through a Berkefeld filter it failed to produce disease when inoculated into a monkey. Before the observations of Nicole came to their knowledge conclusions were arrived at which were based upon other grounds than those derived from the laboratory. Thus an American non-immune came daily in contact with cases of tabardillo in Mexico, and on two nights slept in a bed which for three preceding nights had been slept in by a patient in the first three days of a well-marked attack of tabardillo, the bed clothes of which were then changed. No insects but fleas were found in the room, and the American non-immune escaped infection. The fact is also cited of the attendance of non-immune nurses on 30 cases of typhus occurring during some 23 months, in which none of the nurses were infected. These observations, coupled with the fact that the flea is ubiquitous, whereas the disease is usually limited to the lowest social class, led to the inference that the flea might be excluded. Again, the fact that the bed-bug is attached to houses and that there is no evidence that the tabardillo is a house disease led to the inference that the bed-bug is not concerned in transmitting the disease. A further point noted—viz., that the flea and bed-bug are common in the lowlands of Mexico, while tabardillo is only exceptionally found there—supported these inferences.

A separate paper is devoted to a discussion of the question whether Brill's disease, which is endemic in New York city, is identical with the Mexican typhus fever. Experiments on the rhesus monkey led to conclusions in the affirmative, and further, the inference was drawn that, inasmuch as the New York disease is of European origin, the typhus fever of Europe and that of Mexico are also identical. An interesting account is given of experiments made to determine whether body lice and head lice may become infected with Brill's disease, and whether the virus contained in the bodies of these insects is transmissible by subcutaneous injection of the crushed insect or by its bite. These questions are answered in the affirmative in respect of the body louse, and in the case of the head louse also in the affirmative, except that the ability of the latter to infect by its bite is spoken of with more caution as a "belief."

Experimental studies with the virus of typhus led to interesting conclusions. Thus, it was found that the blood of the monkey which has been infected may be virulent 24 to 32 hours after the return of the temperature to normal. In respect of the localisation of the virus, the evidence obtained favoured the view that the typhus virus is extracellular and free in the circulating plasma, and that the serum of virulent typhus blood is constantly infective, whether obtained from defibrinated blood or after clotting. The conclusion was arrived at as the result of a number of experiments that there was no evidence to show that the virus passed the Berkefeld filter, and in respect of two attempts which were made to filter the virus as it exists in the body of the louse, in one the monkey inoculated with the filtrate was subsequently found to be immune. The virus was found to retain its virulence after heating at 50° C. for 40 minutes, to be deprived of its virulence by heating at 55° for 15 minutes, to be probably deprived of its virulence by heating at 60° for five minutes, and to retain its infectivity after freezing for at least days.

A paper on Studies of Immunity and Means of Transmission of Typhus led to conclusions some of which may here be briefly stated. As many as 22·5 per cent. of rhesus monkeys possess at least a transient natural immunity, and probably 3·5 per cent. possess a permanent natural immunity. A well-marked typhus reaction confers an immunity that may be present after at least two years. The guinea-pig is, and a very small proportion of rabbits may be, susceptible to infection. The immunity conferred by an attack of typhus is specific. Typhus-immune serum obtained between the fifth and the fourteenth day of convalescence has protective value when injected simultaneously with, or within 48 hours after the inoculation of the virus, but immune serum obtained on the thirtieth day of convalescence probably has no appreciable protective influence. When immune serum and virus are inoculated simultaneously no immunity results. When the immune serum is injected 48 hours after the virus, an immunity, probably active in nature, may perhaps result. The therapeutic value of immune serum is at best slight. Vaccination with heated crushed-lice suspension was attempted with a negative result. The bite of the body louse may perhaps be infective within four days after the infecting feed. Attempts to transmit typhus by means of the bites and subcutaneous injection of crushed bed bugs were unsuccessful. The buccal and pharyngeal secretions of typhus were not found to be infective, and therefore droplet infection plays no part in the transmission of the disease.

Diseases of Children. By BENJAMIN KNOX RACHFORD, Professor of Diseases of Children, Ohio-Miami University of Cincinnati. London and New York: D. Appleton and Co. 1912. Pp. 783. Price 25*s.* net.

AS a writer on medical subjects Dr. Rachford is probably little known in this country, but his book on the diagnosis and treatment of children's diseases now before us should serve as an introduction which will invite closer acquaintance. This new publication seems to strike a happy mean between the large text-book which is employed only as a