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Contributors

Smith, Wilberforce.
Royal College of Surgeons of England

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THE TEETH OF TEN SIOUX
INDIANS.

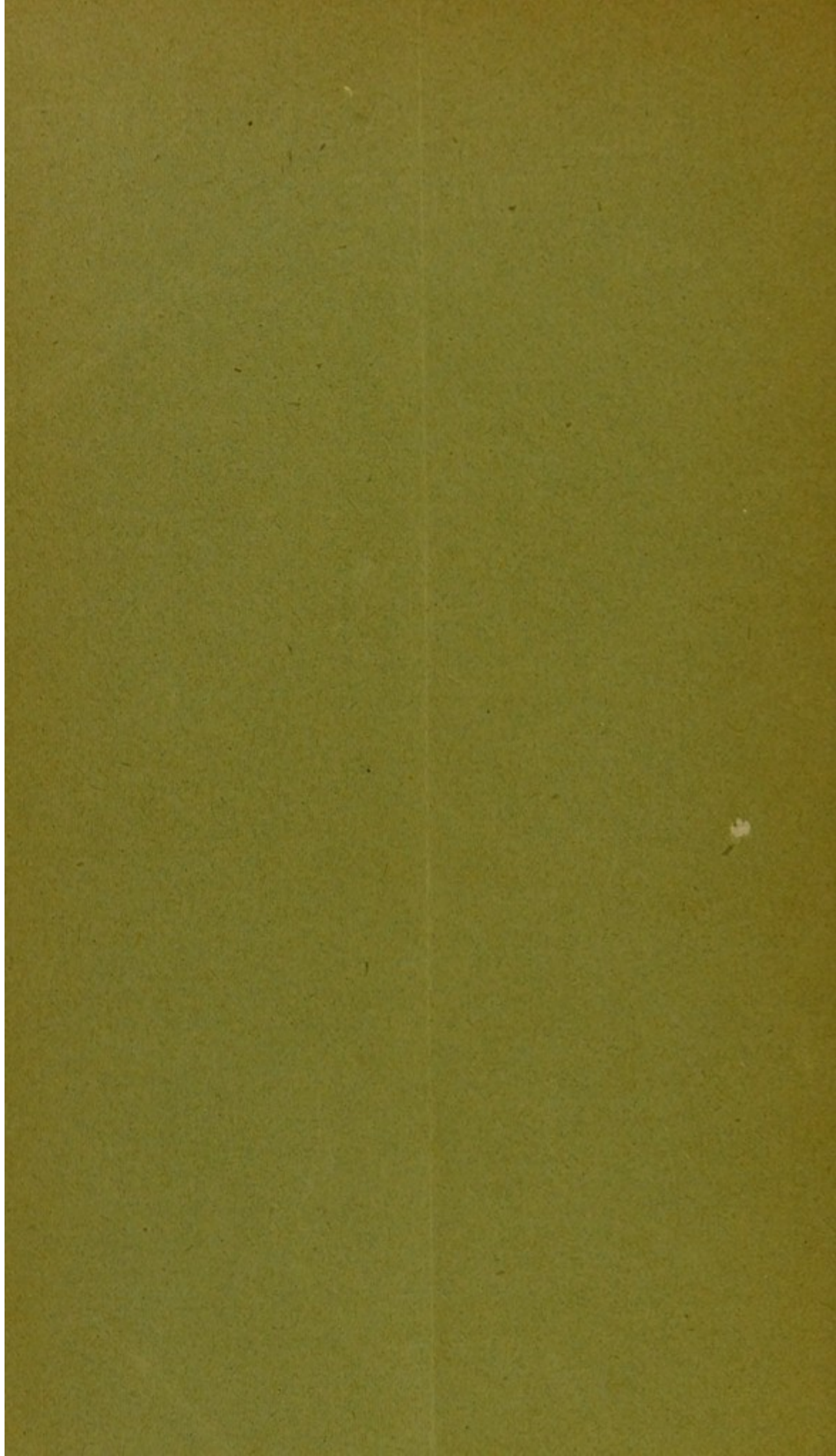
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BY

DR. WILBERFORCE SMITH.

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The TEETH of Ten SIOUX INDIANS. By Dr. WILBERFORCE SMITH.

[PLATES XIV, XV.]

THE teeth of savages in general have characteristics which are well known to scientific osteologists. (Fig. 1.) They resemble precisely those found in skulls of ancient men, not necessarily savages, and are greatly superior to the teeth of modern civilised races, alike in development and in freedom from decay.

The object of the present communication is to give numerical record to this superiority as found in some living savages, viz., in the Sioux Indians who lately visited London. It was obtained with some difficulty in ten consecutive cases.

The form of the record has been determined by the fact that it was undertaken as a fragment of a larger investigation. The latter has a hygienic purpose hardly within the scope of the Anthropological Institute, but it may be briefly mentioned for the purpose of elucidation. An attempt has been made during some years past, to obtain adequate statistics of the average amount of decay of teeth in our own country, that decay being in amount very large and as some think very disastrous. Several years before learning that Dr. Cunningham of Cambridge and others were engaged in kindred work, I had set myself the task of counting teeth, exclusively from the physician's point of view, viz., as pairs of grinding teeth duly opposed and available for mastication. According to this method, I have counted exclusively molars and premolars; and these, not as individual teeth, but only as they form opponent pairs. Single teeth without opponents have been left out of account. To illustrate non-opposition of teeth, I here show a model taken by a dental friend, from the mouth of a member of my own household, 51 years of age. It shows seven good grinding teeth, molars and premolars, but the missing teeth have been lost in a manner so unfortunate for the owner's mastication, that there remains only a fraction of one grinding pair, calculable as a third of a pair. (Comp. also Fig. 2.)

The precautions adopted to secure accuracy in counting, I

will not dwell upon here, especially as they are of little or no consequence in enumerating the regular well preserved teeth of savages.

When the Sioux Indians brought from America by Colonel Cody ("Buffalo Bill") were performing in London, Sir James Crichton Browne, who had already promoted the above mentioned hygienic investigation, suggested that I might seek an opportunity of examining their teeth, and he kindly obtained for me an introduction for the purpose. I hoped accordingly to have been allowed to examine the whole camp at Earl's Court, and so to have obtained fairly large statistics. On my first visit, after much waiting, and adopting various forms of persuasion with the stubborn and suspicious Indians, I obtained the opportunity of examining ten men, all in one or two tents. Then alarm was taken, and on two visits to the camp on subsequent days, I failed to obtain any additional case. Taking models of mouths, for which purpose I was accompanied by a dental co-worker, was out of the question. The results in these ten men are, as will be seen, so uniform and characteristic, that paucity of cases is of less consequence.

Probably most of the Fellows and visitors present had the opportunity of seeing these Indians. The photographic portrait produced (Fig. 3) of one of the tribe will be recognised as characteristic. Their teeth alone proved them to have led the life of genuine savages.

The perfection of these teeth was almost startling to one accustomed only to daily observation of mouths in a modern civilised community. The jaws, broad and regular in shape, presented massive admirably formed teeth, evenly ranged. There was no absence of any single grinding tooth except where wisdom teeth appeared to be wanting. I have to note that the light within the Indian tent was somewhat dim, and the men intolerant of any prolonged examination, but so far as could be discovered, there was an entire absence of caries. Some doubtful discolouration in the teeth of the oldest man, "Plenty Wounds," may have indicated a beginning of the morbid process. In any case, it was true of him, as of all, that no tooth had by reason of decay, lost its contour. The cusps were in most cases worn down to a level polished surface. (Comp. Fig. 1.) Exceptions were found in the teeth of several younger men, and in some wisdom teeth of the seniors. These exceptions, in regard to the state of the cusps, are instructive and will be again referred to. The Indians made halting statements about their ages, and these must be taken as approximate. There was no case, however the fact may be accounted for, between the ages of 21 and 39. Possibly men of such age could be ill-spared from their Indian homes.

The following are the results in tabular form and in age-succession.

YOUNGER GROUP.

Good Son ..	15 years ..	4 mol.	4 premol. pairs	Cusps but little worn.
Good Shot ..	20 „ (apparently, or younger).	4 „	4 „ „	Teeth comparatively little worn.
Good Elk ..	20 years ..	4 „	4 „ „	Cusps worn down.
Lily Boy ..	20 „ ..	6 „	4 „ „	{ Cusps but little worn. Incisors rather crowded.
Bringset ..	21 „ ..	6 „	4 „ „	Teeth mostly worn down.

MIDDLE AGED GROUP.

Little Bear ..	39 years ..	6 mol.	4 premol. pairs	Cusps on wisdom teeth only.
Good Eagle ..	39 „ ..	6 „	4 „ „	{ Cusps on left upper wisdom tooth and remains of cusps on premolar teeth.
Little Wolf ..	40 „ ..	4 „	4 „ „	Cusps retained on right upper molar only.
Good Boy ..	40 „ (about)	6 „	4 „ „	Cusps worn down.
Plenty Wounds	50 „ (apparently).	6 „	4 „ „	Teeth much worn down.

No information would be added by giving the sides of the mouth separately, for they were in every case uniform.

Wisdom teeth are seen to be wanting in three out of five men of the age of twenty and under, just as might be observed amongst our own countrymen of similar age. And two pairs of molars are wanting in one man ("Little Wolf") whose age was stated to be forty; it appeared probable that he had never possessed complete wisdom teeth.

Numerical comparison with the teeth of civilised persons can be readily made. Hitherto I have recorded and in part published the results of examining some 300 consecutive cases of dwellers in London, wholly unconnected, excepting one set of out-patients, with medical or dental practice. Amongst these London inhabitants, the essential modifying condition is age. And it occurs conveniently, that eight out of the ten Indians can be divided into two age groups. Against the four younger men of 20 to 21 years, I have arranged all the London inhabitants of the same age, viz., nineteen consecutive cases (none being

out-patients). And against the four older men of 39 to 40 years, I have arranged all London inhabitants of the standard age-period 35 to 45, viz., twenty-two consecutive cases.

Of *molar* teeth, the four younger Indians had an average of 5 opponent pairs, instead of the 6 which they would have possessed if the wisdom teeth had been complete. Against these, the average of nineteen London inhabitants had just half the number of pairs, viz., 2.50. At the older period the Indians had an average of 5.5 molar pairs, against London inhabitants 1.12. Thus advance of years which had occasioned no loss to the Indians, had left the London inhabitants of 35 to 45 years, with but a small fraction of the normal masticating surface furnished by molar teeth.

Of *premolar* teeth, at the earlier age-period, the Indians had their complete number, viz., 4 opponent pairs against London inhabitants 2.53 pairs. (Amongst the latter the well-known rule thus obtains, that premolars are, on the average, longer preserved than molars.) At the later age-period, the Indians had still the complete number of 4 each. I have no sufficient records of premolar pairs in Londoners at this particular age, but if loss continued *pari passu* from previous age-periods, the number would hardly exceed 1 pair.

The illustration (Figs. 4, 5) shows these results in diagrammatic form for one side of the mouth, it being understood that teeth wholly unopposed are indicated as if non-existent, and that in the Indians there were no unopposed teeth. The oldest Indian ("Plenty Wounds") is placed by his evident years, outside the groups indicated. He could not or would not state his actual age; it could not have been less than 50. But this man had the full normal complement of premolars and molars, wisdom teeth included. At a time of life in which the average masticating capacity of London inhabitants is approaching a vanishing point, our great poet's words, "Age cannot wither," appear to be applicable to the teeth of savages.

But only part of this superiority is indicated by the numbers given. The whole masticating capacity is not shown by counting. If breadth and regularity of grinding surface might be numerically expressed, the Indians' record would be much higher still.

A question may present itself,—were the Sioux brought over to the "Wild West" show, exceptional men with exceptional teeth? But as before noted, when the skulls of savages or of ancient men are compared in any series of museums in this or other countries, such teeth are constantly found, whether derived from ancient sources like British barrows, or from existing savage regions in North or South America, Asia, Africa or

Oceania. Our President for the evening, as a scientific osteologist, will I am sure confirm this generalisation. I here show in illustration savage skulls brought to-night from the collection of the Institute, at my request. (See Fig. 1.) Amongst the skulls in a museum, however, many have been damaged *post mortem*. Others are selected specimens. Hence an object of the present paper is to afford actual numerical record in consecutive cases of living savages at ages approximately ascertained. Moreover an exceptionally powerful frame is not necessarily associated in the same race, with exceptionally good teeth. Information as to the presence or absence of such association is desirable. In the case of twelve of the Horse Guards whom I had the opportunity of examining in 1892, men of magnificent development and muscularity, the grinding teeth were in only a trifling degree better preserved than in average London inhabitants of corresponding age.

Greater wear and better preservation of teeth, may be shown I think, to be linked by no mere coincidence, but by a true causal relationship. The adage applies, that it is better to wear than to rust. The difference between the teeth of savagery and of civilisation, is in part like that between the polished rails of a main line and the rusted metals of a disused siding. All who have undergone the operation of filling a tooth at the hands of a dentist, know by disagreeable experience that his first care is to "prepare" it by grinding away all traces of decay, and polishing the diseased surface. Part of the action of savage feeding is to keep teeth in a constant state of "preparation."

Amongst facts indicating that more wear is associated with less decay, it is seen that amongst the much decayed teeth of our own country, those situated in the front of the mouth, incisors and canines, are on the average far better preserved, but more worn. Their comparatively superior preservation is indicated alike by daily observation and by copious statistics.¹ Such front teeth by their position are exposed to much inevitable friction apart from actual mastication, viz., by prehension of food after it has been lifted to the mouth, by the movements of the tongue and lips, and by the contact of such articles as knives, forks, and spoons. But the important molars and premolars are artificially preserved from wear. Food is rendered soft by cooking, is divided by the implements of the table into morsels small enough for swallowing without mastication and without interruption of table talk. Its progress is quickened by sips of liquid. The results of vomiting show that it is commonly bolted by persons who are quite unaware of their habit. In the lower animals, the conditions are more nearly like those of savage

¹ *Vide* Tomes' "Dental Surgery."

human life, and in like manner the cusps of the teeth are worn down, whilst caries is very rare. An exception occurs in the case of pet animals such as dogs fed on food which they, like their owners, can swallow with little or no grinding. In them, caries is common. The deposit of tartar on the less used side of the mouth, is a familiar circumstance of a kindred kind.

The details of attrition processes capable of levelling down tooth crowns, are not sufficiently made out, and it would be interesting to have any information from the Fellows of the Institute. Much has been ascribed to the effect of gritty particles in unwashed food. I propose a little later to offer a reason for believing that this influence has been over-rated. Absence of table knives and forks involves the use of the teeth for dividing the food into morsels and for gnawing meat from bones. Such morsels must usually be large and with difficulty swallowed until masticated. Cracking nuts, use of coarse meal, and lack of conveniences for eating and drinking together, have their influence. The effect of uncooked fruit and vegetables becomes evident if we compare raw apples or turnips with the same foods stewed or mashed. And the texture of raw vegetable foods involves a cleansing, polishing action. Thus sliced raw potato is amongst agents popularly used for cleaning bottles. And apart from eating, there remains the use of the teeth as implements and tools. Even in our own country, it is not uncommon to see twine or thread held or severed by the teeth.¹

In considering such effects of life habits, I find it interesting to notice that skulls in the museum at Pompeii show teeth worn down, much as in savages. This is noteworthy as occurring amidst a state of advanced ancient civilisation. The effect of using or not using knives and forks at meals may be regarded as important here.² On the other hand, it is unlikely that amongst such a people, dirt taken with food could be an important factor. This therefore militates against the grit theory.

The skulls of mummies are also instructive. It has been

¹ After this paper was read, a Fellow pointed out amongst exhibits to the Institute upon the table for the evening, a small musical instrument of a savage people, one end of which was intended for fixing between the teeth.

² A learned friend, Mr. W. Stevens, kindly sends me the following note: "I looked up Becker's *Gallus* as an authority on matters of detail, and find that even as late as the first emperors, down to the time of the destruction of Pompeii, the knife at dinner was not much used, except by the carver; knives were still relatively scarce. The fork did not come into use till long after. The first mention of it at the dinner table is in Italy at the beginning of the fifteenth century. It was a part of good breeding to use the fingers with cleanliness." I must add, however, that amongst Pompeian implements contained in the museum at Naples are small two-pronged forks, whatever their purpose. References to Roman authors, kindly furnished by Mr. Prickard, Fellow of New College, Oxford, showing use of fingers, are deferred for lack of space.

stated¹ that the teeth of ancient civilisation as shown by Egyptian remains, resemble those of modern life. But by such skulls as I have examined, this statement is not confirmed. In the Anatomical Museum of Edinburgh in 1892, I carefully noted by permission of Sir W. Turner, the six mummies belonging to the Henderson Trust Collection. In such skulls as showed grinding teeth the cusps were worn down and no caries could be seen. In the much larger collection of the College of Surgeons in London, the same conditions obtain in the jaws which I have observed. Thus taking at hazard a row of seven mummies' skulls belonging to the Fourth Dynasty, from the collection of Dr. Flinders Petrie, and numbered B 583, d, e, f, g, h, i, and k, the teeth are admirably preserved, with no sign of caries, whilst the cusps are effectually worn down.

The amount and duration of wear required for levelling down the crowns of teeth, are evidently great. This is indicated by the following facts. In civilised persons there is rarely evident, even in advanced years, any approach to such levelling in grinding teeth, notwithstanding that they are exposed to a certain amount of attrition, and although wearing down is often seen in the incisors of adults. And amongst the Indians under consideration, many years were evidently required for its production. Thus in three out of five younger Indians, aged 15 to 21, it has occurred, as noted in the foregoing table, in only slight degree. And even amongst older Indians, it is seen that the wisdom teeth have in several instances had their cusps preserved, evidently because these were the latest teeth, although erupted for many years. Two cases amongst civilised men have, in the course of years, attracted my own attention as presenting some degree of the levelling process in grinding teeth. One of these was a sealing commander (Capt. C.) who had come from Behring's Straits on business with the Hudson's Bay Company. Observing this peculiarity, I enquired of his past life, and elicited that he once spent some years (five or six I think) in the interior of Patagonia, living amongst the natives and partaking of their life. These years had sufficed to produce a degree of wear which, although sufficient to attract attention, was comparatively slight. In another patient (C. M., Esq.) a similar condition noticed in some of the grinding teeth, elicited the fact that he had, as an officer of border police, spent nine years in the Australian bush, so remote from civilisation, that he had used nothing more like the implements of the table, than the sheath knife at his belt. I show a model of his teeth taken by a dental friend.

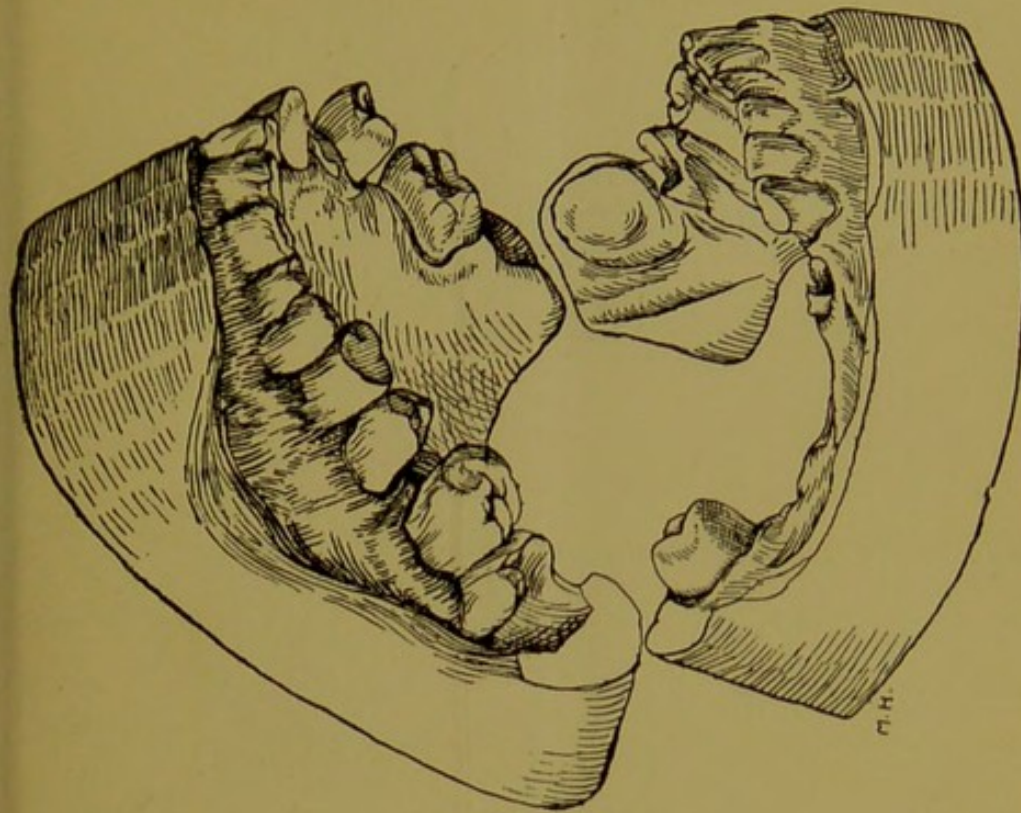
How far race, apart from habits of eating, may contribute to superiority of teeth in living savages, I have no facts to

¹ Comp. *Tomes, op. cit.*

indicate. It would be of much interest if any could be elicited from anthropological observers, particularly cases of men of savage birth, who had lived from childhood amidst the habits of civilisation. And converse facts would be welcome as to the state of the teeth in any persons of civilised birth, who had, from childhood, lived amongst savages, and eaten after their manner. And still another question of great practical importance presents itself, viz., what habits in eating and drinking may be required by civilised persons from childhood onwards, in order to produce, not such amount of wear as is seen in the teeth of savages, but such as may keep the grinding teeth naturally polished and normally preserved. But the reply is not within the scope of the present paper.

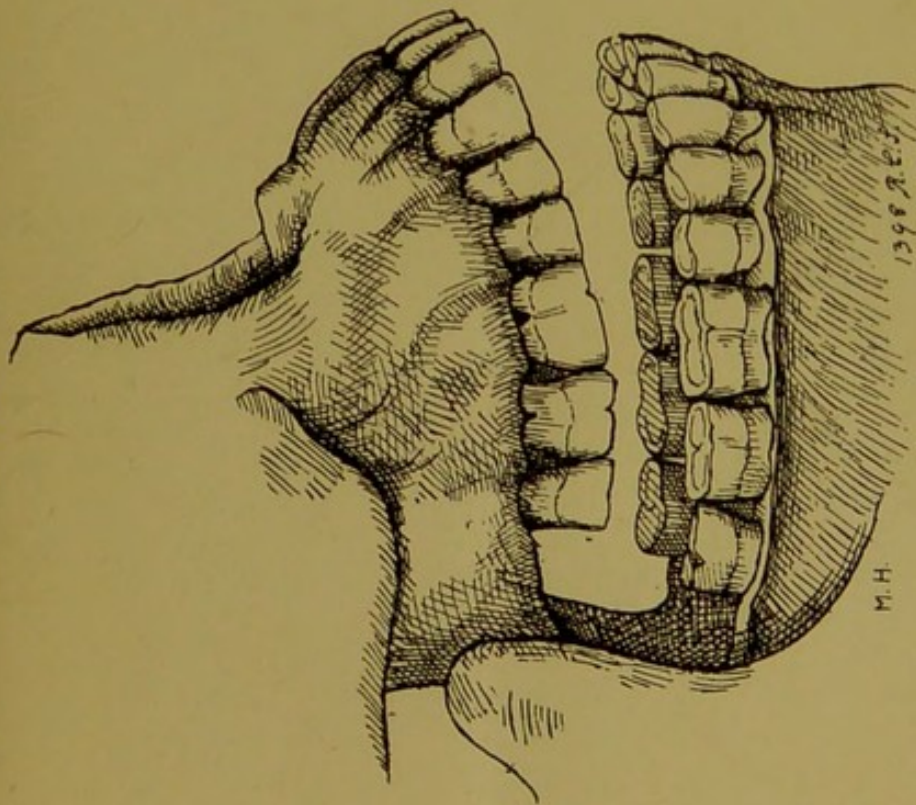
[An additional note to this paper will be given in the next number of the Journal.]

[*Reprinted from the Journal of the Anthropological Institute, November, 1894.*]

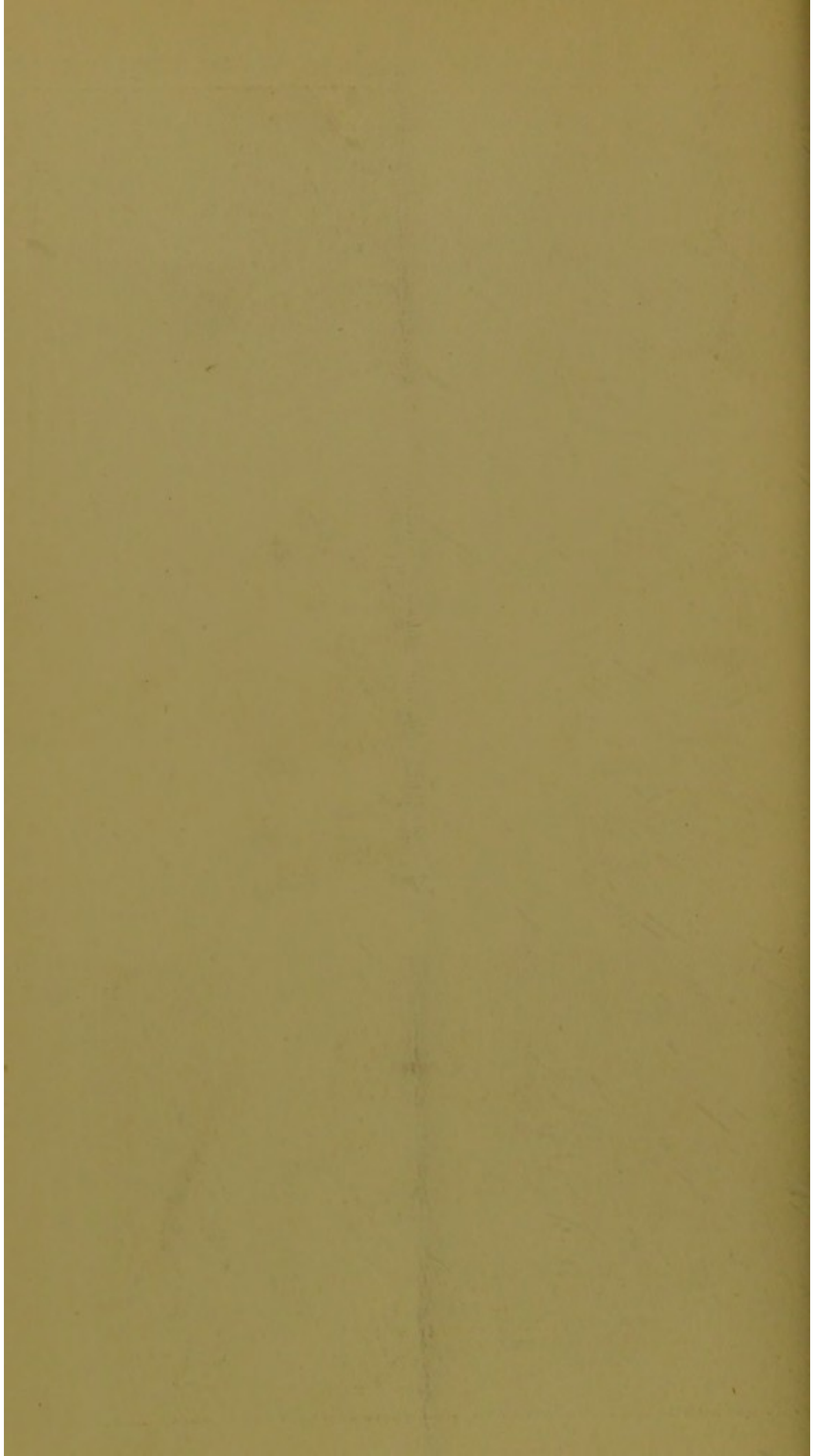


JAW OF LONDONER, showing preservation of cusps and mal-opposition of surviving teeth (from a cast).

FIG. 1.



JAW OF AVERAGE SAVAGE, indicating wearing down of tooth cusps (from a skull).



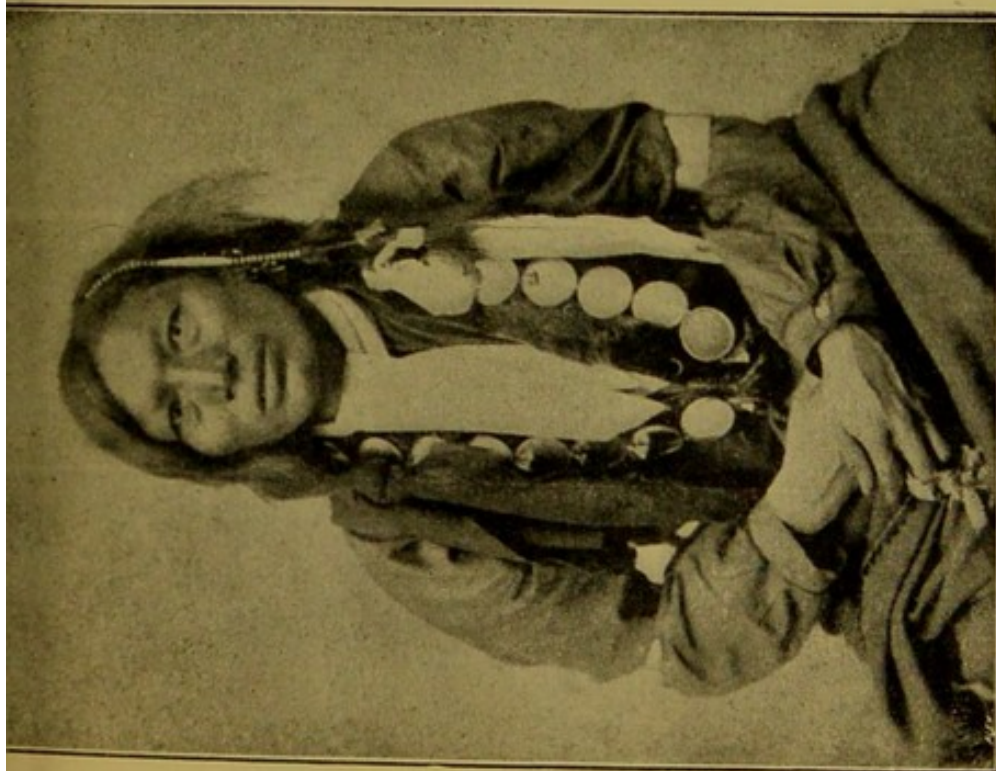
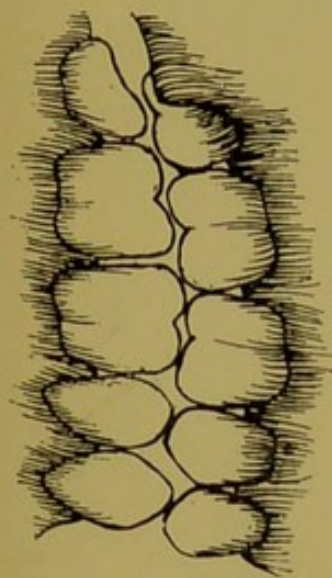
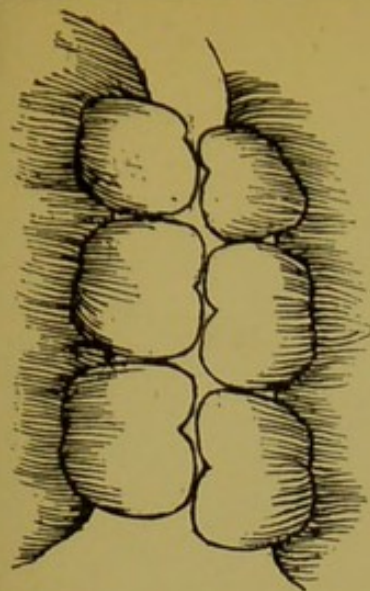


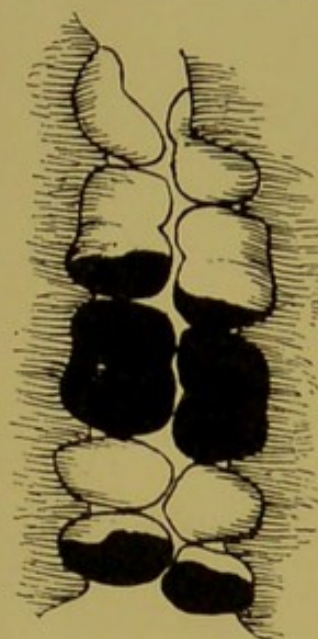
FIG. 3. SIOUX INDIAN—"LONE BULL."
(Portrait from cabinet photograph.)



Indians.

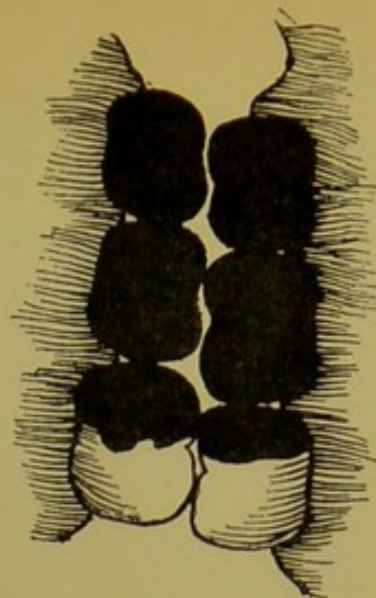


Indians.



Londoners.

FIG. 4. YOUNGER GROUPS.



Londoners (molars only).

FIG. 5. OLDER GROUPS.

DIAGRAMS OF GRINDING CAPACITY.

