DR. J. SHELTON HORSLEY, Richmond, Va.: Many irritants seem to produce cancer. The injection of scarlet red, and, recently, the application of coal tar have been found regularly to cause cancer. While irritation undoubtedly has much to do with the etiology of cancer, certain regions of the body, where irritation is more likely to occur than on any other part of the body, seem to be practically immune from cancer. I have never seen a cancer of the palm of the hand, for instance. Dr. Ochsner's theories about parasites being the cause of cancer are interesting. He thinks that a parasite that produces cancer is present in human excrement. The obvious objection to this theory, however, is that if these parasites are present in the human excrement, cancer of the colon and rectum should be very much more common than cancer of the stomach, where the gastric juice acts as a very efficient bactericide. As a matter of fact, cancer of the stomach is much more common than cancer of the colon. If human feces predisposed to development of cancer, a large proportion of the human race would have cancer by autogenous infection from feces in the rectum. It would also be difficult to explain cancers that arise in the thyroid gland, in the mammary gland, and in various other portions of the body where contact with human excrement would seem improbable, if not impossible. Dr. McArthur's paper was very valuable. A partial operation such as he suggested, followed immediately by cauterization, is much more effective in curing cancer than a more mutilating operation done by the knife alone. The raw surface of the cancer should be cauterized with the electric cautery as the first step in the operation. This seals in the cancer cells, and tends to prevent implantation. A superficial cauterization is sufficient. Under the microscope the destruction by a hot cautery penetrates very much less deeply than is usually supposed, but it is sufficient to kill the surface cells, seal in the deeper cancer cells, and so prevent implantation from the raw surface of the cancer. A complete cauterization of the wound with a hot cautery immediately after the operation will prevent implantation into the raw surface by cells from the deeper portions of the tissues that may have been squeezed out during the manipulation of the operation.

DR. THEODORE BLUM, New York: A more complete study of the tumors of the mouth should be undertaken. The general surgeon regards most of the tumors of the mouth as malignant, whereas the specialist in mouth surgery knows that many are not. If they are operated on with the cautery, or, in less extensive cases, treated with radium, those conditions will not recur. I have found in examining small tumors of the mouth that the clinical diagnosis of the tumor is practically impossible, many being diagnosed microscopically as chronic inflammation, hypertrophy and what not.

Lower Puerperal Mortality Rate.—There was a decline of 3.6 per cent. in the death rate for diseases related to childbirth the first six months of this year compared to the corresponding period of last year. This is especially encouraging in view of the very unsatisfactory conditions that have prevailed during the last four years. The improvement for this year appears to be limited to puerperal septicemia, which declined 21.4 per cent. The mortality from this disease tends to rise and fall in fairly definite four and five year cycles, and on that account a decline was expected this year. The periodic fluctuations in the death rate for this disease are so marked that some authorities have ventured to associate these changes with the rise and fall of scarlet fever, and with cyclical variations in the infectivity and virulence of the streptococci. The year 1921 was apparently the peak year of the upward swing which began in 1919. This year and possibly 1923 may show lower death rates, characteristic of the descent of the curve of mortality of puerperal septicemia. It is disconcerting to find that the successive waves do not show any appreciable diminution in the death toll, certainly nothing commensurate with the increasing care which is being given by public and private health agencies to women in confinement. There is still something materially lacking either in the extent or the type of care provided for parturient women.—*Statistical Bulletin, Metropolitan Life Insurance Company*, August, 1922.

LEUKOPLAKIA BUCCALIS *

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This disease was first described by Sigmund, and a few years later by Bazin, as lingual psoriasis. Schwimmer,¹ in 1877, first described leukoplakia under its present name, and definitely separated it from psoriasis. Probably the best descriptions of the condition are found in Butlin's² "Diseases of the Tongue," and in Fordyce's³ excellent article. In 1915, Levy⁴ reviewed the subject and his article contains an excellent bibliography up to that date. Since 1915, there have appeared in the world's literature only three references to this disease. They are by C. C. Crunston and by E. C. G. Little, and are scarcely more than case reports. The only comprehensive article is by G. Railliet,⁵ in which he analyzes seventy-seven cases of leukoplakia and draws some general conclusions, which may be summarized by saying that he believes that some cases may be of syphilitic origin, but that syphilis is not essential to producing this disease. Bloodgood⁶ in his article on cancer of the tongue gives a review of his experience with leukoplakia.

SYMPTOMATOLOGY

Leukoplakia is not confined to the mouth alone. It is comparatively common on the vulva, and occasionally occurs in the vagina, uterus, urethra, bladder and pelvis of the kidney.

The first evidence is a bluish-white or, more rarely, a bluish-red patch on the mucosa, which is often sensitive to either chemical or thermal irritation. We have seen such a patch develop in one week's time as the result of irritation from a rough tooth. At this stage, the condition frequently escapes notice. When first seen by the physician, the patient usually presents a pearly or milky white, slightly indurated patch on the mucous membrane of the tongue or the buccal surface of the cheeks, or, more rarely, of the gums. Patches are sometimes seen on the lips, and here are often the result of chronic syphilitic mucous patches. The area involved may be but a centimeter in diameter, or may involve the entire buccal mucosa and tongue, and even extend into the larynx. The diseased area may be very thin, or it may be so thick and indurated that it is difficult to tell whether or not malignant degeneration has occurred. Cracking, fissuring and ulceration are late stages. Cracking and fissuring in slight lesions of the tongue are frequently the result of syphilis, and any extensive ulceration usually means cancer.

REPORT OF CASES

CASE 1.—G. R., aged 24, a moderate smoker, whose teeth had many rough edges and cavities, and whose reaction was negative for syphilis, clinically and serologically, was cured by careful dentistry. He acquired syphilis two years later. This was a mild buccal case.

* Read before the Section on Dermatology and Syphilology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

1. Schwimmer: Arch. f. Dermat. u. Syph., 1877, p. 511.

2. Butlin, H. T., and Spencer, W. G.: Diseases of the Tongue, London, Cassell & Co., Ltd., 1900.

3. Fordyce: Some Affection of the Oral and Nasal Cavities That Are Related to Skin Diseases, New York M. J., March 6, 1906, p. 465.

4. Levy: Tr. Am. Laryngol. Ass., 1915, p. 84.

5. Railliet: Bull. et mem. Soc. med. d. hôp. de Paris 43: 325 (April 4) 1919.

6. Bloodgood, J. C.: Cancer of the Tongue: A Preventable Disease, J. A. M. A. 77: 1381 (Oct. 29) 1921.

CASE 2.—Major M., aged 35, a heavy smoker, with very bad teeth, whose test for syphilis was negative, clinically and serologically, presented an advanced case of leukoplakia of the tongue. The patient refused to stop smoking; and there was no improvement after the teeth were cared for. The patient was lost sight of.

CASE 3.—Mrs. G. F., aged 60, whose teeth were bad, and in whom tests for syphilis were negative, clinically and serologically, presented severe leukoplakia of the tongue with well developed cancer. She died in spite of radical surgical intervention.

CASE 4.—B. D., man, aged 40, a heavy smoker, and with bad teeth, whose Wassermann reaction was positive, was unaffected by antisyphilitic treatment, although it was extensive and severe. The teeth were not attended to and the patient continued to smoke. He was lost sight of.

CASE 5.—Colonel W., aged 52, who smoked three cigars a day, and whose teeth were rough, gave a negative reaction to clinical and serologic tests for syphilis. The condition cleared up under simple dental care. This patient has been well more than a year, and still smokes as before.

CASE 6.—Mr. G., aged 55, who chewed tobacco and whose teeth were very bad, gave a negative reaction to clinical and serologic tests for syphilis. This was an extensive case. According to the history, it started in the cheek in which the tobacco was habitually held. The teeth were repaired, tobacco stopped, and roentgen-ray treatment given, but no improvement was noted. The patient was lost sight of.

CASE 7.—Miss K., aged 60, who did not smoke or use tobacco and in whom rough teeth were present, had a moderately severe buccal leukoplakia. Syphilis was excluded. The patient was permanently cured by smoothing off the teeth and using the cautery locally.

CASE 8.—Mr. S., a moderate pipe smoker, whose teeth were very bad, and in whom syphilis was excluded clinically and serologically, presented a moderately severe case, which was cured by cleaning up the teeth and using the cautery locally. This patient is still smoking.

CASE 9.—B. F., man, pharmacist, aged 45, with a negative history of syphilis, whose Wassermann reaction was $\pm$ with cholesterin, negative with plain antigen, and examination negative for syphilis, was a heavy smoker. He was referred for an ulcer behind the last lower left molar tooth, which proved to be a well marked cancer. He presented a patch of verrucose leukoplakia on the buccal mucosa just inside of the angles of the mouth, about 1 cm. in diameter, and similar lesions about 3 cm. in diameter on the buccal mucosa opposite the posterior teeth, which had extended to the gums. One of these had degenerated as noted. The patient stated that the white colored mucous membrane had started on the cheeks just opposite bad teeth. The upper teeth were drawn a week before and were said to have been worse than the lower, which were certainly rough and badly diseased. The patches just inside the lips were opposite the natural position of the cigar end.

CASE 10.—A man, aged 65, whose tests were negative clinically for syphilis, and who did not smoke, had a patch of early leukoplakia opposite a rough tooth. He is still under observation. This condition was discovered in routine examination. Parenthetically, we would note that many such cases have doubtless been overlooked, by ourselves as well as others.

ETIOLOGY

1. *Syphilis*.—This condition was positively diagnosed but once; was positively excluded, so far as possible, in seven; was doubtful in one, and not absolutely excluded in one. Seventy per cent. at least, therefore, could probably be attributed to nonsyphilitic causes. On the other hand, in twelve cases reported in recent years in the American literature, four cases were positive for syphilis, six were negative, and in two no note is made regarding syphilis; while Bloodgood reports positive Wassermann reactions in 27 per cent. of 33 cases.

2. *Tobacco*.—Seven of our patients used tobacco in some form, three to excess, and two of these had cancer when first seen. Two of the patients were cured without giving up tobacco. Three did not use tobacco: In the twelve cases previously reviewed, seven patients used tobacco and one did not, and in four cases there were no notes on this subject. Bloodgood states that all his cases give a definite history of excessive use of tobacco.

3. *Teeth*.—In all ten of our cases, a definite note of rough or diseased teeth is recorded. Bloodgood records bad teeth in all but one case of leukoplakia. On the other hand, in the twelve cases found in the literature, the condition of the teeth is noted in only one case, in which rough and diseased teeth were found. It is interesting to note in this connection that in our private series of the four cases that were mild enough to be cured, two cleared up by the simple procedure of caring for the teeth properly, and the other two by this treatment plus the cautery. Out of a total of fifty-five cases, there were bad teeth in forty-three, and no notes regarding dental trouble in eleven. In the same number of cases, syphilis was definitely excluded in thirty-five, and was very doubtful in six. Forty of the patients used tobacco in some form, and four who had never used tobacco had a well marked leukoplakia. Two of our patients were cured without discontinuing the use of tobacco.

As a result of these observations, the following deductions seem logical: 1. Syphilis represents an accidental rather than a causative factor in this disease. 2. The use of tobacco is not necessarily a factor. 3. Rough teeth, by causing mechanical irritation, inaugurate the disease in the vast majority of cases.

We would call attention to the fact that, etiologically, leukoplakia is analogous to keratosis of the skin, in that the former is a defense reaction against mechanical irritation in the mouth, the latter a defense reaction against the actinic rays or mechanical irritation, or both, on the skin. Each develops as a result of functional overactivity.

ETIOLOGIC FACTORS AND NUMBER OF CASES

	Positive	Negative	Doubtful, or Not Noted
Syphilis	14	35	6
Tobacco	40	4	11
Teeth	43	1	11

PATHOLOGY

Most observers, ourselves included, agree with Fordyce that the earliest change is an inflammatory process in the papillary region, with secondary hyperkeratosis. Once the disease is developed, there is found marked hyperkeratosis, acanthosis with thickening and prolongation of the rete pegs, so that the papillae may become obliterated, and an inflammatory infiltration of the corium with small round cells. There may be distinct fibrosis of the deeper layers in more advanced cases. Here again there is an analogy with senile keratosis, the pathologic picture being very similar.

CLINICAL COURSE

These cases are extremely rebellious. They tend to remain stationary or gradually to progress over a period of months or years. They are distinctly precancerous. Many cases have already developed cancer when first seen—two of our ten—and those that fail to clear up under treatment should be carefully observed periodically and radical procedures instituted the min-

ute ulceration or fissuring with increased induration indicates the development of cancer. In the tendency to carcinomatous degeneration, we have a third resemblance to the keratosis on the skin.

TREATMENT

Whether syphilis is present or not in a case of leukoplakia, antisyphilitic treatment is of no avail, and need not be considered in the treatment. Some of the earlier cases will clear up if the source of irritation is removed. We believe this will nearly always be found in the teeth. However, as tobacco is undoubtedly a very important factor, its use should be interdicted. These two steps should always be employed, because, whether they are the cause of the leukoplakia or not, cancerous degeneration may thus be warded off. If the cases are very extensive and severe, no treatment is likely to avail, even radium, according to MacKee, being useless. A majority of cases that are not already carcinomatous will fall into the following group. They will not disappear with removal of the cause alone, but can be cured by appropriate destructive treatment. In our hands, the roentgen ray has been of no use. We have had no experience with radium, but its users are enthusiastic. MacKee advocates an erythema dose with an unfiltered plaque, believing that the beta ray is the most efficient. Others advocate the use of gamma rays only. In our hands, the best agent has been the cautery. This is used at red heat, with local anesthetic. With a little experience, one can learn to burn deep enough to destroy all leukoplakia, and yet leave a functioning membrane.

ABSTRACT OF DISCUSSION

DR. FRANCIS E. SENEAR, Chicago: It has been my belief that not all cases of leukoplakia are of syphilitic origin. I believe this opinion is rather generally accepted. I have been in the habit of avoiding treatment in those cases in which the leukoplakia has not been severe and in which there has been no evidence of degeneration of the mucous membrane, disliking to replace the mucous membrane with scar tissue. I am glad to hear Dr. Eichenlaub's results with the cautery. I have used radium and the roentgen ray without excessively satisfactory results, and have become an advocate of the use of the actual cautery in many dermatologic conditions during the last few years. It seems to me that the cautery might be an admirable thing to use in these cases. It does not set up any radiodermatitis, which would be as dangerous as the original leukoplakia.

DR. WILLIAM H. GUY, Pittsburgh: This paper is interesting because it crystallizes opinion as it exists today as to the cause of the leukoplakia. We should realize that we are dealing with a lesion that is due to irritation, and that mouth hygiene is of prime importance from the standpoint of prophylaxis. Therapeutic suggestions interest me most, because I advocate the use of radium, and being a pupil of MacKee, naturally my technic is his. We use one-half strength flat applicators unscreened, covered with rubber to remove secondary rays from the metallic edges, leaving them in place long enough to get a reaction. This means varying lengths of time, from ten to twenty minutes, never using the one-half strength applicator for longer than half an hour. In this way we get a fairly sharp localized reaction. The treatments are never repeated until the reaction following the first application has entirely subsided. The results are favorable in a fair number of cases. I do not think that any one method of attack in all cases will be successful. We occasionally find cases in which more than ordinary treatment is advisable. In deep, infiltrated lesions, a filtered application is definitely indicated. In such cases if only a plaque is available, one should use complete filtration and leave it in place for from eight to ten hours. If tubes are

used, a corresponding dosage may be given. In superficial lesions the beta ray is used because depth penetration is not only not necessary, but actually undesirable. Radium, of course, is not the only treatment, and, perhaps, not always the method of choice; but it certainly is of definite service in the majority of cases.

DR. J. M. KING, Nashville, Tenn.: I wish to endorse the method Dr. Guy mentioned. I use the flat plaque with very good results. I am under the impression that the cautery should be used in the deep or thickened patches. Radium could be used, but I would prefer the radium in the cases Dr. Guy mentioned.

DR. WILLIAM T. CORLETT, Cleveland: There is at least one good feature of a long medical career because it enables one to see fashions in medicine come and go. I treated quite a number of cases of leukoplakia during the eighties and nineties of the last century with electrolysis, with very good results. Since then, however, other methods have come into vogue, and I have used in turn the roentgen ray and radium, so that I believe I am in a position to judge without prejudice the merits of at least three methods mentioned for this disease. I might say, in addition, that the subject of syphilis, in my experience, might be excluded in the etiology of the disease. First, then, in the treatment by electrolysis, as first advised by Dr. Hardaway a number of years ago and used by him and other dermatologists for hypertrichosis and various other cutaneous conditions, including cases of leukoplakia, the results in my experience were better than they have been with either the roentgen ray or with radium. I wish to emphasize the point made by Dr. Senear in regard to the actual cautery; and while I think the actual cautery is good, yet one cannot regulate the depth so accurately as can be done with a fine electric needle.

DR. I. L. MCGLOSSON, San Antonio, Texas: I should like to endorse what Dr. Guy has said. In the thickened cases of leukoplakia, then, we need not hesitate to transfuse them with the radium needles. In one case with a vegetative overgrowth which section showed to be nonmalignant, we transfused the plaques with a radium needle very successfully. I think the difficulty some men get into with a flat applicator is that they give too long an exposure. I do not think it is necessary to give a long exposure to get rid of these patches. I agree with Dr. Corlett that antisyphilitic treatment does not do any good. Whether the leukoplakia is on a syphilitic base in some cases I cannot say, but antisyphilitic treatment does not assist in clearing them up.

DR. ERWIN P. ZEISLER, Chicago: I should like to report two cases in which all ordinary methods of treatment were unsuccessful. They were both extensive leukoplakias of the tongue and had been treated by some of our best radium experts. Both patients were referred to the Mayo Clinic and treated by Dr. New by his cautery method under general anesthesia, and the results were remarkable. The thick leukoplastic patches entirely disappeared.

DR. W. H. GOECKERMANN, Rochester, Minn.: I do not know the exact method that Dr. New uses, but I know that in some cases he uses the plaque Dr. Guy mentioned. The local treatment is all under his direction. I find that syphilis is frequently present in cases of leukoplakia. Often we find small patches of leukoplakia in the routine examination, when the patient calls no attention to it. Compared with the dermatologic cases, I should say that its prevalence in syphilitic cases is very large, although I do not mean to say that it is syphilitic.

DR. F. J. EICHENLAUB, Washington, D. C.: The chief object in presenting this paper is to try to establish so far as possible the idea that leukoplakia does not always mean syphilis. We are ready to admit that the site of an old syphilitic lesion is more likely to develop leukoplakia, but the field of syphilis is large enough as it is, and I think we should separate definitely those cases that are not syphilitic from those that are. We have had no experience with radium, and it may be good treatment. However, my feeling, and that of Dr. Hazen, is that the cases that are deep and extensive should be left alone and watched for the development of cancerous degeneration.