high sole, sloped to fit the equinus, and with side irons, can be satisfactorily fitted, there seems no reason for tenotomy of the Achillis.

To sum up (in so far as one may generalize where cases so vary): Osteotomy to be performed not merely because deformity exists, but only for definite indications; tenotomy only to reduce the valgus or as an adjunct to osteotomy; resection of the ankle or Bardenhauer's operation, where apparatus will not control the tipping of the ankle; amputation only in cases utterly unfit for other treatment; treatment of all ordinary cases by apparatus to support the ankle, and prevent valgus—high sole to supplement the equinus in equalizing the shortening—these would seem to be the general lines of treatment. The treatment seems to be at best unsatisfactory, and, as always in such case, operation is to be avoided unless we have some clear gain in view.

Appended is a partial bibliography; other references, especially to older and less accessible publications, with detailed citations of a number of cases, will be found in Haudek's article:

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GONORRHEA IN WOMEN.¹

BY WARREN R. GILMAN, M.D., WORCESTER, MASS.

I SHALL not attempt to discuss this subject at length, but to call to your attention some of the important points which are well worth consideration. The disease usually begins as an acute infection, but the tendency to the subacute form of inflammation, which is so characteristic of it, is sometimes seen even at the outset. I have seen very few cases during the first acute attack, and this is the experience of many men who see a larger number of cases. It may be that women are ashamed or reluctant to seek advice, and do not do so until their sufferings force them to it.

The meatus is the favorite point of attack, and following that, the cervix, the vulva and vagina. The inflammation spreads rapidly, and involves the external

genitals, vagina and cervix. It is purulent in character, and the parts are bathed in pus. The mucous membrane of the lower edge of the meatus is everted and reddened; the openings of the adjacent ducts are evident as red points.

Bartholini's glands are inflamed and tender and the orifices of their ducts are pouting. Pus can usually be squeezed from these ducts and from the urethra.

The gonococci do not find such favorable conditions for growth in the vagina as they do in the glands of the labia and in the urethra.

The vagina bacillus of Döderlein, which is found here in normal conditions, produces a small amount of lactic acid. The normal acid secretion of the vagina destroys most organisms, but offers little resistance to an advancing gonorrheal inflammation.

A more serious obstacle is the character of the epithelium, which is of the type called pavement. It was contended for years that the gonococci did not grow upon such epithelium, but Mandl and Klein have proved that they do, and are able to demonstrate them in the cells.

The vaginal mucous membrane of a young, unmarried girl offers more favorable conditions for their growth than that of a multipara.

The inflammation upon the vaginal portion of the cervix and about the external os, which may be primary or the result of extension from the vagina, is purulent in character.

There is usually little difficulty in making a diagnosis of acute gonorrheal inflammation of the external genitals and vagina. The symptoms and appearances of the parts alone are sufficient, but, if one wishes absolute proof, it can be found by bacteriological examination of a drop of pus from the urethra or from the duct of one of the vulvo-vaginal glands.

By Gram's method of staining, the gonococci can be plainly demonstrated. This early stage of the disease is the time when the gonococci can be found easily, and it is also the time when treatment is the most effective.

The treatment must be prompt and painstaking. It is sometimes claimed that vigorous treatment of this stage of the disease is as unwise as it is in the acute gonorrhea of the male. I do not agree to this except as it concerns the urethra, and even then it is much less likely to do harm in women than in men.

For many years the favorite and most satisfactory remedy has been nitrate of silver. In the few acute cases I have seen I have used a solution of twenty grains to the ounce and what may be called a dry dressing. The parts should be cleansed with a solution of borax, in order to remove all pus and mucus, and to leave a clean surface upon which to apply the nitrate of silver. The silver solution is then painted upon the entire surface and allowed to dry. The vagina is lightly packed with clean gauze, and wisps of absorbent cotton placed between the opposing surfaces of the labia. The absorbent cotton may be removed every four or six hours and the surfaces, which it protects, bathed. The patient removes the gauze in twelve hours and takes a douche of bichloride of mercury, one to five thousand, or permanganate of potash, one to five thousand, every six hours. The nitrate of silver and gauze packing are reapplied every second day. Under this treatment the acute symptoms will usually begin to abate within ten days. The dry dressing gives the patient great relief. The solutions

¹ Read before Worcester Medical Association, March 21, 1898.

of nitrate of silver, bichloride of mercury and permanganate of potash undoubtedly destroy the gonococci which they reach upon the surface, and it is probable that the silver solution destroys those that have not penetrated deep into the mucous membrane. This shows how important it is to begin the treatment early when the cocci are upon or near the surface and to apply the germicidal solution to the whole surface.

As a matter of fact one rarely has the opportunity of beginning treatment at once, and in a very few days the glands in the vestibule, labia majora and vaginal mucous membrane are affected, and the gonococci are beyond reach of treatment applied to the surface.

The invasion of one of Bartholini's glands may result in an abscess; in this case it is best to open the abscess and extirpate the gland. The more common result is a chronic form of inflammation; the gland is enlarged and tender, and a drop of pus is usually found at the mouth of the duct. This pus is a constant source of infection.

With the newer silver salts, argonin and argentamin, I have had no experience. The former in a two-per-cent. solution and the latter in a one to three thousand solution are said to penetrate the mucous membrane more deeply than nitrate of silver and to destroy the gonococci without doing any injury to the tissues. Neither one coagulates albumin as nitrate of silver does.

Protargol is highly recommended by Goldenberg. It does not coagulate albumin; its solution is clear and is not precipitated by acids or alkalies. It is said to penetrate the tissues more deeply than argonin and argentamin. It may be used as a powder. A three-per-cent. solution of lactic acid is also recommended. Its use is probably suggested by the fact that the acid is present in the normal vagina and kills most pathogenic organisms placed there for experimental purposes.

I believe that the most prompt and vigorous treatment of acute gonorrhea of the external genitals and vagina rarely if ever cures. It frequently does limit the disease to the chronic manifestations in the glands of the vestibule and labia. When the gonococci reach the mucous membrane about the external os uteri, either by extension or at the primary infection, they are almost sure to invade the endometrium.

Dudley says, "He who wishes to successfully abort a gonorrhea of the uterus must be there with his antiseptic before the septic intercourse takes place."

As the acute inflammation subsides the symptoms become less and less annoying. There is no doubt that the mucous membrane becomes more tolerant of the gonococci and that the gonococci grow less virulent in their action upon it. But even in their most quiescent stage the gonococci produce an acute inflammation if transplanted to a fresh field. A man who is infected by a woman suffering from a chronic inflammation has acute gonorrhea. The chronic form of inflammation, or perhaps more properly, the results of the acute inflammation are not very evident in the vagina. The mucous membrane is likely to be somewhat atrophied and irritable, and there is a scanty but constant leucorrhea. Frequently there is present a condition called vaginitis granularis or papulosa. In the glands about the meatus and in the labia majora the results are plainer. The gonococci linger in these glands for an indefinite period and have been found

years after the primary infection. Even when no gonococci are found in the pus from the ducts, the inflammation persists.

Bartholini's glands remain a little swollen and the orifices of the ducts are quite distinct as red points.

The chronic form of inflammation of the vagina and vulva is very liable to exacerbation, especially after irritation of any kind and in this fact lies the chief source of annoyance.

These cases are the ones which are seen in such large number both by gynecologists and general practitioners. I see many in my dispensary work, and have always had great difficulty in making a positive diagnosis and treating them satisfactorily.

The routine treatment I have adopted is as follows: The vagina is washed out and then dried with absorbent cotton. Powdered borax or boracic acid is then dusted over the entire surface and dry gauze packed lightly about the cervix and in the vagina. Absorbent cotton and powder may be used between the labia if necessary. The gauze is removed in twenty-four hours and a vaginal douche taken. The powder and gauze are reapplied every second day. Astringent powders are not necessary. Aristol and dermatol are excellent but too expensive. This treatment is not curative but it keeps the parts clean and relieves the symptoms which are caused by an exacerbation of the chronic trouble.

Improvement usually begins in a few weeks and the patient is free from annoyance for several months, when there is likely to be another exacerbation.

In course of time the mucous membrane becomes so toughened and tolerant that these periodic attacks occur less frequently and are less severe. It frequently happens in this chronic stage of the disease that an abscess is developed in one of Bartholini's glands. Attempts to dilate the duct and let out the pus are not satisfactory and it is best to incise the abscess and curette out the whole gland; the cavity is packed with gauze and heals by granulation.

In a dispensary clinic it is a matter of considerable interest to decide which cases are gonorrheal. Among the poor and unclean women, leucorrhea is so common as to be of little value as a guide. A chronic inflammation of the glands of Bartholini and their ducts is a pretty sure sign of gonorrhea; but one naturally looks for an absolute test in the bacteriological examination of the vaginal discharges.

I think it has been the common belief that such an examination gives positive evidence as to the character of the inflammation. That this is not the case is shown by my own limited experience and the testimony of expert bacteriologists everywhere.

During the past year I have had under observation ten cases which I chose from a much larger number because they seemed to me to present strong clinical evidence of gonorrhea. In none of the cases were there any acute symptoms.

Bacteriological examinations of the secretions from vagina and labia were made, in most cases more than once. In no case was I able to demonstrate gonococci. In one case pus for examination was taken from an abscess of Bartholini's glands which I opened and curetted. Gram's method of staining was used in every case.

A few years after Neisser discovered the gonococcus, it was found that there were other cocci present in vaginal discharges which resembled them very closely.

It was evident that the shape of the cocci and their position in the pus cells was not proof of their character. Cocci which corresponded in every particular to the description of the gonococci were found in pus which was known not to be of gonorrheal origin. The term "pseudo-gonococcus" was frequently used.

Gram's stain settled half the problem and it is now accepted that the cocci which are decolorized by this stain are gonococci. This test is sufficient in gonorrhea in the male because there are very few other cocci present and decolorized diplococci are easily demonstrated. In the female it is far different except at the very onset of the disease in the meatus.

A cover-slip preparation of pus from the vagina shows a field crowded with bacteria. A single gentian-violet stain will show scores of diplococci in and about the cells; some of these still pass for gonococci in a few reports. When the attempt is made to decolorize with potassium-iodide solution, it is not successful and proves that the majority of cocci are not gonococci. But in such preparations, swarming with bacteria, who can say that there may not be a few gonococci? I think it is impossible to do so. This is the reason that even Gram's method is not a final test; there are so many organisms in the field that a few decolorized gonococci cannot be distinguished and one is still unable to actually prove the gonorrheal nature of the discharge. When the result of the microscopic examination is negative, as it is in the majority of cases, the only absolute test is the cultivation and isolation of the gonococci.

Martin in 1892 quoted a number of investigators who said the gonococci could be differentiated from other diplococci only by cultivation.

Brose and Neisser in 1893 found cultivation necessary in chronic urethritis in the male. Heiman in 1895 said that cultivation was the only absolute test in many cases.

The cultivation of the gonococcus calls for a great deal of technical skill and experience and must be left to the trained bacteriologist. The microscopic examination of discharges can be made by the gynecologist and if it shows gonococci, the diagnosis is assured. If it is negative, the diagnosis must be made from the clinical history and the appearances of the parts. In this way I think it is possible to make a fairly accurate diagnosis in most cases. At a recent meeting in Berlin, Behrand, who has charge of an institute for the treatment for prostitutes, said that he attached little value to the presence or absence of gonococci. They may be present in a given case at one examination and absent at the next; cases which do not show them are often contagious. Microscopical examination gives a positive result only in those cases where it is superfluous; in other cases it is unreliable. The treatment should be directed by the symptoms.

It is probable that in a large proportion of the cases of gonorrhea of the vagina and external genitals, the endometrium is attacked sooner or later. If the mucous membrane about the external os is one of the points of primary infection, the endometrium is the more quickly affected. While the normal secretion of the uterus, like that of the vagina, destroys most pathogenic bacteria, it has little effect upon the gonococci. So this organism finds the best of conditions for growth in the endometrium which is covered with ciliated cylindrical epithelium. Acute gonorrheal endo-

metritis is not a very active form of inflammation even at the outset, but it is best to retain the term acute to distinguish it from the later and chronic form. In the uterus the gonococcus always causes an interstitial endometritis with a suppurative catarrh.

The symptoms of acute endometritis are not severe. There is likely to be some pain in the back and a sense of weight or fullness in the pelvis; only a small amount of pus is secreted by the endometrium and the discharge from the external os is chiefly glairy mucus from the cervical mucous membrane. The edges of the external os are often eroded and bleed easily; this condition is more marked when there is an old laceration of the cervix. The muco-purulent discharge has an irritating effect upon the vagina and external genitals which have already passed through the acute inflammatory stage, and in some cases when the primary infection is in the cervix, the discharge from these parts may be the cause of acute vulvitis and vaginitis.

It is quite generally admitted that local treatment of the acute inflammation either by the curette or caustics is unwise because of the danger of producing a mixed infection. The active stage of the pure gonorrheal inflammation subsides in a short time and there is less danger of violent inflammation of the tubes than is the case with a mixed infection.

The endometritis which is seen so frequently in practice is subacute and chronic in character. The gonococci penetrate the mucous membrane and muscular walls and have been found in the peritoneal covering; in this way it is possible to have a peritonitis without infection through the tubes. Abscesses have been formed in the walls of the uterus. In this connection it is only fair to state that Bumm very recently announced that he still believed the gonococcus to be a mucous-membrane parasite.

In a typical case of chronic endometritis, the mucous membrane is thickened and congested and the surface covered with a muco-purulent secretion; it bleeds easily. The muscular walls are thickened and the uterus as a whole is heavier than normal. The ultimate result of the process is a considerable atrophy; the ciliated epithelium is replaced by a smooth pavement epithelium which resembles to some extent that of the vagina and has few glands of the normal uterine type; the walls of the uterus become thinner, some of the muscular tissue being replaced by connective tissue. This change may be said to be nature's method of making the uterus an unfavorable field for the growth of the gonococcus.

In the early stage of inflammation it is not difficult to demonstrate the gonococci; but in the chronic stage the organisms are rarely found in the secretions; they must then be sought in the mucous membrane. Snger applies the term residual gonorrhea to this stage of the disease when the gonococci cannot be found. The inflammatory process goes on long after the exciting cause has disappeared. Wiener says there are few cases on record in which gonococci have been found in the secretion three months after infection.

The treatment of chronic endometritis by the curette and caustic applications is now very generally regarded as the most effective. It removes the diseased mucous membrane and this is replaced by a new membrane which is at least more nearly normal in character. Many observations have been made to ascertain the length of time necessary for this reproduc-

tion and it appears that an entire endometrium may be reproduced in about twenty-five days. The curetting should be done thoroughly and proceed systematically from any one point over the whole surface; the object sought is the removal of the entire endometrium down to the muscular tissue. If a curette of medium size is used upon the body of the uterus, a small instrument must be used upon the cornua. Many operators advise the use of the small curette exclusively. The denuded surface should then be painted lightly with a strong caustic, like carbolic acid. This may seem heroic treatment, but it must be nothing less in order to be effective. Packing the uterus is generally conceded to be unnecessary.

Salpingitis is almost certain to follow the endometritis and the inflammation is of the same type as that in the uterus. The shape of the tubes and their relation to the ovaries and pelvic peritoneum make the results of the inflammation complicated and dangerous. The inflammation is much less violent than that caused by the streptococcus and its progress less rapid. The closure of the abdominal opening of the tube is one of the important results of the inflammation; this is not accomplished at once but soon enough, as a rule, to prevent the escape of pus into the abdominal cavity. If the inflammation is not severe and the uterine end of the tube not obstructed at once by the swollen mucous membrane, very little pus may be shut up in the tube. In a considerable number of cases the disease goes on slowly through its regular course without ever causing much distention of the tubes; the later atrophic changes in the mucous membrane and muscular tissue leave it finally not much more than a cord-like band connecting the ovary with the uterus. While such a result is not the rule, it occurs often enough to have some weight in the consideration of treatment.

The accumulation of pus is not usually rapid enough to call for operation early, especially in a pure gonorrheal infection; but repeated chills, severe pain and increase in size of a well-defined tumor may make an operation imperative. A conservative and palliative treatment of the early or acute stage is followed by most men unless the symptoms become very urgent. Early operation is advised, however, by some men. Removal of the tube at this time is sometimes a little difficult because it is much swollen and so friable that a ligature cuts through it readily.

Stone¹⁸ says that in the future the correct treatment of acute salpingitis will be careful irrigation of tube and return to abdominal cavity. He cites a case in which he removed the right ovary and tube and then washed out the left tube with corrosive-sublimate solution, returning it to the abdominal cavity. Recovery.

In the early stage of salpingitis, gonococci are found in the pus and in the mucous membrane. Washing the surface with corrosive sublimate cannot possibly kill them all and the reopened orifice at the fimbriated extremity leaves a clear course for their invasion of the abdominal cavity. This procedure may be comparatively safe a few months later when the contents of the tube are sterile. In certain cases when the tumor has been shut off from the general peritoneal cavity by adhesions, the abscess may be opened with safety through an incision in the vault of the vagina; in this way it may be reached and drained with success. The removal of the tube is sometimes necessary and

it may be carried out either through an abdominal or a vaginal incision.

As I have said, the pus does not usually accumulate fast enough to call for early operation; much of the swelling felt on examination is in the mucous and muscular tissue of the tube and is not due to a large collection of pus. As this infiltration of the tissues subsides, the tumor may decrease in size to some extent.

Of all the palliative measures for the treatment of acute salpingitis the most important is rest, and the more complete the better.

In the chronic stage of salpingitis the inflammatory thickening of the walls is much less marked. Atrophic change in the mucous membrane and muscular tissue takes place as it did in the uterus. It may be that this change in the uterine end of the tube occasionally relieves the obstruction to the outflow of a collection of pus, and thus a pyosalpinx is discharged through the uterus.

In many cases the history of the disease, as told by the patient, points strongly to such an escape of pus; but absolute proof of it is hard to obtain. It has been very generally believed that the pus does not find an outlet in this way. A case reported by Dr. G. E. Shoemaker is of interest in this connection. The patient gave a history of several attacks of bearing-down pains, relieved in each instance by a discharge of pus from the vagina. Vaginal hysterectomy was done and while a tube which was distended with pus was being manipulated, pus began to flow from the external os. Later examination of the organs removed showed a patulous tube between the abscess and the uterine cavity.

Dr. R. T. Morris, while washing out a chronic pus-tube with peroxide of hydrogen, was able to force the fluid through the tube and out the cervix.

Within a tube closed at each end the pus gradually increases. In some instances the amount is never large enough to cause excessive pain or to threaten rupture. Such a small collection sometimes gradually changes to a hydrosalpinx with a little caseous material in the dependent part.

Many tubal abscesses grow to a considerable size; the wall of the tube becomes thinner under the increasing pressure until it finally gives way. Long before this occurs, dense adhesions have bound the tube, ovary, uterus and rectum together in a mass which is no longer within the general peritoneal cavity. The pus may break into the rectum or bladder and be discharged. A description of the conditions found in the pelvis as the result of such a perforation will not be attempted here.

Several years ago it was noticed that a few drops of pus from a chronic pus-tube escaping into the peritoneal cavity did not necessarily produce a general peritonitis. Investigations have shown that after a certain time the gonococci disappear from the pus and the pus becomes sterile. Kiefer gives the result of examining forty cases of pyosalpinx which were operated upon. In fifty to sixty per cent. of the cases the pus contained no germs. In all the cases the peritoneum was soiled during operation, but in no case was there purulent infection of the peritoneum. This shows that bacteria in an enclosed sac lose their virulence. The average time necessary for this change is nine months.

Dr. Parvin quotes statements of Dr. Ludwig Pick as follows: In one hundred and twenty-two cases of

pyosalpinx, seventy-five were free from bacteria. Of the forty-seven containing bacteria, twenty-eight were gonorrheal.

While it is not advised to operate upon a pus-tube during the acute stage of inflammation, it is wise to operate, if possible, before extensive adhesions have formed.

An intact pus-tube, which is not covered and bound down by strong adhesions, may be removed with comparative ease and safety; but the operation for the removal of tube and ovary when there is a thin-walled tube full of pus or a tubo-ovarian abscess is extremely difficult. All the organs in the pelvis are bound together in a mass and we know that within there is a collection of pus. In such cases salpingo-oöphorectomy is sometimes impossible and it is necessary to remove uterus, tubes and ovaries. I will not go into the details of operation upon the pelvic viscera, but will call to your attention some of the methods.

Conservative *versus* radical pelvic surgery has been the topic of innumerable meetings and papers during the past four years. Somewhere between the two extremes will be found the majority of careful operators. The conservative treatment of pus-tubes is interesting and instructive, having as its object the preservation of the tubes and their functions. The tube is separated from its adhesions, the fimbriated extremity opened and the canal cleansed of its purulent contents. A probe is passed through the tube into the uterus and the normal passage from the ovary to the uterus restored. In chronic pus-tubes where the pus is sterile, this is comparatively free from danger.

The tube is sometimes amputated near the uterus, the mucous membrane sewed to the peritoneal coat and the stump then fixed in apposition to the ovary. Such treatment has many earnest advocates who believe in it and put it into practice.

The other extreme of treatment calls for the removal of both tubes and often of the uterus also. Men who believe in the radical treatment of gonorrheal salpingitis claim that the uterus and tubes are damaged beyond recovery and are therefore useless. So, when it is necessary to remove both tubes, it is better surgery to remove uterus and tubes and ovaries than to leave behind organs which are not only useless but liable at any time to an acute exacerbation of the old inflammatory process. Arguments for this method of treatment are well stated by Henrotin² and Robinson.³

Hysterectomy for disease of tubes and ovaries is very strongly opposed by the majority of surgeons. Chronic gonorrheal endometritis is a very doubtful source of danger after the tubes and ovaries are removed, and the fact that the uterus is no longer of use as an organ of reproduction is no argument for its removal. There are cases in which it is impossible to remove pus-tubes and adherent suppurating ovaries without removing the uterus also. In these cases there is little discussion as to the propriety of the operation.

Another matter of interest to-day in pelvic surgery is the route by which operations are to be performed. There is a growing tendency to operate through incisions in the vaginal vault. Men who operate often have acquired wonderful dexterity in this work but in their enthusiasm they often overestimate the advan-

tages of the vaginal route and underestimate its dangers. All operations upon the pelvic viscera which are not concerned with large tumors have been done in this way and the results are extremely satisfactory.

It is claimed that there is much less shock following an operation done through the vagina than there is when the same operation is done through an abdominal incision; also, that the operation is performed much more easily and quickly.

The men who operate in this way so frequently are the ones who advise hysterectomy whenever it is necessary to remove both tubes. They claim that vaginal hysterectomy is almost a simple operation. Granting that vaginal hysterectomy is less dangerous than abdominal hysterectomy, we then ask if removal of tubes, ovaries and uterus through the vaginal incision is less dangerous than the removal of the tubes alone through an abdominal incision.

There is a wholesome reluctance on the part of most men to operate on organs out of sight when it is possible by other methods to keep them in view during operation. There is no doubt that the danger of serious and fatal hemorrhage is greater in the vaginal than in the abdominal operation.

Clinical Department.

A NOTE ON THE DURATION OF EOSINOPHILIA IN TRICHINOSIS.

BY THOMAS R. BROWN, M.D., BALTIMORE, MD.

In a comparatively recent number of the *Boston Medical and Surgical Journal*,¹ Dr. Richard C. Cabot, in discussing eosinophilia in trichinosis (the first account of which had been given by me in the *Johns Hopkins Bulletin*, April, 1897, followed by a complete report in the *Journal of Experimental Medicine*, Vol. 111, No. 3, of three cases in which a marked eosinophilia, between 45 per cent. and 68 per cent. had been found in the blood, and living trichinæ in the muscle), remarked that it would be interesting to know how long the eosinophilia lasted after the cessation of the acute symptoms.

This question had also occurred to me, but unfortunately, all our three cases left the hospital and the city while still showing a marked eosinophilia, 16.8 per cent. in the first, 17.6 per cent. in the second and 34.7 per cent. in the third, with a leucocytosis of 11,000 per c. mm. in the first, and 9,000 per c. mm. in the second and third cases. Recently, by a lucky chance, the third case has again come under my observation and, as there had been no symptoms since leaving the hospital (January 22, 1898) to suggest another trichinotic infection, I took the opportunity to examine his blood to see whether any trace of the old eosinophilia remained.

The count made on July 10, 1898, was:

Leucocytes (per c. mm.)	7,000
Polymorphonuclear neutrophiles	68%
Small mononuclears	23%
Large mononuclear and transitional forms	6%
Eosinophiles	3%

That is, practically, a normal number of leucocytes per c. mm., and normal percentages of the various forms, thus showing that the eosinophilia had entirely disap-

² American Gynecological and Obstetrical Journal, April 1897.

³ Loc. cit., October, 1897.

¹ December 30, 1897.