of disease and in non-febrile conditions. Although many excellent clinical results have been obtained by various clinicians, the experimental evidence obtained from the observations of the immunity of the skin following irradiation and the study of the haemobactericidal response to light suggests that overdosage and excessive exposure have been frequent. The application of an erythema dose of rays renders the irradiated area immune to further reaction for three or four days; this is due to the protective screening action of the exudates in the inter-epidermal tissues. During the stages prior to desquamation the skin is still immune to radiation, since the dead epidermal cells screen off the biological active rays. During desquamation the exposed epidermal tissue is hypersensitive to light, and an irregular action results, demonstrating immune and hypersensitive areas. From these observations it seems right that a period of ten to fourteen days should elapse between the exposures of any given areas of skin. In this way the skin can be kept sensitive to ultra-violet rays for a long period, and excessive heating of the body by prolonged exposure is avoided.

The Finsen Light Institute at Copenhagen claims as good results as Rollier obtains with open air and sunlight. The possible errors of the technique with ultra-violet rays with short-flamed arcs are: (1) The area of skin exposed is too big. (2) The skin is rendered immune to ultra-violet rays. (3) The body is overheated by prolonged exposures. (4) It is unsuitable for febrile diseases. (5) It is laborious and expensive.

From these observations I have adopted a special technique of general treatment with lamps emitting ultra-violet rays shorter than 2,970 A.U., which I have called "short ray" therapy.

1. The source of light is a quartz mercury vapour lamp, and at later stages, when pigmentation has developed, metal-cored 30-ampere carbon arcs.

2. The surface area of skin exposed is roughly equal to one-sixth of the surface area of the body.

3. An interval of ten to fourteen days is allowed between irradiation of any given area of skin.

4. Irradiation is conducted two or three times a week.

5. The minimal erythema dose is applied, and the skin is kept in a "light-sensitive" state during the whole period of treatment.

The "general" irradiation of the normal skin improves the health and body resistance. Early cases of lupus of the skin, nasopharynx, palate, and larynx have been healed by these means. The cases in which chronic ulceration and hard scar fibrous tissue are present are more resistant. Many catarrhal and inflammatory conditions of the mucous membrane are due to general failures of health, associated with a secondary anaemia and vasomotor disturbances. Light has often proved a valuable help and has improved these conditions.

The healing of septic wounds and the repair of granulation tissue are accelerated by general irradiation. In cases of subacute disease and acute inflammatory conditions the cautious use of irradiation of the skin can be helpful. In these types of condition the application of the minimal erythema dose and exposure of a small area of skin to light is a safe technique of treatment. General light treatment has been successfully employed as a post-operative measure, and accelerates the healing of septic wounds and young granulation tissue.

The local treatment of a lesion with correct dosage of light accelerates repair. Some early investigators have maintained that a direct bactericidal action was obtained by means of the water-cooled Finsen-Reyn arc lamp or the mercury Kromayer lamp, but this is an erroneous impression, for serum and lymph greatly impede the penetration of the bactericidal rays.

Excessive dosage produces necrosis of the tissues and extensive oedema, which may cause a spreading infiltrating cellulitis. This applies mainly to subacute conditions when the granulation tissue is vascular, but is uncommon with chronic fibrous ulceration such as is seen in old-standing conditions of lupus vulgaris. The careful dosage in local irradiation, producing a mild erythema reaction and avoiding excessive damage to the tissues, will hasten the healing and repair of many types of septic wounds.

The normal mucous membrane is about three times as sensitive to light compared to the normal white skin. Many cases of tuberculous disease of the mouth, throat, or nose can be healed by general light treatment of the skin. As a rule they react more favourably and quicker than the skin, since the granulation tissue is more vascular and ulceration does not contain hard, old fibrous tissue. Strandberg has claimed good results in the treatment of tuberculous disease of the larynx. Local treatment to the mucous membrane accelerates repair and regeneration of granulation tissue. The application of local light through the mouth to the pharynx and larynx necessitates an apparatus by which the effects of radiation are rapidly obtained. Irritability and pain are prominent symptoms, and only a rapid form of treatment is practicable.

The use of quartz rods and applicators to transmit the rays of light to the site of infection are unsatisfactory, as the intensity of radiation is reduced, and the apparatus becomes cumbersome and is impossible to use for a practical therapeutic exposure. The same criticism applies to the use of reflected light from mirrors. The water-cooled throat lamp (made by the British Hanovia Quartz Lamp Company) is based on the same principles as the water-cooled Kromayer mercury lamp, but is sufficiently small to be readily inserted into the mouth, pharynx, and nasopharynx. The intensity of ultra-violet rays emitted is sufficient to produce an erythema reaction after 60 seconds' exposure of the mucous membrane. A quartz envelope surrounds the burner, and can be easily removed to clean the lamp.

Local anaesthesia with eucaine and cleansing of the irradiated area are necessary before light is applied to the mouth. The reactions of the mucous membrane are similar to those seen when the skin is irradiated; erythema and oedema are evident, and massive exposure produces necrosis and blistering of the mucosa. Since the mucous membrane is more sensitive to light than the skin the regulation of dosage must be made with great care. Excessive dosage can cause a spreading infiltration and acute inflammation which will produce a general reaction of the body, with increased temperature and malaise. In cases of tuberculous disease of the larynx and palate the lungs are often involved, and the irradiation of the local lesion in the mucous membrane may cause reaction of the lung infection. Careful supervision of the lung is imperative. The irritability and pain associated with ulceration of the lesions are rapidly diminished after treatment.

Local treatment is applied every ten to fourteen days. The combination of exposure of areas of the normal skin to irradiation twice or three times a week and local treatment every ten to fourteen days to the lesion has proved successful in resistant cases of lupus and tuberculous disease of the palate, pharynx, and larynx.

Further research on treatment by means of sensitizers and ultra-violet radiations emitted by high-frequency current is in progress.

RADIOGRAPHIC FINDINGS IN 347 PAINFUL SHOULDERS.

BY

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For the purpose of this paper I have examined the radiographs of 347 patients who came for x-ray examination on account of pain in the region of the shoulder-joint during the past three years.

I have not included any patients attending the casualty department with a history of recent injury to the shoulder. On the other hand, many patients complaining of a painful shoulder would not be sent for an x-ray examination, as the clinical investigation revealing definite visceral pathology would furnish sufficient explanation for the symptom. I have seen several patients whose chief complaint was pain around the left shoulder and arm with acute exacerbation in whom the only lesion to be found was a cholelithiasis.^{2(d)} In many instances the condition appeared to be due to toxic absorption, and the patient

was sent only for a radiographic examination of the teeth, sinuses, etc. Frequently the radiograph of the painful joint showed no bone or joint change, but definite apical abscesses or evidence of sinus infection were detected.²

	The Queen's Hospital.	Royal Cripples Hospitals.	St. Chad's Hospital.	Pensions Hospitals.	Total.
Total	149	54	53	91	317
Normal	90	20	19	48	177
Arthritic changes:					
Acromio-clavicular joint	23	8	10	10	51
Shoulder-joint ...	6	3	4	11	24
Loose body	2	4	4	(21 included)	11
Old fracture	11	5	7	(not included)	24
Dislocation (unreduced):					
Acromio-clavicular joint	4	—	4	—	8
Shoulder-joint ...	2	—	2	—	4
Tubercle	4	8	1	16	29
Cyst of humerus ...	—	1	1	—	2
Carcinoma	2	—	—	—	2
Sarcoma	2	1	1	—	4
Myeloma	2	—	—	—	2
Exostosis	—	2	—	—	2
Osteomyelitis with arthritis	1	1	—	5	7

The table shows that the most frequent site of injury or arthritic changes to appear on the radiograph is the acromio-clavicular joint. Most of the shoulder-joints which had been dislocated showed definite changes. The most common evidence of arthritis in the shoulder-joint shown on the radiograph was pointing and irregularity of the articular margins.

The areas in the head of the humerus described by A. L. Fisher³ as cavities, which he believes to be due to local necrosis brought about by amoebic infestation, and as being characteristic of the first signs of osteo-arthritis, I have regarded as varieties of the normal cancellous structure of the head of the humerus, because they are found in many patients in whom there is no suggestion of osteo-arthritis. Fisher admits that such areas are found when there is no other radiographic evidence of arthritic changes. Apart from the pensions hospitals, definite marked osteo-arthritic changes, as shown by indications of erosion and burnation in the shoulder-joint, were seen in only one case.

Loose bodies were seen in only 3 per cent. of the total cases. In all these cases there was a definite history of severe injury. In five a definite history of dislocation was obtained, and in these cases the radiographic appearance suggested detached fragments or calcification of particles of damaged joint structures. The remaining three suggested calcareous deposits in the subcoracoid and subdeltoid bursae.

No case of the condition of osteo-chondromatosis occurred in the series. The loose bodies in this condition usually contain sufficient calcium to permit of their demonstration by 2 rays. Hagemann⁸ recorded a case in which the bodies were shown in the shoulder-joint, in the bursa beneath the coracoid process, and in the synovial sheath of the tendon of the biceps. Albee¹ recorded a case in which sixty-four joint mice were found in the shoulder of a patient, aged 33, who gave a history of trauma thirteen years before. Hugh Jones⁹ records a case of osteo-chondromatosis of the shoulder-joint of a girl of 20, in whom the symptoms extended back twelve years. They were removed, but a further radiograph sixteen months later showed that a new collection had developed.

The presence of "rice" bodies in the joint usually cannot be detected on the radiograph, and there was no record of these bodies having been found in the shoulder-joint or bursae in this series. Mumford¹⁰ records a case in which a large number of rice bodies, not shown on the

radiographs, were removed from a large subdeltoid bursa, the walls of which microscopically suggested the diagnosis of tubercle.

In my experience recurrent dislocation of the shoulder is not often associated with loose-body production.

Fractures and Dislocations.—The numbers recorded under these headings refer only to those cases in which the fracture or dislocation had not been suspected or diagnosed at the time of the injury, and had been found only when, owing to the persistence of the pain in the shoulder, and sometimes at the demand of the patient, a radiographic examination was made. The majority of the bone injuries so discovered were limited to the greater tuberosity of the humerus.

Lesions in the Soft Tissues.—The radiograph does not give any evidence of inflammatory conditions of the muscles, tendons, or bursae unless they have existed for some time and calcium has been deposited in or upon the damaged structures. I reported two cases of infestation with *Cysticercus cellulosae* to a meeting of the Electro-Therapeutic Section of the Royal Society of Medicine in 1925.^{2(c)} These patients complained of "rheumatic" pains, and radiographs showed calcified cysts throughout the musculature of the shoulder. I referred to similar findings by Stieda, Saupe, and Pickler, and to a case of trichinosis reported by Levy Dorn in 1923 in which the radiographs showed numerous minute calcified cysts throughout the musculature.

BIBLIOGRAPHY.

- 1 Albee, F. H.: Sixty-four Joint Mice in the Shoulder. *Journ. Bone and Joint Surg.*, October, 1927.
- 2 Brailsford, James F.: (a) Observations on the Value of Radiography in the Diagnosis of Obscure Dental Sepsis. *British Medical Journal*, June 16th, 1928. (b) Radiographic Findings and their Significance in Focal Sepsis. *The Dental Surgeon*, October, 1928. (c) The X-Ray Diagnosis of Animal Parasites (Helminthes) in Man. *Proc. Roy. Soc. Med.*, vol. xix, p. 41, 1926. (d) The X-Ray Diagnosis of Pathological Conditions of the Gall-Bladder. *British Medical Journal*, March 24th, 1928.
- 3 Carrell, W. B.: Dislocation at the Outer End of the Clavicle. *Journ. Bone and Joint Surg.*, April, 1928.
- 4 Fisher, A. L.: Some Considerations of Second Time Arthritis as Exemplified in the Shoulder-joint. *Ibid.*, January, 1928.
- 5 Hitzrot, James Morley: The Painful Shoulder. *Minnesota Med.*, Bd. 11, No. 3, S. 148, 1928.
- 6 Holmes, G. W., and Jennings, M. King, jun.: The Diagnosis and Treatment of 450 Painful Shoulders. *Journ. Amer. Med. Assoc.*, lxxxix, 1956, December 3rd, 1927.
- 7 Jacoby, P.: Multiple Cysticercen (in Rheumatic Shoulder). *Hospital-student*, Jg. 71, N. 4, 591, 1928 (Danish).
- 8 Jones, Hugh T.: Loose Body Formation in Synovial Osteochondromatosis. *Journ. Bone and Joint Surg.*, April, 1924.
- 9 Lewin, P.: Osteochondritis Deformans Juvenilis of the Shoulder-joint. *Ibid.*, July, 1927.
- 10 Mumford, E. B.: The Origin of Rice Bodies in Bursal Sacs. *Ibid.*, July, 1927.
- 11 Phenister, D. B.: The Causes of Loose Bodies in Joints. *Ibid.*, April, 1924.
- 12 Plummer, W. W., and Potts, F. N.: Two Cases of Recurrent Anterior Dislocation of the Shoulder.
- 13 Rogers, Mark H.: The Formation of "Rice Bodies" in Tuberculosis. *Journ. Bone and Joint Surg.*, October, 1927.
- 14 Ramirez, y Santos: Stiff and Painful Shoulder. *New Orleans Med. and Surg. Journ.*, November, 1927.
- 15 Sullivan, W. E., Geist, F. D., and Mueller, G. G.: Epiphysitis of Extremities at Puberty. *Journ. Bone and Joint Surg.*, April, 1927.

ASTHMA IN CHILDREN.

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ASTHMA occurs in young children more frequently than is generally supposed, for in infancy the clinical picture often differs from that seen in adult life: catarrhal features are much more in evidence and tend to obscure the diagnosis.

CLINICAL TYPES.

Above the age of 5 or 6 years the attacks are usually of the adult type, occurring at irregular intervals, and characterized by the sudden onset of dyspnoea, usually in the early hours of the morning. There is often considerable distress, the face is pale or cyanosed, the chest more or less fixed in the position of inspiration, and expiration is difficult, prolonged, and wheezing. Fever is usually absent. Cough is dry and hard at first, but, as the attack passes off, it becomes loose, and is associated with the appearance of bubbling rales in the chest. The duration