best text-books on Dental Pathology and Therapeutics such cases are the worst ones met with in dental practice. Local surgical treatment is practically impossible in such cases on account of the rigidity of the muscle and the locking of the jaws. The condition is therefore, left to nature to do its best or worst, depending upon the virulence of the bacteria and the general condition of the patient who has to fight his own battle practically unaided. The vaccine treatment which tends to raise the resistance of the patient against the invading bacteria is apparently the only direct help we can give the patient under the circumstances.

The cases here recorded are probably the very worst ones met with by dentists. Practically never have I had a case referred to me unless the dentist was fairly satisfied that he could do little for the patient by local measures alone, or after such local treatment had been given a fair trial and failed. The results obtained are, therefore, more valuable.

The records of all the cases that came under my observation have been cited in detail so that every one may be able to judge for himself and draw his own conclusions therefrom.

The two chronic cases with fistulas were cited principally to call attention to the limitations of this treatment and also to indicate that vaccines should not be expected to substitute local surgical measures when necessary.

CONCLUSIONS.

The number of cases are too few to draw definite conclusions from. I should like, however, to emphasize the following points:

1. Vaccine treatment is of value in acute septic dento-alveolar abscesses—even the worst types of mandibular impacted third molar abscesses have apparently yielded well to this treatment.

2. Such cases with septic apical abscesses, especially the deep-seated ones or the so-called blind abscesses, acute and subacute, have been greatly benefited by the vaccine method of treatment.

3. I believe that there is a big field for vaccine treatment in acute and subacute dento-alveolar abscess cases and its wide-spread use will save considerable suffering and loss of teeth to the patient, and annoyance to the dentist.

In concluding I wish to thank those of the dental profession who have referred the cases to me and made this study possible. I am particularly grateful to Dr. F. S. Belyea of Brookline and Dr. Wm. Y. Allen of Boston who have so kindly put most of these cases at my disposal and rendered valuable assistance in following them up.

CANCER CONTROL.*

BY JOSEPH C. BLOODGOOD, M.D., BALTIMORE.

PRE-CANCEROUS LESIONS.

To improve the results, to increase the number of cures of cancer there are two factors over which we have control,—the duration of the disease and the treatment.

Long experience and investigation seem to show that cancer never begins in healthy tissue. There is always a pre-existing local defect which is benign and in which later there may be a cancerous development.

When this previous defect is situated on the skin or beneath the skin or on the mucous membrane of the lip, tongue and mouth everyone is aware of the little lesion.

These previous defects or local lesions in which cancer may develop may be called pre-cancerous.

The complete removal or complete healing of these pre-cancerous lesions will in my experience accomplish a cure in one hundred per cent. of cases, that is, none of these people will die of cancer from a growth in the situation from which the pre-cancerous growth has been removed.

Such cases cannot be called actually cured of cancer, but we can be quite certain that such treatment prevents cancer in many if not all of the patients treated.

First, little tumors which may have been present since birth, or noticed later in life. These little tumors may occur on the skin as warts, moles or navi. They may be felt beneath the skin as hard or soft nodules the size of shot, peas, beans or larger, or they may be felt deeper as in the breast, thyroid gland, deep in the neck.

Second, unhealed ulcer of the skin and mucous membrane. Here there may be a wound or a burn or some injury or disease which destroys the skin or mucous membrane. The wound never heals or heals badly and then breaks down, the open sore remains for weeks, months or years, often irritated by the patient. At any time, usually after months or years, cancers may develop in such ulcer.

Such ulcers are especially dangerous on the tongue, a week's delay here is equivalent in danger to six months' delay for a like ulcer on the lip.

Third, some form of chronic irritation of the skin and mucous membrane which does not actually destroy it. For example, chronic inflammation and irritation about bad teeth (cancer of the gum never develops about healthy clean teeth). Inflammation and irritations of the mucous membrane of the mouth, lip or tongue in smokers, from chewing tobacco, or from snuff. This tobacco irritation may lead to

* Author's abstract of paper read before the Clinical Congress of Surgeons of North America, Chicago, Nov. 12, 1913.
the formation of white patches (leucoplaica) or ulcers, or thickening of the mucous membrane. Cancer at any time may develop in these areas of irritation.

All of these pre-cancerous lesions, tumors, unhealed ulcers, areas of chronic irritation and inflammation of the skin and mucous membrane are recognized by their hosts the moment they begin. Delay in treatment is due to ignorance, fear or skepticism.

As stated before, treatment in this early pre-cancerous stage, if proper treatment, should accomplish a hundred per cent. of permanent cures.

Any treatment which does not completely remove the little tumor or accomplish healing of the ulcer, or completely excise the ulcer, or stop the irritation of the skin or mucous membrane, or any treatment which does not completely excise the ulcer the result of the irritation, is more dangerous than no treatment at all.

In this stage good surgery should give one hundred per cent. cures.

In this stage bad treatment is dangerous. Far better to delay for good treatment than subject one's self to bad treatment in this stage.

Bad treatment is incomplete removal of the little tumor or ulcer. Irritating treatment which does not completely destroy the cells in the tumor, ulcer or area of irritation. Such irritating treatments are: application of caustics, curetting, improper use of x-rays and radium, and carbon dioxide snow.

Bad Treatment. These pre-cancerous lesions may in some cases be completely destroyed by the application of caustic salves, or curetting or x-ray or radium, but with such treatment a piece is rarely, if ever, saved for microscopic study.

This treatment is dangerous, first, because it may be incomplete; second, there should always be a microscopic study of a piece of the pre-cancerous lesions, because in some cases cancer develops very quickly and can only be recognized with the microscope.

It takes less time to completely excise such pre-cancerous lesions with a knife (combined with the actual cautery in some cases, in certain localities, for example, the tongue). The operation in most instances can be done under cocaine without pain or discomfort. With good surgery the scar will always be the least possible after any method of treatment.

With such proper surgery a piece of the lesion excised may always be studied at once with the microscope, and the possibility of an early development of cancer recognized. This in some cases would lead to an immediate more radical operation.

My investigation over a period of twenty years with almost three thousand cases, demonstrates that in cancer in accessible regions like skin and mucous membrane of mouth, lip and tongue, and subcutaneous areas, that is with palpable nodules, ulcers and areas of irritation teaches that good surgery in this pre-cancerous stage should accomplish a hundred per cent. of cures, because this early recognition and treatment leads to the complete eradication of the pre-cancerous lesion still benign, or to the recognition of the earliest stage of cancer by the microscopic study of the piece excised, and thus leads to the radical operation indicated at a period most favorable for the cure of cancer.

Pre-cancerous lesions in the internal organs are difficult to demonstrate and will not be discussed in this paper, but I agree with William and Charles Mayo and others, that gastric ulcer and the chronic irritation of gall stones and inflammation of the gall-bladder should be looked upon as pre-cancerous lesions and lead to good, appropriate surgical treatment in the earliest stage of the disease. This treatment will be indicated by what the patients complain of, because rarely, if ever, can a tumor or ulcer be felt.

The great hope for increasing the number of cures of cancer, and decreasing the number of deaths from cancer lies in the education of the public and the profession on the significance and potential danger of the pre-cancerous lesion; the education of the surgeon as to the best surgery and the education of the surgeon and the pathologist as to the recognition of the earliest stage of the beginning of cancer in the benign pre-cancerous lesion.

The excision of the pre-cancerous lesion has the great advantage of allowing a microscopic study. There is no other way of excluding the possibility of cancer.

The short duration of the pre-cancerous lesion does not exclude cancer. The long duration does not indicate cancer.

The microscopic investigation not only leads to a decision whether it is cancer or not, but if it is cancer, to the type of cancer. These microscopic diagnoses in the pre-cancerous lesion, benign, early cancer, type of cancer, leads to immediate operations, which in some cases are radically different for the benign and for the cancer, and for the different types of cancer.

Any treatment, therefore, which does not allow the examination of a microscopic section is not devoid of danger, and is not the best treatment.

The best results therefore in the pre-cancerous stage, where the factor of the duration of the disease is controlled rests upon good surgery, and good pathological diagnosis.

To repeat, incomplete treatment in this earliest stage often yields worse result than complete treatment in a later stage.

Carcinoma of the Breast.

The following results illustrate the relation between the probability of a permanent cure and the duration of the disease when surgery is equally good.

These figures are based upon the per cent. of patients who have lived five years or more after
the operation without any signs of return of the cancer.

In the least malignant forms of cancer of the breast, called adeno-carcinoma, there are 35 patients cured five years or more after operation; this is 76%.

In this group there are 15 patients who came for treatment so early in the disease that a diagnosis could not be made until at the operation when the lump was explored. The diagnosis having been made, the complete operation followed immediately. Every one of these patients have remained well five years or more, that is 100% of cures have been accomplished when the operation has been in the early stage in less malignant forms of cancer of the breast.

In the same form of cancer there have been 20 patients who came for treatment late. Here the diagnosis could be made at once. The same complete operation was performed, the per cent. of cures is but 64%.

Results, therefore, in the less malignant form of cancer of the breast can be expressed as follows:

All cases (35) 76% of cures.
Early cases (15) 100% of cures.
Late cases (20) 64% of cures.

The figures 35.15 and 20 represent the actual number of cured patients, and not the total number subjected to operation, except in the group where there was 100% of cures.

The results in the more malignant form of cancer of the breast show the same difference in the results between early and late cases as follows:

All cases cured 92, or 36%.
Early cases 12 cured, or 85%.
Late cases 80 cured, or 35 per cent.

Any woman who has a lump in the breast immediately operated upon has the best chance of a permanent cure. If the lump proves to be the less malignant, adeno-carcinoma, her chances are 100%; if it is the more malignant medullary or scirrhus carcinoma her chances are 85%.

No one can influence the character of the tumor. This is a factor over which we have no control, but if a woman subjects herself to operation at once for a lump in the breast her worst chances are at least 85%, with a possible 100%. If she delays until the surgeon can tell it is cancer her best chances are 64% if the tumor proves to be adeno-carcinoma; in the more malignant form of cancer, 33%.

The danger of delay is really greater than this, because during this time the cancer may grow so that no radical operation can be performed. This stage of affairs was present in 27% of all cancer cases.

The per cent. of cures for all cases of cancer in which complete operation could be done and in which the period of time since operation is five years, is now 42%. Five years ago it was only 38%. This improvement is due to the fact that women are coming earlier for treatment.

Every woman should know that if she submits to proper treatment within a few days after she feels a lump the chances are one out of three that the lump is not cancer, and the proper treatment will yield 100% of cures. If the lump is cancer, her chances are one out of four that it is the least malignant form of cancer, with a possible chance of 100% of cures. At the worst with cancer in this stage the chances are 85%.

Delay, if the tumor is benign, is risky, because at any moment the benign tumor may become cancer. If the lump is cancer when first observed every day's delay must decrease the probability of a cure. Absolutely nothing can be gained by delay.

The difference is the result between complete and incomplete operations for cancer of the breast.

This is best shown in the results after complete and incomplete operation in the early stages where the probabilities of a cure are best.

In the less malignant adeno-carcinoma there are 11 cases in which it is five years since the incomplete operation, with but one cure (9%). We have just shown that after the complete operation in the same state for tumors of like character there are 15 five-year cases with 100% of cures.

For the more malignant type of cancer there are 17 five-year cases without a single cure after incomplete operation. This should be contrasted with results in the same type of tumor when the operation had been complete in this early stage.

Thirteen five-year cases well, 76%.

We may summarize the results as follows:

Operation in the earliest stage when the diagnosis of cancer cannot be made except when the lump is explored.

Adeno-carcinoma, complete operation, 15 cures—100%.
Adeno-carcinoma, incomplete operation, 1 cure—9%.
More malignant carcinoma, complete operation, 13 cures, 76%.
More malignant carcinoma, incomplete operation, 0 cures (17 cases).

By incomplete operation I mean excision of the lump or breast and later, days or weeks, after the microscopic diagnosis of cancer, the complete operation. We have only one positive cure. In this case the entire breast was removed and nothing further was done.

These figures absolutely prove the importance of a complete operation in the early stage of cancer. Incomplete operation gives worse results than delay with complete operation when the diagnosis can be made without the aid of the microscope.

The properly educated surgeon should always be able to diagnose the early cancerous lump of the breast and perform the complete operation immediately after the exploration, giving the patient the best chance of a permanent cure—from 85 to 100%.
CARCINOMA OF THE LOWER LIP.

The following figures show the influence of delay and incomplete surgery.

1. Benign lesions of the lip, 8 five-year cases, 100% cures.

These are pre-cancerous lesions. In every case the microscopic examination showed no evidence of cancer, but these are the lesions that the patients who came for treatment with fully developed cancer of the lower lip tell us about as being the little nodule, or sore or wart which they had observed on their lip for weeks, months or years before the non-present fully-developed cancer showed itself.

2. Lesions of the lip which to sight and touch seem benign, but which under the microscope prove to be early cancer, 9 cures—90%.

The failure to cure in the one case was due, I am sure, to an incomplete operation on the lower lip.

In these two groups it is not necessary to do more than excise the lesion on the lower lip.

3. Fully developed cancer of the lower lip.

When we have removed the lower lip only and not removed the glands we have cured but 7 patients, or 63%. The failure to cure in 4 cases was due to the involvement of the glands under the jaw.

When the complete operation was performed, that is, excision of the lesion on the lip and the glands of the neck, there have been 20 five-year cures, or 95% (in cases where these removed glands showed no positive evidence of cancer). If the evidence of cancer was made out by the microscope there are but 6 five-year cures, or 50%.

If the lesion of the lip has had previous treatment and has recurred on the lip, and the recurrence is microscopically cancer, the probability of a cure in the three groups is reduced from 63 to 20%, 95 to 60%, and 50 to 20%. That is operation for recurrent cancer of the lip reduces the probability of a cure at least 42%.

Similar figures can be duplicated with lesions of the tongue, face, skin of the body and extremities. The same investigation is now complete with over 1000 lesions of the skin and mucous membranes. These tables will be published later.

THE EFFECT OF NITROGENOUS WASTE PRODUCTS IN THE BLOOD IN CHRONIC INTERSTITIAL NEPHRITIS.*

BY MALCOLM REYNOUR, M.D., BOSTON.

This work was undertaken to study the effect of high and of low proteid diet on patients suffering from Chronic Interstitial Nephritis, with increased arterial tension.

Fourteen patients were selected, each case having an arterial hypertension, persistent low gravity urine, with small amounts of albumen, and rare hyaline casts.

For five days the patients were given the regular hospital diet, which contained about sixty grams of proteid. At the end of this period the proteid content of the diet was increased and this diet maintained for seven days.

By the sixth day they were given about one hundred and eighty grams of proteid daily. During the next period of eight days, the proteid was reduced, so that they were given very small amounts, the daily average for this period being about twelve grams.

The nitrogen content of the blood was measured at the end of the normal hospital diet period, and at the end of the high and of the low proteid diet periods.

Urinary nitrogen determinations were made daily, except on the days when the phenolsulphonephthalein tests were made. These latter were made five times during the course of the experiment.

Out of the fourteen cases, eight showed an increase in the nitrogen content of the blood at the end of the high proteid period.

Of these eight cases showing a nitrogen increase, six had edema of the face with puffiness of the eye-lids, and complained of nausea and headache. All of these patients vomited, and in each case refused food at the end of the sixth day. Two of the patients who showed the greatest increase in the blood nitrogen, had more marked symptoms than those showing a more moderate one.

Two cases showing an increase in the nitrogen, had no symptoms.

Of the six patients showing no increase in the nitrogen of the blood, one had only edema of the face, two had nausea and vomiting with slight edema of the face, two were drowsy, dull, and complained of headache. One patient showing no nitrogen increase, had no symptoms.

The effect of the blood pressure is difficult of interpretation, on account of the irregularity of the arterial tension under normal conditions, but it seemed to be an interesting observation, that of the eight patients showing an increase in the blood nitrogen, six showed a lowering of the blood pressure during, at the end, or slightly after the high proteid period. One case had no change in the blood pressure, and in another, the pressure became irregular.

Of the six patients showing no increase in the nitrogen content of the blood, two showed a simple irregularity, three no change, and one patient showed a lowering in the blood pressure.

There seemed to be no relation between the arterial tension and the low proteid diet during the eight day period the diet continued. In some cases there was an irregularity, in some a rise, and in others a fall in the pressure; even though the nitrogen content of the blood was greatly diminished in every instance.