field abroad. Mr. Secretary Arnold-Forster said, in reply, that the war establishment of the army provided for a considerable portion of the medical staff being civilians. As the numbers of the latter available on mobilization had not been determined on, it would not be practicable to give any precise figures on the subject. He might add that the Army Council was aware that the strength of the R.A.M.C. was not adequate, and was making every endeavour to increase it.

A Reserve for R.A.M.C.—On Monday Dr. Thompson asked the Secretary of State for War what steps he had taken to form a reserve of officers for the Royal Army Medical Corps. Mr. Secretary Arnold-Forster replied that the question of whether it might be possible to form a reserve had been under consideration, but no decision had yet been arrived at.

The Volunteers and Medical Examination.—Mr. Lambert asked by what statutory authority Volunteers enlisted for home defence were ordered to be medically examined for service abroad, and Mr. Secretary Arnold-Forster admitted, in reply, that, so far as he was aware, there was no statutory authority for the examination. He said that no such order had been given, but general instructions on the subject had been issued to medical officers to report on the general physical standard of the men. If the men refused to submit, the medical officers would make the best report they could. In reply to further questions as to whether a commanding officer had power to arrest or disgrace any Volunteer who refused to submit to such medical examination, the Secretary of State for War said that no such order as that suggested had been or would be made. The results of the examination had been very satisfactory in those corps in which it had been carried out.

Ireland.

PUBLIC HEALTH OF BELFAST.

At the quarterly meeting of the City Council of Belfast the Medical Superintendent Officer of Health reported that 158 cases of zymotic diseases had been notified, and that 62 deaths had occurred from these diseases, including measles, whooping-cough, and diarrhoea; 104 children under 1 year old had died, being a mortality of 3.7 per 1,000 of population; 863 births had been registered and 472 deaths, being a mortality of 17.1. The one case of small-pox in hospital has now been discharged.

A deputation waited on the Council to protest against the adoption of bacteria beds for the treatment of the sewerage. About 72 acres of slob land are to be reclaimed in which to institute these bacteria beds; and it was stated that the total scheme would cost about £200,000. The deputation urged that the success of the "bacteria-bed" treatment of sewerage had not been proved, and that some other method should be adopted, or, at any rate, the scheme should not be continued till further evidence of its probable results could be given.

The City Surveyor said that in Birmingham "bacteria beds" were being adopted, and that it was proposed in that city to add to the number each year. In Belfast they had been experimenting with these beds for some years. They had worked satisfactorily, and the last bed was an improvement on the former ones; the sewerage passed through it had, according to Dr. Letts, been purified to the extent of 96 per cent. On one of the warmest days of the month there was practically nothing to complain of.

AMBULANCE SERVICE IN BELFAST.

The annual report of the superintendent of the Belfast Fire Brigade shows that 2 447 calls were received during the year 1904-5 ending June 30th, being an increase of 54 on last year; an average of thirty-five minutes per journey was occupied from the receipt of the call until the carriage returned to the station; the distance travelled was 8,856 miles, or an average of 3½ miles per case. The number of calls received between 6 a.m. and 6 p.m. was 1,357; and between 6 p.m. and 6 a.m. was 1,090.

The excellence of this work is appreciated highly by the public; all the men have the certificate or medallion of the St. John Ambulance Association, and some fire brigade team always carries off a cup at the annual competition; and their reliable and practical first aid receives high commendation at the hospitals.

THE DIET OF THE PRECIBICULTURISTS.

By HARRY CAMPBELL, M.D., F.R.C.P.,

Physician, North-West London Hospital and to the Hospital for Diseases of the Nervous System, Welbeck Street.

III.

DIET OF THE AUSTRALIANS.

Vegetable Food.

THOUGH the Australians are a genuinely pre-agricultural people, they may be regarded as being on the verge of the agricultural period. Signs of dawning agriculture are seen in the prohibition they put on the destruction of trees which bear useful fruit and on the digging up of plants bearing useful seeds after they have flowered, a restriction which Sir George Grey, writing in 1841, said he never once saw wilfully violated by the natives. Again, they may be said to bestow a rude sort of cultivation when they burn the leaves of a certain kind of yam and scatter them, as a kind of manure, over the still-growing plant.

In those parts of Australia where game is scarce, the natives subsist mainly on vegetable food, and such, according to Bennett, are apt to display a craving for flesh, and to be easily led into cannibalism. Curr declares that all the Australian tribes eat largely of vegetable food, though some more so than others.

Roots.—The varieties of vegetable food consumed are to be reckoned by the hundred. "Roots" are consumed in large quantities, especially those belonging to the natural orders Liliaceae and Orchidaceae, of which the country affords many species. The women collect them in varieties too numerous to mention. They include several species of orchid; the rhizome of the bulrush, which constitutes the chief food of certain tribes living in marshy districts, and of which the women secure large bundles, which they carry on their heads in nettings; the rhizome of the bracken fern (from which the Japanese obtain large quantities of starch); yams, of which one variety containing 23 per cent. of starch is cultivated in India; the root of the native convolvulus; the bulb of a species of clematis; and the murang root, resembling a small parsnip, and much esteemed on account of its sweetness. These roots are dug up by means of sticks, and always by the women.

The Smaller Seeds.—Among the more important of these are the seeds of many grasses, including millet, the silver wattle, bower grass, and the grass called jaboola; acacia seeds, and the seeds of the pigweed or purslane of England. These latter have the appearance of gunpowder, and are obtained in large quantities by pulling up the plants, making them into heaps, and after a few days collecting the seeds which have dropped out upon the ground; during the season the natives are said to get into splendid condition on this food. All the foregoing are ground and made into cakes or loaves.

The Larger Seeds and Nuts.—The seeds of the bunya cone constitute a valuable food; the cones are over 1 ft. in length, and the seeds bigger than chestnuts. When the ripening season arrives—generally in January—the natives assemble in the bunya groves from long distances round—sometimes as far as 100 miles; each tribe has its own trees, of which a certain number are allotted to each family as hereditary property—the only instance of such inheritance among the Australians. Among the other larger seeds may be mentioned those of the cycas, pandanus, and several species of leguminous plants, such as the beans of the bean tree. The Queensland nut, about the size of an acorn, is much esteemed both by the natives and Europeans on account of its excellent flavour, and timber merchants are prohibited by Government from felling the trees bearing it; it is, indeed, said to be worthy of extensive cultivation.

Luscious Fruits.—Though the Australians eat many different kinds of fruit and berries, these do not constitute an important part of their food, save as a source of acids and salts. Among such fruits may be mentioned the geebung, which is described as mucilaginous and insipid, and the kangaroo apple, which resembles a potato; the fruits of the Epacridae (dwarf shrubs), for the most part small and containing a large stone, some being known as native cranberries; the native raspberry and the fruit of the pig-face. Wild figs, pears, oranges, blackberries, and gooseberries are said to occur in certain parts, but they do not appear to be of much account dietetically. The southern parts of Australia are remarkably deficient in luscious fruits, one of the few deserving the name being the hurt, which is described as "like a cherry without the pip"; it is gathered in large quantities by the natives, who come from long distances for the purpose,

remaining in the district where the fruit grows as long as it lasts.

Greens.—Central Australia, forming as it does the bed of a dried-up salt-water ocean, abounds in highly saline plants. Some of these, such as the pig's-face (*mesembryanthemum*) and sow thistle, are, on account of this very richness in saline material, consumed in large quantities. Eyre, writing in 1845, says: "The thick, pulpy leaf of the pig's-face is in general use in all parts of Australia which I have visited, and is eaten as a sort of relish with almost every other sort of food." Other green vegetable goods are: clover, the young shoots of the bulrush, and the young leaves of the native cotton bush—these green foods are either cooked or eaten raw—the bases of the inner leaves of the grass tree and the budding leaves of a species of palm tree. The Banksia flowers, called by the early settlers honeysuckle, yield a considerable quantity of a honey-like liquid, which is eagerly sucked out by the aborigines; the plant has a wide distribution throughout Australia.

Mushrooms.—Several kinds of mushroom are eaten, also an underground fungus, about the size of an ordinary turnip, called by the white people "native bread."

Gum.—The gum of the acacia, or common wattle tree, is largely consumed by the Australians, as well as employed for cement, and each man has an exclusive right to a certain number of the trees. As soon as the summer heat is over notches are cut in the bark to allow the gum to exude, when it is gathered in large lumps and stored. Short, in his travels, found a number of bark boughs filled with the gum of the mimosa, and large cakes of it upon the ground. One variety of acacia yields large quantities of gum tragacanth, and in the proper season the natives assemble in the acacia district for the purpose of collecting the gum, these meetings being generally made the occasion of their annual barterings. The gum is not only used for the purpose of chewing, but is apparently regarded as an actual food, though physiologists tell us that it has no nutritive value.

Manna.—This is a sweet substance which exudes from the leaves of some kind of gum tree, and drops in pieces resembling small lumps of loaf sugar. Mixed with acacia gum and dissolved in water, it constitutes one of the few artificial drinks of the aborigines.

Another sweet liquid is obtained by boys by inverting young parakeets and compelling them to disgorge the honey-dew after they have been fed by the old birds.

Intoxicating Liquors.—Alcohol is unknown, except through the white man. The natives get a certain amount of stimulus by chewing "pitcheree," which is made by munching twigs of a certain plant into a mass, which is then mixed with gum-tree ash; long journeys are periodically made to obtain the twigs. Leaves of a plant called murradutta, supposed to be pitcheree, are dried in the sun for chewing, and are said to possess intoxicating properties.

Honey.—Wild honey is a favourite food, and is obtained in considerable quantity. If the hive has been exposed to the sun the honey is apt to be sour from fermentation. Not possessing vessels, a common plan of consuming it is as follows: a piece of the inner bark of a tree containing an abundance of bast tissue is smeared with honey, which becomes partially absorbed; the mass is then sucked and chewed by all the company in turn, and, when all the honey has been in this way extracted it is replenished with honey and again sent round.

The Gathering of Vegetable Foods.—As with other primitive peoples, the task of gathering vegetable food falls to the women; they dig up the roots with a pointed stick, no light task, as may be gathered from the fact that to obtain a yam one foot long and half an inch round a hole has to be dug a foot square and two feet deep. The children help the women in collecting the vegetable food, and it is not unusual to encounter large parties thus engaged.

The Preparation of Vegetable Foods.

The black fellow prepares his vegetable food in a variety of highly elaborate ways, and is able to convert many acrid and poisonous substances into wholesome and agreeable foods, so skillfully indeed as actually to suggest to Curr Divine intervention—surely no small tribute to the intelligence of these people. How complex are their methods of preparation is shown by the fact that the natives of one district may be quite unable to utilize as foods many of the vegetable substances on which their neighbours subsist, "so little do they look like what man might live on"; as well as the fact that the scientific explorer, Dr. Leichhardt, though he found

in a deserted camp a quantity of food in every stage of preparation, was unable, even with the hints thus afforded him, to provide his almost starving party with anything they could eat.

As we should expect, some of the vegetable food, such as luscious fruits, certain nuts and seeds, and green foods, are eaten uncooked. Roots, such as the murrang root, the bulbous root of the common orchid, the root of a variety of sedge resembling celery, are also eaten in the raw state much more frequently than is the case with us moderns, who rarely eat any "roots" uncooked. This fact is of interest as reminiscent of prehistoric times, and makes it highly probable that man had already learnt to grub up roots for food before he began to cook them. Other vegetable foods eaten raw are the pig's-face, sow-thistle, and several varieties of fungi.

Methods of Cooking.—Boiling may be said to have been practically unknown to the Australians before they came in contact with the white man, for they were ignorant of pottery, and had not learnt the art of stone boiling in water-tight baskets. Such vessels as they possess are made of wood, bark or the hides of animals. Thus we read that on the march they carry water in bags made from an opossum's hide skinned, after an incision has been made round the neck, from the head downwards, without any further cutting except at the feet; the smaller openings thus made are then tied up, when the bag is ready for use, the fur being inside. Wooden bowls are also employed.

They cook their food over a fire, or in burning embers, or, finally, in underground ovens, which appear to have been employed by all the primitive races of man. A hole is dug in the ground and filled with stones, over which a fire is burnt; the stones and ashes are then raked out, and the article to be cooked is placed between layers of the hot stones; some damp grass or leaves are then put on the top—sometimes the oven is first lined with them—and the contents are covered up with grass, leaves or the like, these being kept in position by a sprinkling of earth. The steam generated by the heat (which is the active agent in the cooking) is thus confined, and after some hours the food is ready for consumption. These ovens are dug wherever the tribe happens to encamp, but sometimes the same ovens are used year after year, and in favourite resorts in South Australia large accumulations of ashes are met with, some of them 5 ft. high and 80 yds round. Certain tribes do not employ oven cooking, but some, at least, of these were formerly in the habit of using them.

Preparation of Vegetable Foods not involving the Removal or Destruction of Noxious Ingredients.—The roots of the parsnip-like murrang are washed, placed in specially-made rush baskets, and deposited overnight in underground ovens, so as to be ready for breakfast next morning; and when several families cook their roots together these baskets may form a pile 3 ft. high. This task is performed by the women, and when it is considered that the baskets can never be used more than twice, it will be allowed that it involves considerable labour. Other roots, such as the bulbs of the clematis and native convolvulus, are cooked in similar fashion. The nut-like seeds of the bunya are roasted after a preliminary bruising, much as we roast horse chestnuts, or they are pounded into a meal called "manu." Various grass seeds are ground by means of stones into flour, which is mixed with water and then eaten uncooked or made into cakes. This practice of eating raw flour is of great interest, as it raises the question whether man may not have learned to prepare his food in various ways before he began actually to cook it. Various roots are similarly pounded up and eaten raw. The grinding of seeds, roots, and other vegetable substances into flour or meal obviously increases their digestibility and saves the work of the masticatory organs. A large number of roots are pounded into paste and then made into cakes and baked. A kind of bread is made from the root of the common fern. The flour which the black fellow is able to prepare is by no means to be despised, for Mitchell, referring to some cakes which the aborigines made from the rhizome of a species of bulrush observes: "They seemed to me to be lighter and sweeter than those prepared from common flour."

Preparation of Vegetable Foods Involving the Removal or Destruction of Noxious Principles.—The objectionable ingredient is either got rid of by maceration, by heat, or by a combination of both; or, again, it is neutralized by admixture with some substance. The by-yu, or pulp encasing the nut of a certain palm, is violently cathartic and emetic, as Captain

Cook and his party, who came upon a collection of these nuts in a native encampment, found to their cost. It is prepared as follows: the nuts, which the women collect in March, are placed in shallow pools of water and left to soak for several days, after which they are transferred to holes—about 1 ft. in diameter and 2 ft. to 5 ft. deep—dug in dry sandy soil and lined with rushes; the contents are then sprinkled with sand and covered in with leaves, and in about a fortnight the by-yu is found to be quite dry and fit for consumption, being eaten raw or roasted; the kernel remains poisonous. All the cycadaceous plants appear to be pervaded by a virulent poison. The nuts of the nut palm (*Cycas media*) are prepared as follows: after the kernels have been bruised they are dried in the sun and then steeped for three or four days in a running stream, whereupon they are pounded between two stones—a large flat bed stone and a smaller one held in the hand—into a fine paste, and finally baked under ashes. The beans of the bean tree are steeped from eight to ten days in a running stream; they are then roasted on hot stones, and afterwards pounded into a coarse meal, which can be kept for an indefinite period; from the meal thus obtained biscuits resembling ship biscuits can be prepared by mixing with water and then baking. The acrid and cathartic nature of the mene (*Haennadorum*) is destroyed by pounding it along with earth. The root of a plant common about the creeks—probably a lily—is pounded, and in this way much of its pungent juice removed.

The Extraction of Starch and Sugar Unknown.—It is somewhat remarkable that though many of the vegetable substances which the Australians submit to elaborate preparations contain an abundance of starch, these people should not have hit upon the plan of extracting that valuable nutritive ingredient. Nor have they succeeded in extracting sugar, although many of their vegetable foods are rich in it; so much so, that in 1876 an application was made at the Patent Office Melbourne for patenting a method of extracting the sugar from one of these. The explanation of the backwardness of the Australians in these respects is doubtless to be sought for in the fact that, possessing neither metal nor pottery, they lack the means of carrying out the process.

The Storage of Vegetable Foods.—The Australians do not appear to store their vegetable food to the same extent as some other preagriculturalists—for example, the Californians—possibly because their roving habits enable them to secure an adequate supply throughout the year. They sometimes store bunya nuts; netted bags are filled with the nuts and buried; after some months they are taken up, and in spite of their offensive smell, are eaten with great relish. Gum is stored in considerable quantity.

The Rotation of Food.

Like all preagricultural people, the Australians are wanderers—that is, they have no fixed abode, but wander about from place to place in search of new pastures and hunting grounds. If a tribe remained at one spot it would perforce starve, for all the game would soon be scared away and all the vegetable food exhausted. Hence they are kept continually on the move, the direction of their wanderings being determined mainly by their search for vegetable food. They visit particular districts when the vegetable foods which grow there are ready to be harvested, hunting game by the way. Thus we are told that in Western Australia every season of the year yields some species of orchid root, and that "the natives regulate their visits to the different districts accordingly." The natives will travel a hundred miles to a bunya district when the nuts are ripe, and remain there so long as they last; and they similarly flock to the acacia districts when the time for gathering the gum arrives. This roving habit induces a similar roving habit in the kangaroos, emus, and other game.

Quantity of Food.

According to Sir George Grey, there are two periods of the year when food is apt to be dangerously scarce—namely, the hottest part of the summer and the height of the rainy season; but he says it is a great mistake to suppose, as some have done, that the natives often suffer from want of food, because, by properly regulating their visits to districts when the vegetable food is ready for consumption, they can secure an abundance throughout the year. He enumerates upwards of 200 different kinds of animal and vegetable food which the natives inhabiting a comparatively small area in South-Western Australia are able to secure; and Curr, referring to

certain tribes, says that before the arrival of the white man they were abundantly supplied with animal food in the shape of bird, beast, and fish. Again, we read that during the pig-face season—which lasts from January to the end of the summer—the natives lead a comparatively easy life; also that they get fat during the bunya season, and on the seed of the pig-weed, which in some parts grows in great abundance.

General Observations.

Infants in Central Australia are not weaned till between 2 to 3 years of age, and long before this are given any food which they can eat, "except those kinds of vegetable which are likely to disagree with them." We are expressly told that no ritual restrictions in regard to animal food are imposed on children till after the age of 12 years, which suggests that it enters largely into their dietary.

Curr says that he never even heard of a cripple among them. The natives tell the moans of a dying man by the simple expedient of killing him. Even partially bald heads are a rarity.

The Australians employ numerous remedies for disease. A severe flesh wound is treated by first sucking it and then applying a poultice of stewed green leaves; for indigestion the drinking and external application of cold water are resorted to; sometimes the sick person drinks the blood flowing from the cut vein of a companion.

CHIEF REFERENCES.

T. L. Mitchell: *Three Expeditions into the Interior of Eastern Australia*. 1839. George Grey: *Journal of Two Expeditions of Discovery in North West and Western Australia*. 1841. James Backhouse: *A Narrative of a Visit to the Australian Colonies*. 1843. E. J. Eyre: *Journals of Expeditions of Discovery into Central Australia*. 1845. F. W. L. Leichhardt: *Journal of an Overland Expedition from Moreton Bay to Port Essington*. 1847. T. L. Mitchell: *Journal of an Expedition into the Interior of Tropical Australia*. 1848. John Forrest: *Explorations in Western Australia*. 1875. R. Brough Smyth: *The Aborigines of Victoria, with Notes, etc.* 1878. G. Taplin: *The Narrinyeri: An Account of the Tribes of South Australian Aborigines*. 1879. James Dawson: *Australian Aborigines*. 1881. A. W. Stirling: *The Never-Never Land*. 1884. E. M. Curr: *The Australian Race*. 1886-7. A. R. Wallace: *Australasia*. 1888. Carl Lumholtz: *Among Cannibals: An Account of Four Years' Travel in Australia*. 1889. J. H. Maiden: *The Useful Plants of Australia*. 1890. F. Rätzsch: *The History of Mankind*. 1896-8. A. F. Calvert: *The Aborigines of Western Australia*. 1894. B. Spencer and F. J. Gillen: *The Native Tribes of Central Australia*. 1889. A. H. Keane: *Man, Past and Present*. 1899.

THE THERAPEUTICS OF YEAST.

WE have received from Messrs. Cooper and Co., of South Kensington, samples of Jacquemin's therapeutic yeast, for which it is claimed that it is a pure ferment of grapes—that is to say, a special culture of the *saccharomyces ellipsoideus*, which will live and ferment actively in the stomach in spite of the acidity of the gastric juices. The specimens we have received consisted of a large bottle of unfermented grape juice and a small bottle containing the ferment. The directions given are to pour the contents of the small bottle into the large bottle, and place the latter in a warm place for a few days until fermentation has started. A tablespoonful is directed to be given in half a tumbler of water, together with a small piece of loaf sugar, twice daily about an hour before meals. By following these directions, the ferment is supposed to grow actively before digestion commences, while its action will be continued upon any sugars which reach the stomach, whether these be natural sugars or the result of the diastatic action of the saliva on starches. We have followed the directions given, and found that in an artificial digestive experiment the wine ferment grew actively in the presence of twice the quantity of normal gastric juice, so far fulfilling the claim made by the maker; but similar experiments made with various pure cultures of yeast gave equally good results, although they had not undergone any special training to stand the acid medium. We also tried two specimens of therapeutic yeast sold under the names respectively of "furunculin" and "zymin." In the case of the former fermentation followed, and budding was marked; in the case of the latter both fermentation and budding were slight. The pure culture yeasts used were: *Saccharomyces cerevisiae* (Logos), bottom yeast; *saccharomyces cerevisiae*, top yeast; *saccharomyces apiculatus*, and *saccharomyces ellipsoideus*.

Therefore the quality of growing and fermenting in the presence of gastric juice does not seem to be peculiar to Jacquemin's special preparation.

We have also given this wine ferment in the manner directed to a diabetic patient who was passing a known quantity of sugar; the case was one of mild diabetes in an elderly man, and the quantity of sugar daily was in round