The majority of the toxæmias (82 per cent. in this series) would, in the present state of our knowledge, be diagnosed at the earliest possible time if the weight only was taken regularly. This is quite a simple procedure which the patient can perform herself, provided that similar clothes are worn and the same reliable scales are used on each occasion. If an increase of more than 5 pounds occurs she should have had instructions to report to the doctor. In this way a certain number of the toxæmic cases may be avoided; if not avoided, with appropriate and early treatment most of the cases would be less severe. Appropriate treatment infers that the patient should be seen frequently in order that the blood pressure be estimated, other signs and symptoms of toxæmia looked for, and a diet given until the abnormal increase in weight has been reduced. An important dietetic measure appears to be the elimination of salt; in a few cases this alone was sufficient to reduce the weight.

Conclusions

1. The average increase in weight during pregnancy is 16 to 18 pounds, and the monthly gain during the second and third trimesters is normally between 2 and 4 pounds.
2. An increase of 5 pounds or more per month is suggestive of an impending toxæmia, the probability of its occurrence varying directly with the amount of the sudden increase.
3. Every patient should weigh regularly throughout pregnancy, and be instructed to consult her doctor if the monthly gain is 5 pounds or more.

Summary

1. The variations in weight of 211 patients, fifty-two of whom developed toxæmia, have been investigated and analysed.
2. The average gain of the toxæmic patients was found to be definitely more than that of the normal patients. Moreover, a sudden abnormal increase in weight was of great value in foretelling a toxæmia; 63 per cent. of the cases which gained more than 8 pounds in one month became toxæmic, whereas the incidence of toxæmia in those cases with a normal monthly gain was only 0.9 per cent.
3. If a patient gained more than 5 pounds in a particular month it did not invariably signify that a toxæmia would develop, but 98 per cent. of the toxæmic cases showed this abnormal gain.
4. This abnormal increase in weight appeared, on the average, one month before the albuminuria, and was as a rule an earlier sign than a raised blood pressure.
5. The type and duration of labour did not appear to be affected by increased weight of the mother. Loss of weight a few days before labour was noted in only 36 per cent. of the cases.
6. It was concluded that systematic weighing of patients during the ante-natal period is of definite value in foretelling, and perhaps avoiding, the toxæmias of pregnancy.

REFERENCES

- Bingham, A. W. (1932). *Amer. J. Obstet. Gynec.*, **23**, 38.
 Cummings, H. H. (1934). *Ibid.*, **6**, 808.
 Davis, C. H. (1923). *Ibid.*, **6**, 575.
 Gassner, U. K. (1862). *M Schr. Geburtsch. Frauenkrankh.*, **19**, 1.
 Hannah, C. R. (1923). *Texas State J. Med.*, **19**, 224.
 — (1925). *Amer. J. Obstet. Gynec.*, **9**, 854.
 Harding, V. J., and Van Wyck, H. B. (1934). *Canad. med. Ass. J.*, **30**, 14.
 Hirsch, R. (1922). *M Schr. Geburtsch. Gynäk.*, **59**, 141.
 Randall, L. M. (1925). *Amer. J. Obstet. Gynec.*, **9**, 529.
 Siddall, R. S., and Mack, H. C. (1933). *Ibid.*, **26**, 244.
 Slemmons, J. M., and Fagan, R. H. (1927). *Ibid.*, **14**, 159.
 Toombs, P. W. (1931). *Ibid.*, **22**, 851.
 Wieloch, J. (1924). *Zbl. Gynäk.*, **48**, 898.
 Zangemeister, W. (1916). *Z. Geburtsch. Gynäk.*, **79**, 124.
 — (1925). *Zbl. Gynäk.*, **49**, 225.

LUPUS VULGARIS *

WITH SPECIAL REFERENCE TO ITS TREATMENT WITH THE FINSEN-LOMHOLT LAMP

BY

ROBERT AITKEN, M.D., F.R.C.P.Ed.

Physician to the Skin Department, Royal Infirmary,
Edinburgh

Lupus vulgaris, though not a common disease, constitutes a serious social and economic disability. Sufferers from this disease are apt to be shunned by their fellow beings, while if the disease is extensive there is difficulty in obtaining employment. As a result, the patient is dependent for maintenance on the public authorities, or on his family, with possible hardship to them.

Lupus patients also suffer considerable hardship even in connexion with holidays. If the disease is at all extensive they get admission to hotels and boarding houses with difficulty, and if they take private rooms they are looked at askance, and it is made clear that they are not really welcome. Because of this these patients not infrequently prefer to remain at home. They have, therefore, not the same chance of getting their health built up, and so the disease tends to spread more rapidly.

Incidence

In Scotland lupus is not a common disease. I am indebted to dermatological colleagues in other towns for furnishing me with statistics relating to the incidence of lupus as they see it in their clinics. In Glasgow during the last few years the number of lupus cases has varied from 0.3 to 2.1 per cent. of all new cases of skin disease. In Dundee the number has been 0.4 per cent., in Aberdeen 0.78 per cent. In the Royal Infirmary of Edinburgh the incidence has varied from 0.6 to 1 per cent. in the last five years, the number of new cases of skin disease being about four thousand per annum. The incidence of lupus as seen in Edinburgh is definitely less than it was ten to fifteen years ago, when the percentage varied from 2.8 to 4. The tendency to decrease is seen in other Scottish towns also. The reason for this decrease I shall discuss later. The percentage of lupus cases seen in some clinics in England is about the same as it is in Scotland, though other clinics have about double our percentage. The disease shows the same tendency to diminish, and I have little doubt that the same causes responsible for this decrease are found in England as in Scotland.

Sex Incidence.—Lupus vulgaris is more common in females than in males, the incidence being twice to three times as great in women as in men. This greater incidence among women is not limited to this country, but is seen fairly constantly throughout the world.

Age Incidence.—Lupus usually begins in childhood or early adolescence. Cases are seen where the disease begins after middle life, but these are not common. In an analysis of 294 cases in the Royal Infirmary I found that the age period 6 to 10 years shows the greatest number—no fewer than seventy-three cases, or almost 25 per cent., occurring during that time. Before the age of 5 years forty-five cases occurred, and of these a good many began during the first year of life, several beginning about eight months and generally after some illness such as measles. The age period 10 to 15 years accounts for fifty cases. Thus we see that more than half the cases begin during the school life of the child.

* Lecture to the Border Counties Branch of the British Medical Association, November, 1936.

Sites Affected

Lupus affects the face more frequently than any other part of the body, and is commonly found in the region of the nose. In an analysis of 310 cases I found that the face was affected in 238, or 77 per cent. As a rule lupus is not manifest on many parts of the body at the same time, but some cases show evidence of widespread disease. One patient, for example, had it on the buttocks, thigh, knee, feet, wrists, and elbows. Another had as many as fifteen patches of different sizes on his body. These multiple patches generally follow measles or chicken-pox, chiefly the former, and represent a blood-stream infection.

In addition to the skin the mucous membranes may be involved—in the nose, lips, gums, mouth, or pharynx. No patient with lupus in the neighbourhood of the nose should be allowed to go without examination of the mucous membrane. In many cases the mucous membrane is the starting-place of the disease, which spreads through to the skin. In some cases, however, the skin of the nose is involved without apparent affection of the mucous membrane.

Tuberculous Glands and Lupus

The relation between tuberculous glands and lupus must be stressed. In an examination of 270 to 280 cases of lupus I found that almost 50 per cent. followed cervical adenitis. These are minimum figures, because in many cases the site of the lupus made it certain that cervical glands had preceded the skin disease. As no definite mention was made on the patient's record card, however, these cases are not included in the 50 per cent. Van Vonno of Holland, in an examination of about the same number of cases, found scars of submental or cervical adenitis in 71.9 per cent. of his lupus cases.

During the last six years I have treated 116 cases of tuberculous adenitis in my light department at the Royal Infirmary. These cases have been sent by surgeons for treatment of the glands. Of these cases, thirty-three had discharging sinuses when sent for light treatment. Had these patients not been given general light baths I am convinced that most, if not all, of them would have had definite tuberculosis of the skin before the sinus ceased to discharge. In addition to these cases, some patients already had involvement of the skin when sent for light treatment, but they were referred for the gland condition and not for treatment of the skin disease. If the curative effect of ultra-violet radiations in tuberculous adenitis were more widely recognized a great step forward in the fight against tuberculosis of the skin would be achieved.

Lupus vulgaris is an extremely chronic disease, progressing insidiously from month to month. Occasionally it disappears spontaneously, sometimes it develops rapidly, but at other times it appears to remain stationary. It is a pity that the disease is not painful, as the want of discomfort causes the patient to neglect it and not to seek advice when that would be of most value. The intractable nature of the disease leads to an accumulation of patients, and so the number of cases attending the clinics grows steadily larger. In some ways it is an advantage to have some extensive cases attending at the same time as the early ones. I point out to those with a small patch what they will become like if they do not attend regularly for treatment, and I also show a patient who has improved greatly as the result of steady treatment. In this way new patients can be induced to attend more regularly than they might otherwise do.

The healing of the disease leads to scar formation, and while the cosmetic result is in some cases excellent in others the scar is unsightly. The contraction of the scar not infrequently leads to considerable deformity when the disease is in the neighbourhood of the natural orifices. Ectropion is seen when the eyelid is involved. On the nose the disease may lead to narrowing of the nostrils, while the tip of the nose may become thin and pointed. In other cases the nostrils may become distended, while at the mouth there may be distortion, or the orifice may be inconveniently narrowed. When the lupus is situated in the neighbourhood of a joint the resulting contraction of the scar may lead to great restriction of movement. One end-result of the contraction of the scar I have not seen mentioned so far as I can recollect. When the lupus is situated in front of the neck the scar tends to break down as the result of the constant movement of the head. The continued movement prevents the wound healing, and the constant irritation of the parts leads to the development of carcinoma. I have seen several cases during the last few years where this seems to have been the sequence of events.

Reasons for Diminishing Incidence

I have mentioned that the incidence of lupus is diminishing. This is due chiefly, in my opinion, to the fact that in many places tuberculous glands are now being treated by means of general light baths instead of surgically.

I have already indicated the considerable percentage of gland cases with sinuses which I have been asked by surgeons to treat during the past few years at the Royal Infirmary, and I had the same experience in my light department at Leith Hospital. This experience is not merely my own. It is quite a common one among those who are accustomed to light treatment—sanatorium medical officers, for example. Some years ago Dr. John Comrie read a paper before the Medico-Chirurgical Society of Edinburgh on "The Medical Treatment of Surgical Tuberculosis." He gave his experience at Rollier's clinic at Leysin, and showed photographs of patients with sinuses and involvement of the skin where the skin infection and the gland mass had cleared up under light treatment. If a gland mass will clear up when there is a sinus, it will surely do so before a sinus has formed. The large mass of glands with periadenitis, where the glands are matted together and adherent to the deeper tissues, is the type of case leading to sinus formation. This is exactly the type of case so suitable for ultra-violet irradiation, and as more and more of these cases are irradiated we shall see fewer cases of the scrofuloderma type of tuberculosis of the skin. This applies also to those cases of bone and joint tuberculosis which so often advance in spite of all ordinary surgical measures and form abscesses. Incidentally it may be said that the amount of movement obtained in these joint cases as the result of radiation treatment is far in excess of that obtained by surgical measures. Subsidiary causes for the diminished incidence of lupus are the larger amount of fruit and vegetables now eaten and the clearing away of slums, while the medical inspection of school children also has its bearing.

General Treatment

General treatment includes all those hygienic and dietetic measures which apply to the treatment of all forms of tuberculosis. The Gerson diet has its advocates and its opponents, but it is hardly a feasible proposition for a working-class household—the class in which most cases of lupus are found. Even the advice that patients take plenty of good nourishing food is hardly possible in many

cases in these days of economic stress. But where possible a diet rich in vitamins, in addition to the ordinary diet, will help, especially in debilitated patients. In the Finsen Institute this supplementary diet consists of vitamin A (50 grammes of butter and two carrots), vitamins B and E (two tablespoonfuls of wheat germ), and vitamin C (the juice of a lemon), and it was found that these patients put on almost twice the amount of weight put on by the patients on ordinary diet.

Another important form of general treatment is general ultra-violet irradiations. Finsen was the first to observe the excellent effect that sun baths had in surgical tuberculosis. He died before he could complete his work on this subject, and it was left to others to carry out his ideas. For lupus, general ultra-violet irradiations are excellent, and in favourable cases complete cure can be brought about by treatment with carbon arc light baths alone. Such treatment should be given to all cases.

Tuberculin is a valuable remedy, and, in the absence of facilities for light treatment, would be my remedy of choice in an extensive case of lupus. Some three years ago, in a discussion at the Royal Society of Medicine, the statement was made that no thorough investigation of Koch's work had been made in this country. This was surprising to us in Edinburgh, for Sir Norman Walker began to use tuberculin in 1907, and its use in one or other form was continued till 1926, when the lack of assistance in the department prevented this work being carried on.

Local Treatment

Local treatment is looked upon as more important by many people and the remedies employed are legion. The very number suggests the inadequacy of most. I will mention only a few.

Excision, while theoretically good, is of little value. If the lupus patch is small and on a covered part the result may be excellent, but recurrence is not uncommon. On the face the method is hardly practicable. All the tissues above the muscles must be removed so as to get rid of the skin glands which extend into the subcutaneous tissues. As these are diseased the lupus spreads from the glands to the overlying skin if they are left. This applies whether the skin covering the glands and hair follicles is the adjacent skin pulled over after the excision of the patch or a graft.

Scraping, so freely indulged in by surgeons of a previous generation, will of itself never cure lupus.

Caustics may be employed with benefit, but these may prove a disadvantage in a patient who is later to receive the most modern form of treatment. Trichloroacetic acid and acid nitrate of mercury are my favourites, and I have seen excellent results from their use.

X rays I mention only to condemn. I admit that they give a good transitory effect, but isolated nodules are often left in the scar and give rise to trouble later. The disfiguring appearance of the x-ray scar, with its telangiectasis and its parchment-like atrophied skin, is well known, but the great danger of x-ray treatment is the frequency with which carcinoma follows the treatment. I have seen two waves of x-ray carcinoma. I never want to see a third. Lomholt states that of the cases of carcinoma on lupus which he had seen all but one had had x-ray treatment.

Concentrated arc light treatment is undoubtedly the best local treatment for lupus. Kromayer mercury vapour lamps have been and are still used, but the results cannot compare with those from concentrated arc light treatment, only 29 per cent. of cures being recorded with the

Kromayer as against 90 per cent. with the arc, and this arc being the older model with which Finsen's name is associated. This percentage of cures with the arc will, I am convinced, be increased with the most recent form of lamp, and the cosmetic results leave nothing to be desired in most cases.

Finsen Light Treatment

Finsen revolutionized the outlook for sufferers from lupus when he began the work with which his name is associated. He first used the sun as his source of energy, but found this somewhat inconstant, and he then devised the lamp which bears his name. The results obtained with this apparatus in the treatment of lupus were finer than anything ever achieved before, but there were certain disadvantages. If the arc were too high or too low a greater or less proportion of rays failed to be collected by the lenses, and so the best results were not obtained. Another disadvantage was that the applicator had to be held on the part. As the application was for two hours this imposed a considerable strain on the nurse and the patient. While Finsen's name is associated with the local treatment of lupus, it ought not to be forgotten that he was the first to suggest light baths.

Various modifications of Finsen's apparatus were made to try to overcome its disadvantages, but they were not successful till Lomholt's modification came into being. Here the lamp, the concentration or lens system, and the compression system are in one. The carbons are set at an angle instead of being one above the other as in the Finsen apparatus. The axis of the positive carbon corresponds to the axis of the concentration system, and, while burning, the carbon is automatically moved forward in this axis. The lenses instead of being made of natural brittle quartz are made of fused silica. Fused silica has a coefficient of expansion of 0.00000054, and it is this low coefficient which enables it to withstand sudden changes of temperature. It is this property of fused silica which has been made use of in the Lomholt lamp. The arc can be placed much nearer the lens, and actually it is less than two inches from the posterior surface as against four inches with the Finsen apparatus. This means at least four times the energy or intensity of radiation passing into the lens system. The lens system is a complex but very efficient one. Almost 70 per cent. of ultra-violet energy passes out, whereas the energy with the old apparatus did not amount to more than about 15 per cent. of the total radiation energy.

This energy passes through the actual compressor, which is applied to the diseased part to be treated. The compressor is hollow, and cold water circulates through it. By an ingenious arrangement the weight of the apparatus is utilized to keep the applicator firmly pressed on the part, and so, instead of one nurse to each patient as with the Finsen apparatus, one nurse can look after two or three lamps. With the increased amount of ultra-violet rays passing through, the time required for treatment is reduced to one hour. This means a great saving for the patients and staff. The results obtained with this apparatus are better than from any other form of treatment, and in many cases are literally amazing.

Permanence of Results of Light Treatment

It may be asked, "Are the results permanent? The lamp is of too recent installation to enable me to speak dogmatically on that point, but fortunately other evidence is available which will help us to judge. In 1930 Reyn of the Finsen Institute read a paper at the Eighth International Dermatological Congress in which he discussed

the results of treatment of lupus at the Institute. He took the period 1914-23. This ten-year period was chosen because the method employed in the treatment was the use of light baths as well as local Finsen treatment, and I may say in passing that Lomholt emphasizes the need for general irradiations in addition to the local treatment. Another reason for Reyn's choice was that sufficient time had elapsed since treatment was stopped to allow a true evaluation of the method to be made. During the ten years 957 cases of lupus were treated. Of these, 735 were apparently cured, 75 were still under treatment, and 147 had not gone through with the treatment to the end. If these latter are omitted, there are 810 cases, and of these 735, or 90.7 per cent., were cured when discharged. Reyn, however, was not content with these figures. He acknowledged that some may have had recurrences, and so he gave these also. In some cases the patient was too far away from the Institute to report personally, and he estimated them at fifty. He deducted these, stating that for statistical purposes they ought to be omitted. That brings his number of cases of whom he had authentic information down to 685 cured, a percentage of 90.1. Of the total number of cases cured there were thirty-two in whom recurrences took place, and further treatment cured these. In addition, there were twelve in whom the disease appeared in a new locality, and these were cured by subsequent treatment. That means that out of 735 patients who were treated to the end, forty-four showed signs of disease later.

These figures give some idea of the value of the treatment by means of general light baths and concentrated arc light applied locally, and no other treatment known will show results comparable to them. There is every reason to believe that the new lamp will give results every bit as satisfactory as those obtained with the old lamp, and in a much shorter time. The fact that at the Finsen Institute all the Finsen lamps have been discarded, except one used as an exhibit, and Finsen-Lomholt lamps installed in their place, will serve to show what is thought of the new lamps by those in the best position to judge. Under these circumstances it is hardly too much to say that Dr. Lomholt has completely altered the outlook of sufferers from this disease and has opened out a new vision of life for them. Surely it is incumbent on those of us who can help them to do everything in our power to see that they get the chance of happiness instead of the misery which has hitherto been their lot.

[Dr. Aitken quoted a number of cases treated with the three Finsen-Lomholt lamps in his department, and showed a number of lantern slides in natural colour demonstrating the striking change brought about by the treatment.]

For the forthcoming meeting of the International Surgical Congress, to be held in Vienna in 1938, the following subjects have been chosen. Arrangements are now being made with regard to speakers. Any member of the society who would like to take part is asked to communicate with Professor Grey Turner, British Post-Graduate Medical School, Ducane Road, London, W.12. *Surgical treatment of arterial hypertension*: (1) The physiopathological problem from the surgical point of view; (2) intervention and its results: (a) paroxysmal hypertension, (b) solitary hypertension. *Bone grafts*: (1) Biological studies, with report on the comparative value of various procedures; (2) bone graft in new traumatism and in pseudo-arthritis; (3) in osseous tuberculosis and articular tuberculosis; (4) in the osseous dystrophies and tumours (cysts, osteosarcomas); (5) in chronic arthritis. *Surgical treatment of cysts and pulmonary tumours*: (1) Physiological conditions of pulmonary surgery; (2) methods and procedures; (3) results.

BLOOD GROUP TESTS IN DISPUTED PATERNITY

BY

DAVID HARLEY, B.Sc., M.B., A.I.C.

*Asthma Research Council Fellow, Inoculation Department,
St. Mary's Hospital*

AND

G. ROCHE LYNCH, O.B.E., M.B., D.P.H., F.I.C.

*Senior Official Analyst to the Home Office, Director of the
Department of Chemical Pathology, and Lecturer on
Forensic Medicine, St. Mary's Hospital*

The existence of individual differences between the bloods of normal persons is well known. The four classical blood groups were described by Landsteiner and his pupils during the early years of the present century. The more recently discovered M and N blood factors, taken in conjunction with the older groups, define twelve different blood types. These blood types are determined solely by heredity, and their inheritance is carried out in an orderly manner in accordance with certain well-established laws. Accordingly, blood group tests can be applied in medico-legal problems involving questions of blood relationship, particularly in cases of false accusations of paternity.

The Agglutinogens A and B

The four Landsteiner blood groups, now designated AB, A, B, and O,* are characterized by different combinations of two agglutinable factors (agglutinogens) A and B in the red blood cells, and two agglutinins α (anti-A) and β (anti-B) in the serum:

Group	Agglutinogens in the Red Blood Cells		Agglutinins in the Serum	
AB	A	B	—	—
A	A	—	—	β
B	—	B	α	—
O	—	—	α	β

The agglutinogens A and B are inherited characters which behave as simple Mendelian dominants. The factors controlling their inheritance and development are called genes, and are localized in the chromosomes in the nuclei of the body cells. These genes occur in pairs in corresponding sites on a pair of chromosomes, there being twenty-four pairs of chromosomes in each body cell. In the formation of the male and female germ cells, however, the pairs of chromosomes separate so that each mature germ cell contains only one half-set of chromosomes, and consequently one half-set of genes.

The union of male and female germ cells results in the formation of a new individual whose cells contain the full complement of chromosomes (and therefore of genes), one-half from each parent. The blood groups are determined by the presence of a gene for A, or B, or their absence O, in each of one pair of chromosomes in each body cell.

There are then six possible genetic formulae or genotypes—AB, AA, AO, BB, BO, and OO. There are two kinds of group A and group B individuals, genetically speaking, depending on whether the genes for A and B are carried by both chromosomes (AA and BB) or by one only (AO and BO). The former are termed homozygous and the latter heterozygous. From the serological aspect, however, the bloods of individuals of genotypes

* International nomenclature; Moss groups I, II, III, and IV correspond to AB, A, B, and O respectively.