

some of the loose methods in observation and thought that unfortunately are not so uncommon in purely clinical work. But I must add that during the last fifteen or twenty years physiologists have also committed many sins and put obstacles in the way of broad physiologic progress, by drawing far-reaching physiologic conclusions on the basis of unphysiologic experiments.

DR. ALFRED A. STRAUSS, Chicago: It is true, as Dr. Alvarez has stated, that some of the interpretations of these contraction waves, as recorded by his electrical instrument, are difficult to understand. I have recently done some experimental work on the emptying time of the stomach, which is really a check up on an operative procedure which we have done clinically for about seven years. The procedure was the partial resection of the sphincter of the pylorus and pyloric antrum. When this is done in the human being, following a resection of an ulcer on the lesser curvature, the stomach will empty about twice as quickly as it will normally. We have followed this up clinically in a large series of cases. The animal experimental work checks up with this clinical observation in the minutest detail. After taking careful fluoroscopic readings and studying the emptying time of the individual animal, and then resecting the sphincter of the pylorus, we have found that the emptying time is from 30 to 50 per cent. quicker than in the normal animal; that the contraction waves on the lesser and greater curvature are so shallow that they can hardly be seen. Therefore, when the sphincter of the pylorus is paralyzed, there is very little resistance met by the contents in the stomach, and the intragastric pressure produced by the tonic contraction of the cardia is sufficient to empty the stomach contents very readily through the paralyzed sphincter. We have learned both from the clinical and the animal work that the size of the peristaltic waves on the lesser and greater curvature is in direct proportion to the amount of resistance that they meet at the pyloric sphincter; for when we produce a partial obstruction at the pylorus by fascial transplant, the size of the waves is very large because they meet a great resistance. When the pyloric sphincter is cut away, the waves are hardly visible because of the little resistance that they meet at the sphincter of the pylorus.

DR. W. C. ALVAREZ, San Francisco: I fully appreciate the dangers and pitfalls Dr. Carlson points out. I worked out the method of using the electrogastrogram about two years ago, and I was so surprised at the things I saw that I practically dropped it for a year and developed a method of getting records of the actual contractions before daring to talk about the peculiar things I saw on the electrogastrograms. And since we cannot by any present known methods get records like this of the impacted stomach of a wide awake man, I feel that we must make the beginning, and make that beginning on animals. To my mind the hopeful element is this: We know that a dying heart, or a heart that has been handled too long, develops certain abnormalities of rhythm; many of those abnormalities of rhythm are found in disease, and study of them under abnormal conditions has helped in the understanding of disease. Therefore, I think that probably it will be the same way with this work.

Percentage of War Neuroses.—Analysis of the 170,000 cases discharged for disability in England showed that 20 per cent. were due to war neuroses.—May, *Mental Diseases*, 1922.

SYPHILIS OF THE MOUTH

COMMON TENDENCY OF THE MOUTH AND SKIN
TO THE SAME PATHOLOGIC PROCESSES*

WILLIAM ALLEN PUSEY, M.D.

CHICAGO

There is a close relation between the tissues of the mouth and those of the skin. Their structures are very much alike, and they react to many pathologic processes in the same way. There are numerous systemic diseases which have eruptions on the oral mucous membrane as well as on the skin, and these oral eruptions are identical with those of the skin, except as they are altered by the peculiar local conditions to which they are subjected in the mouth. These facts are particularly well exemplified in syphilis. The skin and the mouth are the structures for which syphilis shows its greatest predilection, and the predilection is quite as great for the mouth as for the skin. Indeed, it is probably true that syphilis occurs with as great

frequency in the mouth as on the whole surface of the skin. Its frequency in the mouth, then, would of itself make syphilis of the mouth a subject of great practical importance. When we remember in addition the peculiar danger to others of syphilis of the mouth in its early period, it becomes doubly important.

One can get most easily a clear grasp of syphilis of the mouth if he will bear in mind that its lesions are those that occur on the surface of the skin, modified only by the peculiar influences to which their occurrence in the mouth exposes them.

These are chiefly: expo-

sure to moisture and warmth, causing the lesions to be macerated; irritation or injuries from eating, drinking and biting, from irregular, rough or sharp teeth or from tartar; and secondary infections in the mouth. Peculiarity of structure of the tissues involved accounts for some variations, but these are as a rule of little account except in late lesions of the tongue.

The special influence which is always active in modifying the appearance of syphilitic lesions in the mouth, and the one that does most to change their appearance, is the maceration to which the lesions of the mouth are, of course, always subjected. This factor produces little variation in the chancre or tertiary (true gummatous) lesions, but it causes distinct alteration from their cutaneous types in the lesions of secondary syphilis in the mouth. These early syphilids of the skin are mostly dry lesions. They are covered by a horny layer, which is imperfect, it is true, but sufficient to prevent free exudation from the lesions. In the mouth, this horny layer gives way, and

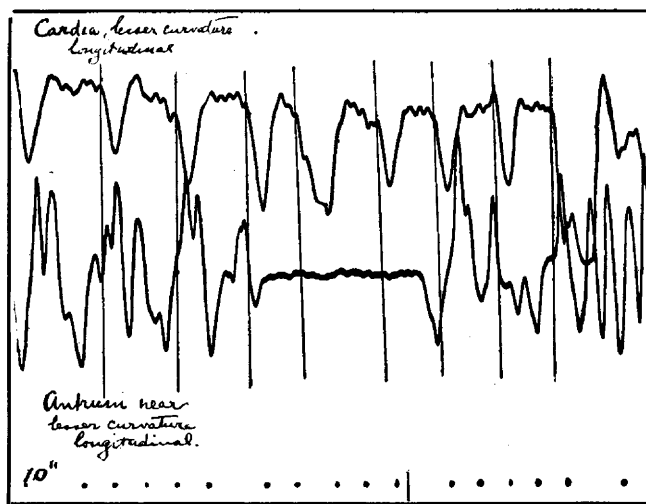


Fig. 4.—Electrograms from the cardia and antrum of a cat. The small deflections on both records are probably respiratory in origin. Note the blockage of two waves. The main deflection in the cardia's record is a positive one, suggesting that the pacemaker lay between the two electrodes placed on the lesser curvature next to the cardia.

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

these lesions become the classic excoriated mucous patches.

PRIMARY SYPHILIS OF THE MOUTH

Chancre.—Of all extragenital chancres—and extragenital chancres constitute about 5 per cent. of all chancres—about 75 per cent. occur on the head; and of these that occur on the head, more than 80 per cent. occur in the mouth. Thus, about 60 per cent. of all extragenital chancres are chancres of the mouth. In Fournier's statistics, covering 1,124 extragenital chancres, 849 occurred on the head; of these, 723 occurred in the mouth. Of these 723 cases occurring in the mouth, 567 occurred on the lips (usually the lower lip), seventy-five on the tongue, sixty-nine on the tonsils, eleven on the gums, and one on the buccal mucosa. Chancres of the mouth, therefore, occur with vastly greater frequency on the lips; after that, they occur with about equal frequency on the tongue and tonsils. They are very unusual on the gums, and excessively so on the buccal mucosa. The frequency of their appearance on the lips and tongue obviously depends on the great frequency of exposure of these parts and the common occurrence of breaks here in the epithelium which allow infection. The frequency of the involvement of the tonsil is not so obvious; it probably lies in the unusual susceptibility of the tonsil to infections in general. Of course, a chancre may occur on any tissue in the mouth, as it may appear on any living human tissue, but it is a fact established by experience that chancres occur frequently on the lips, tongue and tonsils, and with great rarity in other structures of the mouth.

The chancre is most frequently a superficial erosion or ulcer of pea or bean size on an indurated base; occasionally, it is a frank ulcer of thumb-nail size or larger. It may be a dry indurated papule or nodule, or an elevated moist nodule. Very rarely, the chancre is a dry indurated nodule; usually, it is an open lesion with an indolent surface covered by a thin yellowish exudate. This can be wiped off, leaving a red weeping surface, which does not bleed freely, but has a very free serous discharge full of spirochetes. It is practically painless. Chancres are more frequently multiple on the lips, I believe, than elsewhere, but even on the lips multiple chancres are exceedingly rare.

With all of their variations in unessential details, chancres of the mouth, as elsewhere, have a few common objective features which are distinctly characteristic. A chancre always means a dense, indolent, inflammatory infiltration in the tissues at its site; and density and indolence are the essential clinical features of the lesion. Its base has a peculiar solidity. It can be grasped between the fingers as a solid button from which, because of its density, the blood is easily pressed out, leaving between the fingers a distinct disk of yellowish cartilaginous color and cartilaginous feel. It is indolent in degree of activity and in course. The reaction is so sluggish that it is practically painless, and it persists almost without change for from one or two to four or five weeks. It is this indolence in particular which is most likely to call attention to an otherwise unsuspicious chancre about the mouth. Another and peculiar characteristic of the chancre about the mouth is the extraordinary enlargement of the contiguous glands which usually accompanies it. These are painless and hard, but the degree of enlargement is much greater than with other lesions in the

mouth of similar size, and also usually much greater than occurs in the adjacent glands with chancre of the genitals.

Of course, many variations may occur in the chancre, but on the whole chancres are surprisingly true to type. This fact, while it should lead to the clinical recognition of chancres, should never justify us, in the present state of our knowledge, in making a diagnosis of an initial lesion of syphilis on clinical grounds alone, or in excluding syphilis on the same grounds, in the case of any excoriation, fissure, erosion, ulcer, or similar lesion which by any possibility might be a chancre. Except when facilities for examination are unavailable, the clinical diagnosis of chancre should immediately be confirmed by examination for *Spirochaeta pallidae*. They are present in abundance in the exudate of the chancre; and their demonstration is of excessive practical importance, because the presence of syphilis can be definitely established by their demonstration in the chancre; and experience has shown that, when the disease is thus early recognized, the prospect of aborting it by immediate intelligent specific treatment is good. In the old days, it was the rule of all conservative men never to make a positive diagnosis of syphilis on the chancre alone. The diagnosis was never made except when the character of the chancre was confirmed by the typical evolution of the disease up to the appearance of secondaries. Now we can make the diagnosis on *Spirochaeta pallidae* alone, even before the disease becomes systemic, and before the Wassermann reaction becomes positive. And when we can get patients at this stage, we can cure them; it is the golden opportunity in syphilis for which every practitioner should be alert.

SECONDARY SYPHILIS OF THE MOUTH

The manifestations of early systemic syphilis in the mouth are, as I have said, exactly analogous to the secondary eruptions that occur in the skin. We have all of the manifestations from the macular erythema, through the papular and nodular eruptions, up to the ulcerative secondary lesions. Corresponding to the faint macular syphilid on the skin, we may see an eruption of dry red spots on the inner surfaces of the lips or on the mucosa of the cheeks or soft palate. This is a very rare eruption and usually of short duration. More frequently, but still rarely, we see a dry hyperemic eruption on the soft palate or in the pharynx. This is sometimes a faint spotted erythema, but is more likely to be a diffuse bright red hyperemia. It is occasionally dry, but, as a rule, the epidermis is more or less excoriated, and the picture resembles a mild degree of catarrhal pharyngitis. It differs from this, as a rule, by presenting a mottled appearance due to the individual macules whose coalescence has caused the larger area.

Mucous Patches.—Vastly more frequent than any other eruption of secondary syphilis in the mouth are the several forms of mucous patches. They are the prototypes of the secondary eruptions on the skin and, like all of the secondary eruptions in the mouth, occur with them. They have a red, but not angry, base, which is usually covered by a thin pellicle of exudate and necrotic epidermis, around whose edge a narrow border of red shows. The pellicle can be wiped off, but it is fairly adherent. The lesions do not bleed easily, but, like the chancre, they have a free exudate of serum which contains many syphilitic spirochetes. They are, as a rule, almost or quite without discomfort; they are

usually few in number, and thus they may escape even the patient's attention. It is this combination of insidious features which makes them so dangerous in the transmission of the disease; for they are highly contagious.

Mucous patches may be so superficial as to appear as small areas of necrotic epidermis, neither elevated nor depressed, surrounded by a narrow red collar. Usually, they are superficial erosions or very superficial small ulcers. Sometimes, they are deeper ulcers. Occasionally, they are elevated eroded nodules or plaques. They vary in size from that of a pin head to that of a small coin. Typically, they are round or oval, and from one-eighth to three-fourths inch (3 to 19 mm.) in diameter. They are, as a rule, multiple; and sometimes they are so numerous as to involve a large part of the surface of the mouth. The exaggerated lesions and the extensive distribution of the lesions occur only, as a rule, in careless, neglected patients.

They may occur on any part of the surface of the mouth or pharynx. They occur most frequently on the buccal mucosa, especially near the angles of the mouth, on the sides and tip of the tongue, on the under surface of the tongue, and on the floor of the mouth under the tip of the tongue.

On the surface of the tonsils, mucous patches are common, and in this location they are frequently angry, and accompanied by more reaction than is common elsewhere in the mouth. They occur here as discrete patches, either erosive or ulcerative, of the ordinary size. In some cases, they are larger than usual, or occur in numbers that coalesce into patches producing a severe ulcerative tonsillitis or pharyngitis.

Smooth Glossitis of Early Syphilis.—Mucous patches occur on the dorsum of the tongue in one form of lesion which is not included in this general description of the usual forms. This lesion is a superficial specific infiltration which produces a dry red patch. In these patches, the papillae of the tongue entirely disappear in the infiltration; the patch thus has a perfectly smooth surface, and is covered by a thin layer of glistening epidermis. The whole lesion is a smooth bright pink to red patch with a sharply defined border between it and the normal surface of the tongue. These patches are usually of finger-nail size, and several of them usually occur on the dorsum. They may coalesce and produce a smooth red tongue whose surface in front of the circumvallate papillae is, except for the extreme redness, much like that of the buccal mucosa. This is the smooth glossitis of early syphilis, and is a characteristic condition. It is quite painless.

Mucous patches are nearly always accompanied by other evidence of syphilis. They occur frequently and abundantly in early secondary syphilis, in the first six months after the chancre. At times, they will be seen when no other syphilitic eruption is to be found. But their connection with syphilis will be shown by the history or by the presence of other manifestations of syphilis; usually, by an indurated scar at the site of the chancre; or by indolent and enlarged inguinal, cubital or posterior cervical glands. When they are present, the Wassermann reaction is nearly always positive.

While they are distinctly an early lesion of syphilis, one of their dangerous characteristics is their tendency to relapse for a considerable time. They occur most frequently, and in the greatest abundance, during the

first six or eight months of the disease. Even in untreated or poorly treated cases, they occur less frequently in the second year, and rarely after that. But the recurrence of the mucous patches has been recorded a surprising number of years—even eight or nine years—after infection. I confess that I have seen no such late manifestations of the lesions, and that the occurrence at these late dates is so inconsistent with the recognized course of syphilis that I, personally, am compelled to question the accuracy of the observations which attribute these lesions to infections so old.

Condylomas.—Condylomas are vegetating secondary lesions of syphilis. They are exactly analogous to the secondary macular and papular lesions, and their only peculiarity is the fungoid hyperplasia. This is due to the fact that the warmth and moisture at the orifices of the body furnish conditions so favorable that unusual overgrowth of certain infectious lesions occur at these sites. This happens not only with the lesions of syphilis but also with other inflammatory processes of indolent degree. The condylomas of syphilis, however, differ from other and similar vegetating lesions in that they are liable to be less active. The lesions form flat elevated nodules or, from coalescence, plaques, which are usually raw and covered by a dirty yellowish exudate. They are not the exaggerated exuberant granulations or the accumulate warty growths of other infections, so that their recognition can be made on their clinical features alone. They abound in spirochetes, and the clinical diagnosis in doubtful cases should be confirmed by dark-field examination. Condylomas are rare lesions about the mouth. They occur occasionally at the angles and very exceptionally in the floor of the mouth.

TERTIARY SYPHILIS OF THE MOUTH

Late syphilis of the mouth is frequent; for the disease in the tertiary stage shows as great a predilection for the mouth as does early syphilis.

Gummas.—Gummas may occur in any of the tissues of the mouth. Their sites of predilection are the tongue, especially the dorsum; the hard and soft palate; and the tonsils and walls of the pharynx. They invade the bone structures as they do the soft parts. Periosteal gummas in the mouth occur most frequently in the hard palate. They also occur, with less frequency, in the upper and lower mandibles.

Gummas in the mouth, as elsewhere, vary from small pea size tumors to tumors the size of an olive, or larger, and develop as solid painless and oval or round elevated tumors. They may undergo solution and disappear without ulceration, either spontaneously or as the result of treatment. As a rule, if a gumma is untreated, the center becomes necrotic, and an opening forms on the surface. The ulcer resulting is relatively deep, with rather irregular, precipitate borders, and with a base made up of irregular red granulations having a thin purulent discharge. When gummas occur as small nodules—pea size to hazelnut size—they are usually multiple and have a characteristic arrangement in the arc of a circle or as an archipelago-like group. As they break down, the ulcers coalesce and form crescent-shaped ulcers or a group of small ulcers that look like a map of a group of small islands. These small group gummas are not their usual manifestation in the mouth. As a rule, in the mouth, they occur as isolated, deep, destructive oval ulcers. They are usually painless, except as a result of secondary infection. On the

tongue, they occur usually on the dorsum. On the hard palate they appear in the periosteum, and by breaking down cause often a characteristic perforation into the nose. On the soft palate, they appear as disk-shaped gummas which are liable to break down with great rapidity and cause extensive destruction, which may temporarily cause great difficulty in eating and drinking. Gummas of the tonsil are likewise liable to be rapid and destructive. The amount of destruction produced by rapidly breaking down gummas of the soft and hard palate and tonsil produce, at times, destruction which is temporarily appalling. Fortunately, a surprising amount of repair occurs in the healing of these lesions. Cases in which apparently irremedial defects are occurring may end with relatively little deformity. The posterior wall of the pharynx, as well as the posterior nares, is a frequent site of gumma. As a rule, on the posterior wall of the pharynx the lesion is relatively indolent and produces less destruction.

Interstitial Infiltrations.—The tongue, in addition to being a frequent site of gummas, is attacked even more frequently by an interstitial syphilitic infiltration, which is analogous to the sheetlike interstitial infiltrations of syphilis that occur in the viscera, and in connective tissue and muscular structures such as the aorta. In this condition we do not find circumscribed gummas but diffuse gummatous infiltrations. This interstitial syphilitic glossitis may be superficial or may extend deep into the tongue. It is not an ulcerative form of syphilis, but it is a form which is followed by scar tissue formation and sclerosis. Its clinical appearances vary with the extent, and particularly with the depth of the involvement.

Smooth Atrophy of the Tongue.—This condition is a result of interstitial glossitis. It may occur in superficial discrete patches, but it usually occurs diffusely over the entire dorsum of the tongue. Early in the course of the condition, the tongue may be red and swollen; usually, this early condition is not seen. As a rule, when the cases first come under observation, the dorsum of the tongue shows either several patches or a diffuse surface covered by smooth, glistening, dull red epidermis, the small papillae of the tongue having been destroyed in the process. With this, there is more or less superficial furrowing of the tongue. As the syphilitic infiltration is replaced by scar tissue, these furrows become deeper and the tongue is slightly distorted.

This smooth atrophy of the tongue occurs also at its base, producing a smooth even surface behind the circumvallate papillae. It occurs often without similar involvement of the tongue in front of the circumvallate papillae. It is one of the characteristic, but most frequently overlooked, lesions of syphilis.

Sclerosis of Tongue.—A deep interstitial glossitis produces a picture like that of the superficial glossitis, except that the distortion of the tongue is exaggerated. As a result of this condition, the tongue is hard and smaller from the presence of scar tissue; when sclerosis is established, the fissures are deeper, and it is nodular or lobulated, or otherwise distorted.

Leukoplakia.—Patches of leukoplakia occur on the scars of gummas, but they develop much more commonly after superficial or deep interstitial syphilitic glossitis. Superficial glossitis is probably the most frequent cause of syphilitic leukoplakia.

Syphilitic leukoplakia characteristically occurs on the dorsum of the tongue. It is likely to occur extensively over the tongue, showing in whitish patches which mottle the tongue, but between which a lesser degree of leukoplakia extends. It is usually of moderate degree until it has persisted for several years. Gradually, it may show much greater horn formation, and it then becomes a dangerous precursor of cancer. Syphilitic leukoplakia also occurs frequently on the buccal mucosa, but, except as it occurs on the tongue, I am not sure that it has any characteristics that distinguish it from nonsyphilitic leukoplakia. And nonsyphilitic leukoplakia is much more frequent than is leukoplakia due to syphilis. I wish to emphasize this fact because there is a widespread impression that leukoplakia is usually, or always, the result of syphilis. That undoubtedly is not the fact. Leukoplakia is simply a symptom. It is a manifestation of increased cornification of the epidermis, and it is the result of a subacute or chronic inflammatory reaction at the site. It thus may be produced by any sort of chronic inflammation from any source of chronic irritation. Very frequently this source is chronic irritation of external origin. Even in syphilis, leukoplakia is rarely a manifestation of the disease itself; it is so only in rare cases in which there is a proliferation of the epithelium over an area of active syphilitic manifestation which has not yet disappeared. In these cases only, it is influenced by specific treatment. As a rule, in syphilis it occurs at the sites of previous active syphilitic lesions, where the mucosa has been damaged in a sclerotic process that followed the active lesions. In these cases, specific treatment is of little or no use.

Macroglossia and Macrocheilia.—As a result of diffuse syphilitic glossitis, the tongue not infrequently is reduced in size. In distinction to this, we occasionally see a hypertrophy of the tongue resulting from syphilis. This macroglossia is an elephantiasis due to lymphatic obstruction. This may be either the result of syphilitic lymphangitis or of a lymphangitis from a secondary infection occurring in open syphilids.

A similar macrocheilia occurs even more often from syphilis. In this connection, the lips, or either of them, may be moderately or enormously thickened. Both with syphilitic hypertrophy of the tongue and that of the lips, specific treatment causes improvement, but rarely does it cause entire disappearance of the enlargement.

CONGENITAL SYPHILIS

Congenital syphilis of the mouth differs in no essential feature from the acquired disease. It is very likely to produce an exaggeration of the picture. The mucous patches of congenital syphilis are liable to be abundant and more ulcerative than usual. They occur in greater abundance on the lips, particularly at the commissures, where they commonly leave pathognomonic radiating linear scars. The gummatous lesions produce all degrees of destruction of the soft and hard parts of the mouth which I have outlined as occurring in acquired syphilis.

TREATMENT OF SYPHILIS OF THE MOUTH

The treatment of syphilis of the mouth is the treatment of the disease in general. As a matter of fact, probably because of the simplicity of the structures of the mucous membrane as compared with those of the skin, the lesions of syphilis in the mouth heal with greater rapidity under specific treatment than do those

of the skin surfaces. There are no lesions of early syphilis which yield to arsphenamin with more rapidity than do chancres and mucous patches of the mouth. The late lesions of syphilis of the mouth yield promptly under specific treatment, whether arsphenamin, or mercury and the iodids, or both. For their healing, mercury and the iodids are all sufficient, although healing is somewhat more rapid when they are combined with arsphenamin. No local treatment of either early or late syphilids of the mouth is necessary beyond cleanliness and obvious rational measures. The only lesions that will not heal under specific treatment are those in which there is dead bone whose removal is necessary before cure can occur.

7 West Madison Street.

ABSTRACT OF DISCUSSION

DR. W. S. BALNBRIDGE, New York: We should keep in mind the points which Dr. Pusey emphasized and put them into practice. The one point in which I am especially interested is that syphilis may occur with many other conditions. The mouth often represents a multiplex pathology, and it is not often easy to make a diagnosis. Even the microscopic findings are not always to be depended on.

THE CAUSES OF SURGICAL FAILURE IN HYPERTHYROIDISM*

J. EARL ELSE, M.S., M.D.

AND

HARRY S. IRVINE, A.B., M.D.

Assistant Professor of Surgery and Instructor in Surgery, Respectively,
University of Oregon Medical School
PORTLAND, ORE.

A review of the literature shows that from 65 to 75 per cent. of the patients operated on for exophthalmic goiter make a complete recovery. The majority of the remaining 25 to 35 per cent. are benefited; but some show no improvement, and death occurs in from 1 to 4 per cent. In the cardiovascular group of goiters, including the toxic adenomas, adenomatosis and compensatory hyperplasia, better results are obtained. During the last two and a half years, approximately 300 cases of goiter of various types have been studied. In this group have been several cases in which the patients had been previously operated on without complete relief. These cases were studied in conjunction with unoperated cases of similar types in order to determine, if possible, the causes of the incomplete results or failure. These causes have been classified thus: (1) errors in diagnosis; (2) overestimation of the patient's resistance; (3) persistent symptoms due to delayed operation; (4) recurrence of symptoms due to insufficient operation; (5) improper or insufficient after-care.

ERRORS IN DIAGNOSIS

As was pointed out by Plummer, a number of years ago, other etiologic factors, usually mild toxemias, produce a chain of symptoms similar to those of mild hyperthyroidism. When this chain of symptoms occurs in patients having nontoxic thyroid lesions, it is often very difficult or even impossible to differentiate between the lesions that may produce these symptoms and hyperthyroidism, without a determination of the basal

metabolic rate. These patients complain of various nervous manifestations; tachycardia of varying degree is usually present; often there is a tremor; the patients are frequently undernourished, and have, as a rule, a poor appetite, contrasting them with the majority of patients suffering from hyperthyroidism. In this series of cases, there have been several of this group that have been previously diagnosed as hyperthyroidism and two in which the patients had been operated on. The symptoms, in the majority of cases, were due to chronic infected tonsils. There were two cases of incipient tuberculosis; one of asthenia with ptosis, and in one, the patient, a woman ten years previously, at the age of 30, had had a double oophorectomy, followed by nervous instability. Other than the nervous manifestations, and the presence of a small goiter, there was no evidence of hyperthyroidism. The basal metabolic rate was normal.

OVERESTIMATION OF THE PATIENT'S RESISTANCE

Operative procedure more radical than the resistance of the patient will stand is the principal cause of unduly severe reaction or death following operation. There is no one method by which the resistance of the patient can be accurately estimated. The basal metabolic rate and the clinical manifestations must both be considered. Disregarding either one is certain to be followed sometimes by disastrous results. The basal metabolic rate indicates more accurately the activity of the thyroid gland, while the clinical manifestations indicate the resistance of the patient to the thyroxin absorbed.

Hyperplastic or exophthalmic goiter is a disease that occurs in cycles, each cycle consisting of four stages: (1) the stage of development; (2) the stage of maximum intensity; (3) the stage of retrogression, and (4) the stage of remission. In the first stage, the basal metabolic rate increases more rapidly than do the symptoms, and is higher than the symptoms would indicate. In the second stage, the basal metabolic rate and the symptoms have reached their height, and run about parallel. In the third stage, there is improvement both in the basal metabolic rate and in the symptoms; but the basal metabolic rate drops more rapidly than the symptoms, and is lower than the symptoms would indicate. During the first stage, the basal metabolic rate is of greater importance than the symptoms in determining the operative procedure. Either a rapidly rising rate or a high rate is a danger signal. During the second stage, the basal metabolic rate and the symptoms are about equal in importance. Except in mild cases, the radical operation should never be performed in this stage. Ligation of the superior thyroid poles brings on the third stage. In this stage, the metabolic rate is lower than the symptoms would indicate, and the symptoms are the more accurate guide. As a rule, patients do well when operated on in the third stage.

In the stage of remission, the basal metabolic rate is usually about normal. The presence and severity of the symptoms depend on the severity of the cycle or cycles through which the patient has passed and on the damage done by the thyroxin. In this stage, operation is usually safe; yet in some cases, in which there have been severe permanent lesions produced by the thyroxin, especially in the heart muscle, it is fraught with danger. If the basal metabolic rate is high, the radical operation should not be performed without preliminary ligation, even though the symptoms are mild; and, conversely, if the symptoms are severe, the radical operation should never be done without preliminary

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