similar diets. To account for this, they believe that the rates of oxidation and excretion must vary widely. Bernheim (1926) fed large quantities of carrots to 3 patients, who quickly produced a high icteric index, which, however, fell to normal within 12 hours. In our cases the rate of metabolism seemed to be remarkably constant in the different individuals. The threshold quantity appeared to be a minimum of 4 lb. of excess carrots per week for a minimum period of seven months before skin pigmentation became visible. The rate of fading appeared to be equally constant once they returned to an average diet. Fading was first noticed in a minimum of two weeks and was complete within eight weeks. In view of Bernheim's findings of the rapid disappearance from the blood of excess lipochromes within 12 hours, it would seem that above the threshold quantity the body is unable to oxidize or excrete all the lipochrome, so that some pigment is slowly accumulating. The capacity of the body to eliminate lipochromes must be well above the normal requirements, as it takes a minimum of six months' accumulation before the high threshold is reached on such abnormal intake and before skin pigmentation is noticeable.

The findings of the remarkably constant threshold in the accumulation of pigment and of the steady rate of fading in normal individuals support the theories of diminished conversion of carotene to vitamin A in the liver of diabetics and poor urinary excretion in nephritics, as in both diseases carotinaemia occurs more frequently than in health.

Summary

Carotinaemia is a carotyl pigmentation of the naso-labial folds and palms when mild and, when marked, a general body tanning except in the sclera, which distinguishes it clinically from jaundice. It is due to the excessive consumption of carrots and other lipochromic foods. The patients are healthy and do not require treatment apart from reduction to average consumption.

Four cases of carotinaemia are described in normal women after eating more than the threshold quantity of 4 lb. of raw carrots per week for a minimum period of seven months.

A baby fed only on the breast of its carotinaemic mother developed the condition within two months. This is believed to be the first case described.

The simple three-layer test of Greene and Blackford to differentiate between carotinaemia and jaundice is described.

We are indebted to Drs. S. Smithson and M. C. Welsh for allowing us to see and investigate their cases. We wish to thank especially Dr. M. L. Thomson for permission to investigate the case of the infant of the carotinaemic mother.

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W. E. Snell (*Tubercle*, 1942, **23**, 101) maintains that garden work is the main form of occupation for sanatorium patients for the following principal reasons: (1) it provides controlled exercise for patients under open-air conditions, and thus hardens them for return to a working life; (2) it relieves the boredom of institutional life and should provide the patient with a mental interest; and (3) the patient's labour theoretically provides some return to the institution. In any sanatorium of 300 beds about 50 patients will be available for garden work, consisting of the following groups of cases: (1) early or pleural cases for which no collapse therapy is indicated; (2) patients undergoing artificial pneumothorax and those convalescent from thoracoplasty; and (3) patients not suitable for artificial pneumothorax but whose general condition is good.

BEE-STINGS IN KENYA COLONY

BY

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East Africa is a good place for studying the effects of bee-stings, because people living there are stung more often than those in England. This is in part because the common native bee, *Apis mellifica adansonii*, is more savage and eager to attack than the honey-bee of Europe, *Apis mellifica*, its near relative—for example, an expert bee-keeper of my acquaintance would often get as many as 50 stings a day while looking after her few hives of native bees—and in part because the bee population is large, the native inhabitants being apt to put up barrels, hollow pieces of tree-trunks, boxes, and other contraptions in trees anywhere and everywhere for the wild bees to hive in, the honey being used for beer-making. Further, these bees swarm all the year round, so that there is never a day when flying or settled swarms may not be met with out of doors or indoors. Finally, many East African houses, especially those that have been unoccupied for a time, acquire nests of bees in roofs, hollow walls, or under the floors that are very hard to get rid of when the house is occupied again. When they do attack, nests, hives, or swarms of native bees are apt to do so on the heroic scale. This is illustrated by the following 3 cases occurring in European settlers:

Cases of Massive Stinging: Recovery

Case 1.—A small man aged 75 was attacked by a swarm of bees in his garden. Between 200 and 400 stings were removed from his face and neck, and he was given an intravenous injection of 2 pints of 2% sodium bicarbonate solution. He showed no reaction from either the stings or the treatment, and no severe signs or symptoms.

Case 2.—A man aged 64 was attacked by swarms of bees and heavily stung about the face, neck, and hands. In 2 or 3 minutes he was overcome by violent diarrhoea and vomiting, and soon after that became unconscious. He was presently rescued and came to himself quickly. His face was so beset with upstanding bee-stings that he said he looked as if he had not shaved for 3 or 4 days. Over 300 bee-stings were extracted, and ammonia solution was dabbed on. He slept well with a sedative, and next day, apart from a little thickening and itching of the skin of the face and hands, felt quite all right.

Case 3.—A young woman set upon by swarms of bees was badly stung; she had attacks of diarrhoea and vomiting, and was rescued in a fainting condition. The number of stings extracted from her scalp, face, neck, chest, back, arms, and legs was at least 500, probably more—an hour and a half's work, including extraction of a sting from the very back of the tongue. Fine curved entomological forceps were used, and care was taken not to squeeze the venom-sacs during extraction. Dilute ammonia was applied, and the patient required a sleeping-draught and morphine. She kept to her bed next day and then recovered rapidly.

The numbers of the stings removed in these instances are those estimated by the medical men who removed them or by other observers, and there is no reason to believe that they have been exaggerated. The amount of venom injected by a single bee-sting is said by Phisalix (1922) to be 0.33 mg.; its active constituent is a protein. Case 1 suffered no more than a severe but passing inconvenience from the stings and must have had an exceptionally high tolerance of or immunity to bee-stings; Cases 2 and 3 can probably be taken as having the normal degree (if there is such a thing) of sensitiveness thereto.

Two Fatal Cases

The following two cases illustrate the fact that a man who has suffered no more than the normal transient local pain and swelling after bee-stings all his life may suddenly become hypersensitive to bee venom and be very near to death or even die when stung again.

Case 4.—A healthy man aged 45, passed fit for insurance 6 weeks previously, was stung 4 or 5 times while driving a swarm of bees out of his veranda; these stings gave rise to the usual

transient painful swellings, as stings had done in previous years, but to no general symptoms. A fortnight later he was attacked by a swarm of bees while walking along a road, and was again stung on the face 4 or 5 times; he ran away, and in about 2 minutes collapsed and died. Artificial respiration, continued for an hour, was without effect.

Case 5.—This patient, a man aged 55, owned and lived on a sisal farm which chanced to have a particularly large bee population. For 20 years he had been stung at least a dozen times a year with no ill effects beyond slight and passing local swellings. A sudden change for the worse took place in this state of affairs. One day, while playing bridge on a veranda, he was stung in the leg. He felt very ill, collapsed in 2 or 3 minutes, was unconscious, cyanosed, and pulseless for 10 minutes, passed water and motions, and struggled violently on coming to. Twenty minutes later he was well enough to drive himself home in his car. During the next 9 months he had 10 more similar attacks on being stung; each attack was said to be more severe than the previous one. The last attack but one followed a sting on the forehead; the patient walked into the house, collapsed in half a minute, and was cyanosed and pulseless for 10 minutes. Two hypodermic injections of strychnine were given and the pulse slowly returned; while still unconscious the patient passed water and motions, as always happened in these attacks, had a violent rigor, and dripped with perspiration. He was placed on a couch and slept for 4 or 5 hours, waking up perfectly well. The eleventh and last attack followed a sting in the neck, and proved fatal in about 15 minutes.

Discussion

It seems reasonable to assume that in Case 4 the patient was sensitized or rendered hypersensitive to bee venom by the 4 or 5 stings he received a fortnight before his death. But in Case 5 there is, unfortunately, nothing to show why the patient suddenly became hypersensitive to bee venom 9 months before he died, after having been quite insensitive to it for 20 years. The sensitization in Case 4 was specific; in Case 5 it may have been specific, but the possibility of non-specific sensitization to bee venom (Foulkes, 1939; Bray, 1934; Oriel, 1936) should not be overlooked.

An explanation of sudden death occurring after wasp- or bee-stings often met with in medical literature (Dyke, 1941; Barber, 1941; Cummins, 1939) is that the sting has chanced to puncture a vein in the dermis, so that some of the venom enters the circulation direct instead of being fixed and destroyed by the skin. The cases detailed above lend no

struck a vein in the dermis. In fact, this theory of venepuncture is superfluous. A better explanation of such sudden deaths can be given in terms of idiosyncrasy, hypersensitiveness, allergy, or anaphylaxis. If the signs and symptoms observed in severe or fatal cases of bee-stings are compared with those recorded (Bray, 1934; Lamson, 1924) in severe or fatal cases of serum disease, as in the accompanying Table, the two are seen to be nearly identical, and death in each case can properly be set down to anaphylactic shock.

Summary

The frequency of bee-stings in Kenya Colony is noted. Three cases of multiple bee-stings with recovery and 2 fatal cases are recorded.

The suggestion that fatal cases occur when the sting penetrates a vein is discredited.

It is argued that death in fatal cases of bee-stings is due to anaphylactic shock, as it is in fatal cases of serum disease.

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INDIRECT RADIOTHERAPY*

BY

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Radiotherapy as ordinarily practised exerts a local destructive effect. Indirect radiotherapy produces good results by its effects on function, especially that of the sympathetic and glandular systems. Radiations act very differently on cells *in vitro* and *in vivo*. Their effects cannot be measured solely by the morphological changes which they produce; other less-known modifications have a great field of usefulness in treatment.

Cardiovascular Disorders

In *arterial hypertension*, which Vaquez showed to be due to excessive development of the suprarenal glands, irradiation of the suprarenal capsules has been widely practised since 1913. Generally speaking, in chronic constitutional hypertension with no evidence of nephritis or of any other assignable cause, irradiation does not reduce the blood pressure any more readily than do the simpler methods of rest and diet. On the other hand, it often greatly relieves the functional symptoms, such as headache, vertigo, spasm, and muscae volitantes. Similar results are obtainable with high-frequency current. Moreover, exacerbations of hypertension are quickly controlled by irradiation of the suprarenals, though the underlying condition is unaltered. The dosage is comparatively slight, and no change in the suprarenal tissues has been observed at necropsy. These apparently contradictory observations may be explained by Bard's differentiation of arterial hypertension into several varieties. Some of these he suggests are compensatory either for some known disorder like nephritis or for an unknown disturbance. To reverse the physiological changes, the cause, whatever it is, must be treated. On the other hand, hypertension due to a derangement of the mechanism controlling arterio-constriction is amenable to suprarenal irradiation.

Thrombo-arteritis obliterans falls into two classes: local, due to compression, embolism, or localized thrombosis; and general. Local forms may respond to various other kinds of treatment but never to radiotherapy; in the general group, cases which develop rapidly from infection and septicaemia do not respond to irradiation, but chronic and subacute cases

* Translation abridged for publication.

Severe Bee-stings	Severe Serum Disease
Restlessness, apprehension Unconsciousness	Restlessness, apprehension Vision completely lost Unconsciousness
General Symptoms	
Erythema, pallor Urticaria Giant urticaria Itching, local or general Numbness, tingling Generalized burning pain Sweating	Erythema, pallor Urticaria Large confluent wheals Itching, local or general Numbness, tingling Generalized sudden pain
Muscular System	
Uncontrollable twitching Muscular spasms Convulsions, rigor Transient paralyses of eye, pharynx, limbs Intense weakness	Twitching of face Spasms of arms and legs Severe convulsions, tonic and clonic Opisthotonos Dilatation of pupils
Heart and Lungs	
Anginal pain in chest Heart failure Heart beating after cessation of respiration Cyanosis Acute dyspnoea Cheyne-Stokes breathing Crowing respiration Respiratory failure	Pain in chest Heart failure, syncope Heart beating for 3 to 15 minutes after cessation of respiration Cyanosis Acute dyspnoea, choking cough Typical attack of asthma Respiratory failure
Digestive Tract	
Violent diarrhoea and vomiting Loss of sphincter control Inability to swallow	Violent diarrhoea and vomiting Loss of sphincter control

support to this notion. In Case 5 one cannot believe that the bees should have missed the veins a dozen times a year for 20 years and in the ensuing 9 months punctured them 11 times in succession. And in Cases 1, 2, and 3 it is hard to imagine that not one out of so many hundreds of stings should have