

THE THERAPEUTIC VALUE OF SUN AND AIR BATHS.

by

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INTRODUCTION.

The fact that the Kaffir tribes in South Africa are particularly immune to the great majority of the chronic diseases of civilisation e.g. neurasthenia, gastro-intestinal and rheumatic affections etc., stimulated me to investigate the cause of this immunity.

In European centres the Kaffirs live under more unfavourable hygienic conditions, and are more exposed and susceptible to the evil rather than to the good influence of civilisation, yet they retain their resistance to these chronic diseases. This applies specially to those born and reared in their own environment and under natural conditions, which primarily implies direct exposure of their naked bodies to the sun's rays from birth onwards.

The Kaffir certainly is of a placid mental disposition, irresponsible and indifferent to social problems involving mental stress and strain. On the other hand the mental factor in chronic diseases is originally most probably a concurrent or secondary manifestation of a primary physical pathological process. While there are undoubtedly other considerations, one is forced to conclude that the relative immunity/

immunity of the Kaffir can to a large extent be attributed to the direct and indirect beneficent effect of the daily exposure of his naked body to the sun's rays.

Although perhaps not beyond criticism, this conclusion decided me to introduce sunbaths as a therapeutic measure, more especially for the treatment of chronic conditions, and to investigate their uses and limitations.

In the absence of any literature on the subject at that time, and in the face of considerable lay and even professional prejudice, the treatment was started not without a feeling of trepidation. Later on those patients who had been prevailed upon to undergo this method of treatment properly, (and who had fortunately derived considerable benefit from it), instilled a certain amount of confidence in others in its practice, through their enthusiasm confirmed by their obvious improvement.

Over an experience of nine years' general practice, in which sunbaths have been consistently prescribed, the uniformly good results obtained have amply justified their adoption.

With the knowledge gained from experience the sunbath treatment gradually evolved into a scientific measure with a definite rationale, scope and limitations.

In/

In recent years the general therapeutic, social and economic value of the sun's rays in Preventitive State Medicine has been emphasised throughout the world; whilst their special protection and curative properties in such diseases as infantile Rickets and Tuberculosis have established heliotherapy as a potent medical science.

THE ACTION OF SUNLIGHT. (LITERATURE)

The sun's rays have a double action on the body exposed to it, the direct and indirect.

The direct action is due to the bactericidal actinic-violet and ultra-violet rays, acting superficially on the skin. Weisner's work has shown that the infra red rays are also bactericidal, and in virtue of their long wave-lengths can penetrate the body through the skin, and thus have an action on deep-seated tissues. Experiments with filters show that the potent radiations are the ultra-violet rays (Hess, New York).

The indirect action. If the violet and ultra-violet rays be detained at a depth of 1 mm. from the skin, the network of skin capillaries is dilated, producing a generalised erythema.

These rays are also absorbed by the blood circulating in the peripheral capillaries, and.-

- (1) The blood is charged with radiant energy.
- (2) The temperature of the blood at a depth of more than $1/3$ " in the skin is increased by about 5°C . (Sonne)
- (3) There is an increase of haemoglobin (Naegeli).
- (4) There is more active respiration of the red blood corpuscles (Behring).
- (5)/

- (5) There is an appreciable rise in the antigenic power (immunity) of the blood (Webster and Sonne).

The maintenance of the actinic rays in the skin also causes the phenomenon of pigmentation, which is partly protective against irritation by ultra-violet rays, and partly regulative in controlling the heat dosage absorbed from the sun, and in addition the pigment itself has a profound biological value. The potency of the sun's rays is affected by the intensity of pigmentation of the skin.

Hess has shown in his experiments on the prevention of Rickets by light, that under the minimal protective dose of light, diet and rate of growth being the same, black rats will develop rickets, whereas white rats will not. The protective rays are rendered inert by the pigment of the integument and fur.

Block has shown that a substance chemically like adrenalin, submitted to the action of the oxidised ferments of the epidermis, produces the formation of normal epidermic pigments, sunlight strongly accentuating this formation.

The skin ferments again seem to depend upon the quantity of vitamins contained in the food, as proved by the experiments on rickety and insufficiently fed children in Vienna (Dr Hariette Chick).

Prof./

Prof. A. Harden suggests that possibly the product formed from exposure to light is Vitamin A., which is known to cure rickets, though Goldblatt's experiments tend to disprove the actual formation or synthesis of Vitamin A., they appear to show that exposure to sun's rays helps in economising the supply of Vitamin.

W. Cramer, from his experiments on rats, suggests that sunlight acts as a stimulant to living protoplasm, a physiological process resulting in the formation of blood platelets.

Rowland and Kramer found in treating rachitic infants with sunlight that, accompanying calcification of the epiphyses, there was an almost constant rise of the Inorganic Phosphate to the normal level. The sun's rays produce a very strong retention of Calcium Phosphate in the blood (as high as 400%).

Hess found that the average percentage inorganic Phosphate content of the blood was highest in summer, and diminished progressively as winter advanced, this seasonal tide being mainly due to the seasonal variation of sunlight - a fact which partly explains the greater prevalence of rickets in winter months.

Sir Wm. Bayliss concludes that sunlight must produce some substance which eventually passes to the blood; possibly the pigment in the skin acts as a sensitiser/

sensitiser by absorbing certain wave-lengths of light.

Leonard Hill from certain experiments infers that the effect of pigment is to make the skin thinner or apparently thinner.

Rollier concludes that the pigment receives, supplies and increases the activity of the elements essential to the metabolism of the hormones.

Leonard Hill found that the metabolism of children whose bodies were directly exposed to sunlight as a therapeutic measure was put up from 50 to 100%, and to the same extent in red skinned as in dark skinned children.

Sir Henry Gauvain from his experiences particularly emphasises the degree of muscular development acquired from sunbath treatment.

GENERAL CONSIDERATIONS.

I practised in Smithfield, Orange Free State Province, 4400 feet above sea-level, where there is a dry sub-tropical climate (maximum average daily temperature 90° - average minimum 50°), with an average annual rainfall of \pm 16 inches. During the summer months (November to March) the sunshine is practically uninterrupted. In winter the nights are sharp and frosty with the average daily temperature and the period of sunshine varying considerably. During the Spring months the south-westerly trade winds with dust storms prevail.

I have always prescribed sunbaths during the summer months, when the climatic conditions are practically stable, as experience has shown that it is inadvisable to interrupt the sunbath treatment, on account of the loss of time involved, and more especially because the process of cure is greatly enhanced by maintaining the body at its maximum power of vitality and power of defence through an uninterrupted progressive series of successive daily exposures.

Exposure of the patient's whole body to the sun and air, constitutes proper and efficient sunbath treatment, for with limited exposure of any particular part of the body, the general stimulating, invigorating and/

and tonic effect is not obtained.

Patients who come from other climates, especially low altitudes, should be allowed sufficient time to become acclimatized, before being subjected to the Sunbath treatment.

GENERAL DIRECTIONS.

The following general rules have been evolved from experience, and all patients who undergo the sunbath treatment have to carry out these instructions.

1. Patients are not to begin the sunbath until one hour has elapsed since the last meal.
2. The sunbath is not to be taken after a long walk or active exercise or during free perspiration.
3. Nervous excitable subjects are to recline on a couch or sofa, for 15 to 30 minutes, before beginning the seance.
4. During treatment patients are to abstain from all active internal medication (arsenic, cod liver oil etc.) and avoid alcohol.
5. The bowels are to be kept well open, preferably by a morning dose of salts.

6. Meals are to be taken regularly, overeating avoided, meat and leguminous vegetables partaken of sparingly, and plenty of water to be taken between meals.
7. Patients are to live a regular life, as much in the open air as possible, when practicable have to take a moderate amount of exercise daily in the open air, and sleep out of doors at night. Children have to go about in light clothing with their legs and arms preferably bare.
8. A luke-warm bath (about body Temperature) with Tidman's Sea Salt dissolved in the water, has to be taken every night, and the skin subsequently rubbed dry with a rough towel.

DOSAGE.

As the sunbath treatment demands a certain amount of personal sacrifice on the part of the patient, as well as accuracy and perseverance, it is necessary that instructions be given explicitly, and that the patient's whole-hearted cooperation be invoked for the attainment of success.

TECHNIQUE.

A quiet secluded spot is selected, generally in a corner of the garden, which is sheltered from wind and dust by trees.

A simple cheap and efficient hut can readily be constructed as follows:- Four seven foot poles are planted a foot deep at the four corners of a square 8 by 8 feet: Two sets of cross beams connect these poles at the top, and about a foot off the ground. From the upper beams Kaffir grass mats are suspended all round, and secured to the lower beams; one grass mat is secured below with tapes, so that it can be readily lifted to allow of ingress and egress to and from the hut.

Inside the hut an ordinary camp stretcher is placed covered with a folded sheet, and a pillow provided.

The hut is so constructed that the whole body of the individual on the stretcher will be exposed to the sun's rays during the particular time of the day the seance is taken; this is comparatively easy, as the sun is at an angle of about 45° at 9 a.m.

SPECIFIC DOSAGE.

Every patient, preferably in a dressing gown, proceeds to the sunbath hut with a watch, a beaker of cold water containing two linen compresses, a pair of coloured glasses to shade the eyes from the glare if necessary, and a sunshade, which is adjusted to screen the patient's head and neck from the sun's rays during the seance.

The seance is to begin at 9 a.m. and should not be continued past 11 a.m. at any time.

On the first day the patient exposes the feet and legs, together with the hands and forearms for 5 mins.

On second day the same parts are exposed for a similar length of time, then the thighs and elbows as well for an additional 5 mins.

On third day repeat the graduated exposure of 2nd day, then expose up to umbilicus and upper arm for another 5 mins.

On fourth day to hips and elbows 10 mins., then to umbilicus and upper arm 5 mins., then to shoulders and costal margins another 5 mins.

On fifth day to hips and upper arms 15 mins., then to costal margin and shoulders another 10 mins.

On sixth day repeat 5th day, plus 5 mins. for the whole body, i.e. up to level of 3rd or 2nd rib, this being/

being the highest point of exposure reached at any time.

From now onwards the daily graduated progressive exposure of the whole body is continued, the chest being exposed 5 to 10 mins. longer every day, in accordance with the degree of pigmentation acquired and the tolerance of the patient to the sun's rays. The relative times of exposure for the limbs and trunk are gradually approximated, due regard being paid to the development of congestive symptoms and to the sensitiveness of the patient so that by the 14th day a full hour's exposure for the whole body is generally reached. It will be noted that by the time the whole chest is exposed for the first time, the limbs are already exposed for $\frac{1}{2}$ hour, also that the exposure of the abdomen and chest is carefully graduated and proceeds gradually.

When exposure reaches to the level of the costal margin, the patient applies a moist compress over the praecordial region, and one over the forehead as well. These are an important part of the routine of the daily seance, and the compresses are to be kept moist during the duration of the exposure.

The patient has to turn over on the sides and belly also during the exposure, so that all parts of the body are exposed to the sun's rays. After the 14th day the nature of the complaint will determine the/
the/

the relative time of exposure of any particular part of the body, e.g. for an abdominal condition the front of the body is exposed $\frac{2}{3}$, the back $\frac{1}{3}$ of the duration of the seance, and vice versa.

Exposure to the sun's rays is also less difficult to stand, when the patient moves about on the stretcher.

The ultimate duration of the sunbath depends upon the patient's constitution, the sensitiveness of the skin to solar radiation, the degree of protective pigmentation acquired, and the intensity of the sun's rays during the time of exposure. My practice is to limit the time of exposure to a maximum of $1\frac{1}{2}$ hours daily (9 - 10.30 a.m.) after pigmentation is established, and the results have been quite satisfactory.

I do not recommend a morning and short afternoon seance, as the radiant heat generated from the ground, as well as the heat reflected off the ground in the afternoon, is very liable to cause congestive and other unpleasant symptoms.

Dark skinned people acquire pigmentation more readily than the fair skinned, and they can later stand $1\frac{1}{2}$ hours exposure comfortably, whilst the red skinned patients will hardly tolerate more than 1 hour's exposure with comfort at any time; the results in both cases however are equally good.

After/

After the sunbath the patient takes a footbath in water warmed by the sun's rays, and after the 14th day this is substituted by a light body sponge, the skin being allowed to dry by evaporation. The patient now rests on a couch in a cool shaded room for $\frac{1}{2}$ to 1 hour, during this time he perspires and generally falls into a refreshing sleep.

It is true that the rate and duration of exposure in each case cannot be mathematically calculated, but by following out the above routine in its every detail during the last five years, I have never had occasion to experience the least alarm from the developments of such bad effects as will be described later.

The length of time required for a cure will depend upon the nature of the complaint, the general nutrition and development of the patient, the sensitiveness of the skin to acquiring protective pigmentation, and the stability of climatic conditions. Generally speaking a minimum of 4 weeks to a maximum of 16 weeks will suffice for any condition, though in some cases the sunbaths are repeated for a shorter period during the next summer, in fact in all cases they can be repeated with great advantage, if not for any specific complaint, then for their general stimulating and tonic effects.

EFFECTS.

When the body is exposed to sunlight there is a generalised erythema of the skin, a momentary elevation of temperature from $\frac{1}{2}$ to 1° , with a heightened colour of face and acceleration of the pulse and respiration. The skin becomes moist, and there is a sensation of fulness in the head and a momentary sense of oppression in the chest. These signs may be considered as physiological effects.

The skins of fair people and of some women are very sensitive to the sun's rays; such skins are apt to become freckled, or to develop a scarlatiniform erythema or an irritative dermatitis (sometimes vesicular) when the exposure is not carefully graduated. These sensitive skins do not pigment readily, and here the cure may take considerably longer.

The process of pigmentation in sensitive skins will be best induced by the following methods:

1. By adequate protection from wind, which retards pigmentation.
2. By gradual graduated exposure.
3. By covering the parts (later the body) exposed to the sun with red gauze.

4./

4. By lightly sponging the surface of the skin with cold water immediately before the exposure.
5. Dilute the sunbath by going into the shade for a short period during the seance, and if necessary by attenuating exposure every few days with a period of a few days rest.
6. By beginning the sunbaths at 8 a.m. instead of 9 a.m.

The development of the following signs or symptoms indicates that the seance must be terminated:-

1. In children.

- (1) When they become drowsy and stop playing with their toys.
- (2) A continued high colour.
- (3) Profuse perspiration.

2. In adults.

- (1) Palpitations.
- (2) Throbbing in the head.
- (3) Giddiness with headache.
- (4) Epistaxis.
- (5) A feeling of faintness, fatigue or exhaustion from excessive reaction.

When the after effects of the sunbaths are indicated by such signs as.-

- (1) Loss of appetite,
- (2) Pallor,
- (3) A feeling of fatigue,
- (4) Insomnia and restlessness at night,
- (5) Attacks of migraine,

the causes should be thoroughly investigated, and the treatment modified or the patient be warned in the first instance to adhere strictly to the original instructions.

Since the favourable progress of every case is primarily concerned with the establishment of pigmentation of the skin, and varies with the degree of intensity of pigmentation, those measures already indicated under the "induction of pigmentation" are to be adopted in the cases which develop the above unfavourable signs.

ILLUSTRATIVE CASES.

The following series of cases described are taken from my records of a large number of patients treated by sunbaths during the last 9 years. They are specially selected because in practically every instance a thorough course of medical treatment had been prescribed with little or no benefit to the patient. The primary medical treatment included the elimination of any recognised focus of infection as far as possible.

In the cases given below, the sunbaths, with the precautions and restrictions already detailed, were the only form of treatment prescribed. The majority of conditions treated, though not in themselves fatal, ultimately reduce the patient to a state of chronic illhealth and misery, which may be reflected in the home-life, and not infrequently involves the peace of mind and the reputation of the family practitioner.

Case No.1. Mrs J.P., aet 36. Has been ailing for last 2 years, since last confinement.

Loss of appetite, chronic dyspepsia with constipation. Lost about $1\frac{1}{2}$ stone in weight. Has had 2 abortions since confinement. Periods irregular and painful. Dragging pains in pelvis, pains in back and legs. Subject to skin rashes. After a course of 4 months sunbaths, improved in every way. In 8 months added 2 stone in weight.

Case No.2. Mrs W.W., aet. 23. Nullipara. Previously enjoyed good health. In June 1919 had an attack of Spanish Flu with complications and protracted convalescence. Took change to coast for 3 months and was under drug treatment for 6 months. On her return, conceived and aborted at $2\frac{1}{2}$ months. After 3 months sunbaths, added 11 lbs in weight, became pregnant, (4 months after abortion), went to term, and was delivered of 9 lb baby.

Case No.3. Mrs N., aet. 26. Nullipara. Has enjoyed good health, though anaemic, until 6 months ago. Since this time she had not had her period, and has grown exceedingly stout and suffered from shortness of breath, feeling of fatigue, and constipation. Was considered to be pregnant. On examination uterus rather small (normal); patient very fat (especially abdomen), and with obvious signs of hypothyroidism, e.g. dry skin, loss of outer third of eyebrow, slow cerebration etc. Treated by 4 months sunbaths with special diet for obesity. Six months later had lost 20 lbs. in weight, girth of abdomen decreased by $4\frac{1}{2}$ inches; patient energetic and cheerful; periods regular. When seen the following year the improvement had been maintained.

Case No.4. Mrs v. D., aet. 27. Nullipara. History of indigestion, pain in relation to food, vomiting and constipation of several years standing. Had vomited blood three times, the last occasion being 6 months ago. Had been treated by 11 doctors. Gastric ulcer? Patient emaciated, anaemic pasty appearance; urine contains albumen. Muscular nutrition very poor. Periods irregular and painful. After 4 months sunbaths, there was most remarkable improvement and patient was able to eat everything. A further 3 months sunbaths was given the following year, and she was apparently quite cured. Has had a baby since.

Case No.5. Mrs E., widow, aet. 35. Multipara. Has suffered from epigastric pain, daily vomiting, flatulence and most distressing eructations for the last 2 years. Periods irregular and painful. Sleepless. On examination: neurasthenia, visceroptosis and great emaciation, with anaemia and general muscular weakness. Under 3 months sunbaths with 6 weeks' special diet, patient gained 17 lbs. in weight and she declared herself cured.

Case No.6. Mrs C., aet. 44. Multipara. Had been under treatment for 4 years. State of chronic ill-health, headaches, pains in back and legs. Stout flabby woman with pasty appearance, large sensitive prolapsed uterus and visceroptosis. After 4 months sunbaths, she advised me by letter that she felt and looked young and fit. Confirmed by husband personally 9 months after.

Case No.7. Mrs S., 38. Multipara. After 3 months' almost continuous vomiting was operated on for gall-stones a year ago, and since that time has been in bad health, and cannot walk half-a-mile; not fit to conduct home. Visceroptosis (confirmed by surgeon), enlarged retroflexed uterus, neurasthenia and psychasthenia, muscles flabby. Four months sunbaths with ring pessary. Patient greatly improved, sleeps and eats well, no pain, and walks into town daily (3 miles) to meet her children from school.

Case No.8. Mrs P.S., aet.46. Multipara. Has been operated on for goitre 7 years previously. For the last 12 months has complained of abdominal and pelvic pain, vomiting, obstinate constipation, palpitation and insomnia with loss of weight and strength. Patient emaciated, asthenic, dilated/

dilated stomach, uterine fibroid with adhesions. (Has been confined to bed for last 6 weeks on liquid diet). Uterus anteverted. Given 3 months sunbaths; pelvic pain disappeared in 3 months - picked up 22 lbs in weight. Then operation, hysterectomy; discharged 3 weeks after.

Case No.9. Mrs v. d. B., aet. 38. Nullipara. Had exophthalmic goitre. Spanish Flu, October 1918, with recurrent broncho-pneumonia and continuous palpitations. Severely ill for 3 months and another 3 months convalescence. Spontaneous cure of Exophthalmic goitre with signs of hypothyroidism and amenorrhoea. Following 4 months sunbaths, she became pregnant and was delivered of healthy 8 lb baby (after 18 years married life).

Case No.10. Mrs F., aet. 36. Multipara. Since last confinement, 18 months ago, has had more or less continuous pelvic pain aggravated by menstruation; excitable, irritable, and sleepless. Drawn face, poorly developed, weak musculature. Given 6 weeks sunbaths (disappearance of pain after 14 days) after which period she refused to continue as she felt perfectly well.

Case No.11. Mr W.L., aet. 43 (farmer). Previously in good health, had Spanish Flu in 1918. On convalescence became subject to praecordial pain with giddiness, feeling of faintness and insomnia. Proceeded to seaside for change; returned 3 months later, practically no improvement. Presented symptoms of neurasthenia with vaso-motor instability, and obvious hypothyroidism. Was completely cured after 3 months sunbaths, and has carried on extensive farming operations since then with no relapse.

Case No.12. Mr v. d. W., aet. 28. Previously in good health and athletic. Had Spanish Flu in 1918 (abdominal type), and has been in indifferent health and under treatment since then for last year. Progressive loss of weight and strength, insomnia, abdominal pain with constipation; unable to follow occupation - accountant. Diagnosis: Neurasthenia with dyspepsia and inucous colitis. After $3\frac{1}{2}$ months sunbaths, eats well, sleeps well and feels well. Capable of sustained physical and mental exertion without fatigue, and has continued in good health since.

Case No.13. J.C. (brother) aet. 25. Engineer.

Attack of acute dysentery treated in Military Hospital for 4 months. Since discharge has had recurrent attacks of diarrhoea, loss of appetite, loss of weight and strength, insomnia and grave mental depression. Frequently recurring crops of superficial boils. Incapable of work last 6 months. Examination: emaciated, pasty appearance; chronic dysentery with neurasthenia, and presumably hypo-functioning internal secretions. Four months sunbaths with 6 weeks special diet produced a complete change in appearance, temperament and speech. Has been in good health for last 6 years.

Case No.14. Mr W.G., aet. 45. Farmer. Has had "weak" stomach since Anglo-Boer War (1902).

Is of a very nervous disposition, not capable of any sustained physical effort, restless, irritable and sleepless. Examination: pinched, worried facial expression, sparsely developed, weak musculature. Vaso-motor instability, atonic stomach and bowels. Three months sunbaths, has greatly improved, eats and sleeps well (though still has to modify his diet), added 8 lbs in weight. Rides all day, drives motor-car (previously refused to drive in motor/

motor on account of nervousness) and is quite fit to superintend big farming operations. Repeated sunbaths the following 2 summers, and has been well since, (1917) and eats anything.

Case No.15. Mr J.B., aet. 61. Progressive anaemia, wasting and weakness with obstinate constipation of 4 months duration.

Examination: enlarged liver and spleen, dilated colon, glycosuria, pancreatic stools with marked anaemia and weakness. Treated for 9 months, seen in consultation 7 doctors, no improvement; was confined to bed all the time. Diagnosis: septic anaemia with mucous colitis, and deranged duodenal secretions from bowel auto-intoxication. Three months sunbaths, increased 11 lbs in body weight, is up and about all day, though he is not capable of sustained exertion. Sunbaths repeated for 4 months last year, and he advised me by letter that he considers himself cured.

Case No.16. G.E., boy aet 8. Spanish Influenza.

Broncho-pneumonia, pleurisy with effusion (twice tapped) and collapse of lung.

Three months illness. No improvement for last 6 months. Great emaciation, anaemia, with chronic cough and dyspnoea. Three months sunbaths with breathing exercises/

exercises, picked up 1 stone in weight, robust and now walks to school 6 miles daily. No cough. Has remained well for 3 years now.

Case No.17. du B., boy aet. 9. Had Pneumonia 3 years ago and has had recurrent attack every winter for the last 3 years. During this time has taken cod liver oil and treated with vaccines. Pale, badly nourished, sickly aspect, easily tired, and very susceptible to change in climate. Cough and shortness of breath on running. Three months sunbaths. Aspect entirely changed, eats and sleeps well, athletic, and picked up 9 lbs in weight. Father informed me he has kept well for last 3 years.

Case No.18. S.S., widow, aet. 33. One child. Tuberculous family. Has always been an invalid. Presents a pale sickly aspect with emaciation; palpitations, attacks of diarrhoea and is always tired. A mass felt in ileo-caecal region - tuberculous peritonitis? Four months sunbaths, continued for 2 months 3 years in succession. During first year added 2 stone in weight, and from physical examination and signs, apparently quite cured.

Case No. 19. Mr D., aet. 28. Tuberculous kidneys, left kidney removed in Johannesburg Hospital. Right kidney also affected as evidenced by X-ray picture etc., bad prognosis given. Four months sunbaths, then returned for examination, which proved negative in every respect and he was pronounced cured.

Case No.20. Mr J.A.E., aet. 34. Had been in comparatively good health previously. Was walking in Bloemfontein Street and suddenly developed severe haemoptysis. Tubercle bacilli in sputum. Four months sunbaths; and was passed 8 months later for £3500 Life Policy by company's consultant doctors, who pronounced him in good health.

Case No.21. Miss B., aet. 24. Teacher. Developed a neuro-muscular weakness of back muscles which were very painful and tender on pressure; was incapable of walking or standing. Had been treated by 6 months rest in bed with massage and electricity, then ambulant treatment with Plaster-of-Paris jacket for 3 months; resumed duties 3 months later. Relapsed 3 months after resumption. Neurasthenia with marked pain, weakness and/

and tenderness of back muscles. Four months sunbaths, and then resumed duties; repeated 6 weeks every year during December vacation, and until retirement from profession 4 years later, never had day's absence from school.

Case No.22. Miss M. Teacher aet. 21. Operation for varicose veins both legs, Johannesburg Hospital. On discharge developed pains in legs aggravated by standing and walking; had massage and electrical treatment for 6 months with little improvement. Examination: pale, nervous, poor musculature, and general nutrition; muscles of lower limbs weak and wasted, cannot walk 100 yards without developing intense pain. Three months sunbaths, with great improvement after 6 weeks and disappearance of all pain. Resumed teaching duties the month after cessation of sunbath, and with repetition of sunbath during summer holidays, has been well ever since.

Case No.23. Miss v. R., aet. 20. Teacher. Had been off duty for last 6 months owing to a condition of chronic illhealth - loss of appetite, dragging pain in abdomen, pains in legs, insomnia and constipation. Neurasthenia with visceroptosis/

visceroptosis and floating right kidney, scanty painful periods and general loss of tone. Three months sunbaths, kidney belt worn; so greatly improved in every respect that she resumed duties a month after, and having repeated sunbaths during summer vacation, informed me by letter that she felt absolutely well.

Case No.24. Mr A.F., aet. 46. (farmer) Chronic lumbago, right-sided sciatica and rheumatic pains in legs and joints for last 3 years; practically incapacitated. Pains aggravated by damp, cold and changeable weather. Three months sunbaths; has resumed his occupation with impunity; and has not had a recurrent attack for last 5 years.

Case No.25. Mr P. du B., aet. 42. Farmer. Has suffered from very painful chronic lumbago for last 3 years. He is not fit to do any work in the stooping posture, and cannot ride. Develops acute attack on least provocation (exposure to cold, damp feet, change in weather). Has a stooping, shuffling gait. Eight weeks sunbaths, and with ordinary precautions, has been able to perform any kind of work. No deformity, no pain. Has not had attack for 4 years.

Case No.26. Father, aet. 60. Has had chronic Sciatica 3 years standing (unilateral) with great interference with function of limb, deformity and wasting of muscles. Develops acute attack on least provocation. Has been treated by every recognised treatment for Sciatica with temporary improvement only. Two months sunbaths, disappearance of all pain and deformity, and has not had least sign of recurrence during last 5 years.

Case No.27. Mr A.L., aet. 38. Farmer. Chronic lumbago with frequent acute exacerbations during last four years, associated with chronic indigestion and rheumatic pains; reduced to a state of chronic ill-health and bad temper. Ten weeks sunbath treatment; all pain has disappeared, digestion greatly improved, and has not relapsed since. (August 1920).

Case No.28. Mr v. S., aet. 47. Farmer. As a result of a wetting received, developed acute sciatica (bilateral) with very severe neuralgic pains in lower limbs. Had been under treatment 6 weeks, confined to bed, little improvement. Six weeks sunbaths; after 14 days treatment could walk with aid of sticks, and all pain practically disappeared after 3 weeks' treatment. Has not had another attack since (6 years).

Case No.29. Mr G.L., aet. 23. Farmer. Sustained abrasions of hands and forearms whilst working with barbed wire 6 months ago. These became infected, and since then he has had sores and recurrent boils (21 all told). Anaemic pasty appearance, loss of appetite, general physical and mental debility. Incised boil forearm. Two months sunbaths, has not had boil since, and has improved remarkably in appearance and in general nutrition. Feels quite fit and energetic.

Case No.30. Mrs S.W.D., aet. 34. Mason. Whilst working with lime, developed an irritative vesicular dermatitis of hands and forearms; later generalised pustular rash with great impairment of general health. After 3 months active treatment with no improvement, returned home. Eight weeks sunbaths; no new pustules developed after 3 weeks; and cured after complete course.

(31) Septic Conditions.

It has been my practice during the last five years to treat every case of chronic suppuration, e.g. empyema, suppurating hydatids, suppurative arthritis - (together with drainage) - and septic wounds, /

wounds, by means of sunbaths (in all cases when the temperature is normal or nearly normal) with the most gratifying results, as there can be no doubt that such cases are cured far more rapidly and effectively by this method. Moreover coincident with the healing of the sinus or wound, the patient has completely recovered his general health, a great economising factor in the case of the labourer as well as of the business or professional man.

INDICATIONS FOR SUNBATH TREATMENT.

- (1) Neurasthenia with gastro-intestinal disturbances (Glenard's visceroptosis).
 - (2) Chronic digestive disorders, e.g. dyspepsia, mucous colitis, chronic dysentery.
 - (3) Multiparous women with muscular weakness, headache, pelvic pain, intestinal stasis, secondary anaemia and neurosis. (A post-partum chronic inertia which is very commonly met with).
 - (4) Anaemic chlorotic young women with neuro-muscular pains and weakness.
 - (5) In disturbances of internal secretions (the hypo-functioning variety) with consequent disturbances of metabolism.
 - (6) Sciatica, lumbago, myalgias and other chronic rheumatic conditions.
 - (7) In chronic infective and toxic conditions generally.
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CONTRA-INDICATIONS.

- (1) Patients convalescent from an acute illness, whilst very debilitated. During febrile stage of any illness when temperature exceeds 100°F.
 - (2) Children under 5 years of age, and those with a tendency to status lymphaticus.
 - (3) High blood pressure (chronic nephritis); the full-blooded, shortnecked apoplectic middle aged type, senility (generally).
 - (4) Exophthalmic Goitre.
 - (5) Advanced cardiac disease.
 - (6) Chronic alcoholics.
 - (7) Chronic malarial infections.
 - (8) Patients who have had heatstroke or mild sunstroke at any time.
 - (9) Certain people whose sensitiveness to exposure cannot be overcome (idiosyncrasy).
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THERAPEUTICS OF SUN'S RAYS.

In order to understand the definite therapeutic results obtained from the action of the sun's rays on the skin, it is necessary to remember that the skin is an organ of respiration, nutrition and elimination; that it is endowed with a wonderful peripheral apparatus possessed of sensitive end organs, responsive blood vessels and sweat glands; and that the close relationship between the skin, the sympathetic nervous system and the endocrine glands has been established.

The sun's rays probably act in the following ways:

- (1) By direct amelioration of the blood.
- (2) By stimulation of the peripheral circulation which partly regulates the blood supply to the viscera.
- (3) By stimulation of the peripheral sensory end-organ system in the skin, which determines the inhibition or stimulation of the trophic innervation of the internal organs (peristalsis, quantity and quality of secretions)
- (4) By stimulation of the internal secretions which determine metabolism, muscular vigour, vasomotor tonus, immunity.
- (5) By stimulation of exhausted nerve cells.

C O N C L U S I O N S .

The beneficial effects of Sunbaths can be summarised as follows:-

- (1) Recuperation of general body vitality, a feeling of euph^oia, as manifested in the face, by enjoyment of life, quickness of movements, etc.
- (2) The pigmentation of the skin increases the resistance of the body to exposure, to differences in temperature, and to infections generally. Pigmented skins are less amenable to diseases of the skin. (Cutaneous diseases 'per se' are rare in Kaffirs).
- (3) The tonus of the abdominal and thoracic viscera is restored, and the processes of digestion are stimulated; as evidenced by the increased appetite, the improvement and cure of gastric and intestinal troubles, and by increase in weight.
- (4) The internal secretions are stimulated (when deficient in quantity or quality), and the general metabolism modified in accordance with the need of the healthy organism, as shown by increase/

increase of weight in certain cases, or loss of weight in unhealthy obese individuals with return of the menstrual functions.

- (5) The general muscular nutrition and tone are increased, muscular development acquired, physical vigour and strength renewed. In this respect sunbaths are, in my opinion, superior to a course of massage. Patients after sunbath treatment are energetic with great muscular development and capable of sustained physical exertion.
- (6) Direct analgesic and bactericidal effect as proved by the fact that wounds get painless and heal quickly; the cure of staphylococcal skin infections and the rapid disappearance of pain in neuritic and myalgic conditions.
- (7) The sun's rays have a definite ionising lytic effect on pathologically formed fibrous tissue, as evidenced by the following facts.-
- (a) Old standing cases of neuritis (sciatica) and fibrositis (lumbago) recover completely, without any interference of function of affected parts or deformity.
- (b) That subacute pelvic inflammatory exudates with organisation tissue and recent adhesions disappear entirely.

(c)/

- (c) That the scar tissue of fairly extensive healed wounds, (treated by sunbaths during healing) does not tend to ultimately produce the same degree of cicatricial contraction, that generally occurs; the scar tissue remains thinner and more pliable.
- (8) Cures anaemia and chlorosis, as shown by the improvement in colour, the disappearance of such signs as headache, lassitude, general debility, etc., and the restoration of the normal menstrual functions.
- (9) Acts as a great sedative and tonic to the nervous system, inducing sleep, promoting a bright spirit, a sense of optimism and renewed power for mental application.
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