

Studies of the Micro-Bacillus
of Acne and Clinical Studies of
Cases Treated by Vaccines

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Studies of the Micro-Bacillus of Acne and
Clinical Studies of Cases Treated by Vaccines.

One notes on reviewing the literature that a gram fast micro-bacillus is primarily the etiological factor in the production of Acne. The theories of the pathogenicity of this organism are diverse and the most favorable culture medium on which it can be grown is at the present in an experimental stage.

Unna was the first observer to note the presence of this organism in Acne lesions. He therefore, advanced the postulate that it was of etiological importance in the lesions of Acne. Engman, a worker in the laboratory of Unna, carried on a series of researches based on this postulate, but unfortunately was unable to complete his researches as he had to leave the laboratory, whereon ^dHodara, a worker in the same laboratory with the observations of Engman continued the study of this organism with the following results:- The organism was culturable with difficulty on an agar which was slightly acidulated with acetic acid and a subculture was negative. In his animal experiments he found that a lethal dose of the organism was not fatal to guinea pigs and white mice.

Sabaraud, in his first communication stated that Unna and his co-workers were unable to grow a pure culture, and a subculture was negative; but does agree with Unna in that he believes a micro-organism is a responsible factor in the production of this malady.

Gilchrist carried on very extensive researches as to the etiological importance of this organism and its pathogenicity in production of Acne. In his researches he found that the organism grew quite readily on plain glycerine agar, and that a

lethal dose was fatal to guinea pigs and white mice.

Fleming found a gram fast micro-bacillus which grew very readily on an oleic acid agar of 0.2% ; and if an emulsion of this organism was rubbed into the skin there will develop at the site of the application, pustules of an Acne type and that a gram fast micro-bacillus can be recovered from the pustule. He further found that a mixed vaccine which contains this organism and the Staphylococcus Epidermis Albus, yielded better results than a vaccine composed of only one of these organisms.

Sudmensen and Thompson in their observations noted that this organism grew very readily at 37° C. on a variety of agars, and that it grew anaerobically as well as aerobically. In their animal experiments they found that a lethal dose of this organism was fatal to rabbits and guinea pigs.

Whitfield in his observations noted a gram fast micro-bacillus in Acne lesions and when this organism was planted in 0.2% glucose agar it grew quite readily anaerobically. In comparing the organism grown by Fleming with the one he grew, he found that the organisms culturally were not the same. On noting this fact he sent Unna a specimen of the two organisms for identification. Unna in answer to this inquiry selected the organism which he had grown and questioned the organism which Fleming had grown.

Moleworth found that the organism was culturable with difficulty and that subcultures were negative.

Engman in a recent paper states that the organism is grown with difficulty and that a mixed vaccine yielded better results when given in small or medium doses than when given in large doses.

Lovejoy and Hastings stated that in their experiments they had little difficulty in culturing the Acne bacillus.

From the preceding observations one is unable to determine the pathogenicity of this organism, the cultural characteristics and the culture media upon which a growth can be obtained with moderate certainty. At the suggestion of Dr. M. A. Barber a series of experiments was commenced.

The technique for the preparation of the skin which was found most effective and free from organisms was as follows:- The skin overlying the area of the comedones and pustules was thoroughly washed with soap and water after which it was wiped with a piece of cotton which had been dipped in chloroform. The object of this step is twofold, first and most important is to render the skin as fat free as possible, second, it assists in the process of sterilization. This step was followed by wiping the skin with alcohol after which a piece of cotton saturated with alcohol was placed over the comedones^{nes} or the pustules.

The technique pursued for the extraction of the comedones and the evacuation of the pustules was as follows:- The skin adjacent to the comedo and the pustule is held firmly between the thumb and the index finger of the left hand, a sharp bistuary is held by the thumb and index finger of the right hand. The pressure is slightly increased by the thumb and finger of the left hand while at the same time the point of the bistuary is quickly passed through the skin into the pustule. The first portion of the pus which appears is wiped away with the bistuary. The pressure is then increased and the pustule evacuated. The technique for the extraction of the comedo is the same with the

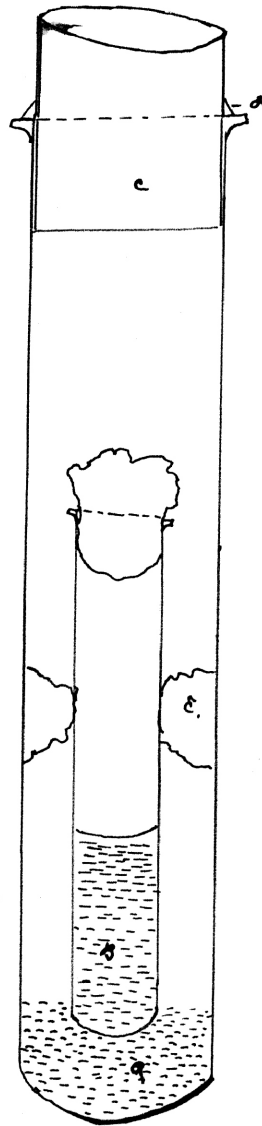
exception that the comedo is extracted en masse'. As soon as the pustule was evacuated its contents were placed on a ground glass slide which was inside of a large Petri dish. The comedo when extracted was placed on the ^{same} slide at a distant point from the pustule.

The following methods were pursued. No. 1. The skin having been prepared as previously described, the pustules were evacuated and the comedones extracted, the next step was that of maceration of the pustule contents and the comedones. The comedones and pustules were held in separate droplets of salt solution of 0.85% on the ground glass slide contained within the sterile Petri. This step was followed by mixing further ^{Comedo - Pustule} emulsion with a small glass pipette at the large end of which there was made fast a piece of rubber tubing. The mouth of the pipette was immersed in the emulsion, suction was made and the emulsion drawn into the pipette after which it was discharged on the slide. This process of mixing was performed from four to six times. The mixing having been completed, a new pipette was made of the same type as the one used for mixing, upon which a mark was made to measure a definite quantity of the emulsion used in each experiment. The tubes of agar that were to be used were placed in a water bath at 100 C., after which they were allowed to cool to 40 C. A measured portion of the emulsion of the pustule and comedo was then drawn into the pipette and planted in tube No. 1. Tube No. 2 was planted from No. 1; tube No. 3 from tube No. 2; tube No. 4 from tube No. 3 and tube No. 5 from tube No. 4. Each tube after having been planted was rolled vigorously between the hands to insure a thorough mix. Time and date were noted after which they were placed in the incubator at 37°C.

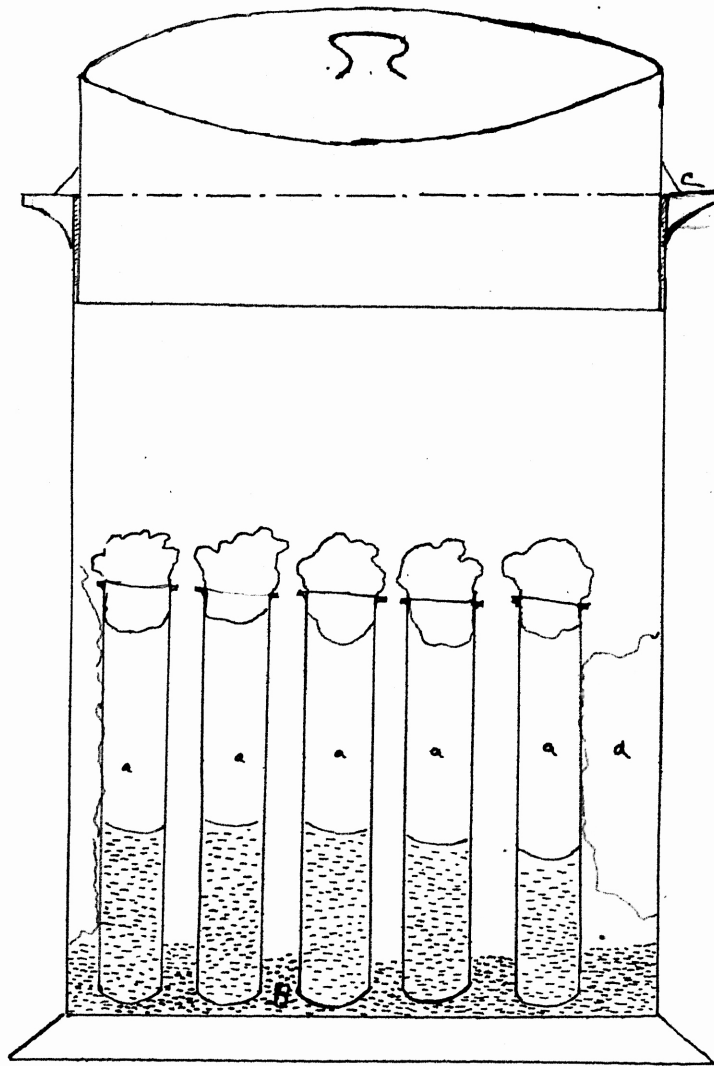
Method No. 2. The skin preparation and the extraction of the comedones were the same as described in Method No. 1. In this method the comedones were thoroughly crushed after which two drops of an 0.85% salt solution were added. The Petri was then covered and placed in the incubator for two hours. At the end of this time the Petri was removed and the mix was completed as described in Method No. 1. A new pipette was made and the tubes were planted as in Method No. 1. Time and date were noted and the tubes placed in the incubator at 37°C.

Method No. 3. The skin was prepared, the comedo extracted and the pustule evacuated the same as in Method No. 1. The technique was reduced to complete simplicity. The pustule and comedo were ~~then~~ placed on the ground glass slide as in Methods No. 1 and 2, after which they were planted deep in the agar which had been cooled to 40 C. The tubes were then rolled vigorously between the hands and slanted. Time and date were noted and the tubes placed in the incubator at 37°C.

Method No. 4. In this method the tubes were planted as in Method No. 3. after which they were placed in one of two types of container to determine if the organisms were anaerobic. When many tubes were planted they were placed in a large glass jar in the bottom of which there was Pyrogallic acid. The glass stopper was inserted and sealed with paraffin. (See drawing). When planting a few tubes they were placed in a large tube containing Pyrogallic acid, ^{the} a cork was inserted and sealed with paraffin. The object of the Pyrogallic acid in the glass jar and large tube was to obtain an air content which contained no oxygen. Time and date were noted and jar and tube placed in the incubator at 37°C.



- a - Pyro gallic acid
- B - Tube of culture media
- c - Cork.
- d - Paraffin which coats cork.
- E - Cotton which is placed Tube for inoculation

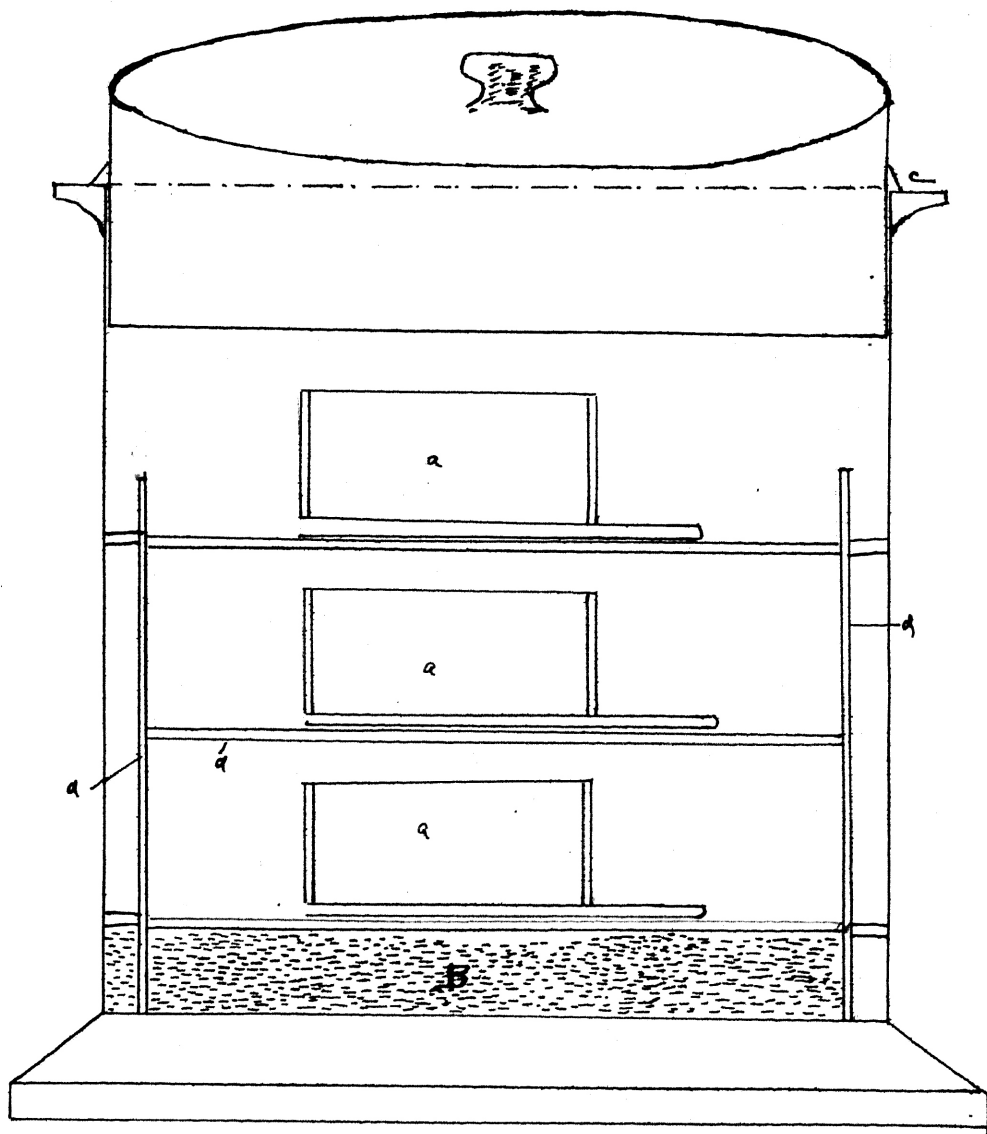


- a - Tubes of cultures Med in
- b. Pyrogallic acid.
- c - Paraffin sealed edge of jar.
- d - Cotton which has been treated with

Method No. 5. The pus and the comedones after removal were placed on a ground glass slide, mixed and macerated. An emulsion was then made of this mixture by adding an 0.85% salt solution. The slide was then placed in a large Petri which was placed in the incubator for an hour. At the end of this time the Petri was removed and a small amount of the mixture was placed with a fine pipette on the under surface of a cover glass on the isolating cell. The cell was then placed in position on the stage of the microscope, an isolating pipette was drawn and the shank filled half full of steril salt solution. ~~(*)~~ The pipette was then adjusted and bacillary types of bacteria were isolated and planted in droplets of culture media. The cell was then placed in a large glass jar. Time and date were noted and the cell was placed in the incubator at 37°C. (See drawing)

Method No.⁶ . In this experiment the technique of preparation of the comedones and pus and the isolation of the organism was the same as in Method No.5. The organisms after isolation, however, were not planted in droplets on the cover slip of the isolating cell but were mixed with agar from pipette number two after which the mix was drawn into the pipette. The pipette was then removed from the pipette holder and the capillary portion was sealed in a fine gas flame. The rubber tubing which was attached to the other end of the pipette was then removed and this end was also sealed in a gas flame. (See drawing) Time and date were noted and the tube placed in the incubator at 37°C.

Method No. 7. The preparation of the comedones and pus, the isolating of the organisms and the technique were the same as described in Method No.6. The isolating and the planting having been completed, the pipette was removed from the pipette



- a- Isolating cells
- b- Pyrogalllic acid
- c- Paraffine sealed edges of jars
- d- Rock which holds Isolating Cells



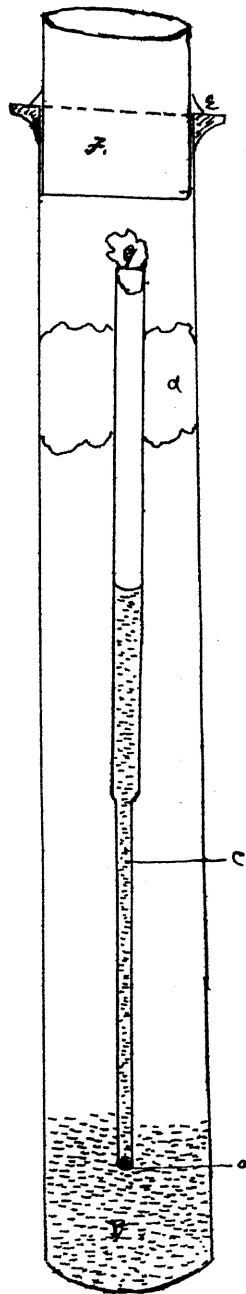
- A - solution pipette
- a - sealed end of pipette
- c - culture media in pipette

holder and the fine capillary end of the pipette was sealed in a gas flame after which the large end of the pipette was heated and a piece of burned cotton was carefully inserted in the lumen of the tube. The time and date were noted and the tube placed in the incubator at 37°C.

Method No. 8. At the suggestion of Dr. Barber the following technique was pursued. The comedo and pus were thoroughly macerated and mixed on a glass slide. The emulsion was drawn into a fine capillary pipette, the end of which was bent at a right angle to the shank. A cover glass was then placed on an isolating cell, the pipette containing the emulsion was held in the right hand and was discharged on the under surface of the cover slip. The cell was then placed in a large glass jar containing Pyrogalllic acid, the stopper was inserted and sealed with paraffin after which it was placed in the incubator at 37°C. Time and date were noted.

Method No. 9. The technique of making an emulsion of the comedones and the pus was the same as described in Method No. 8. The emulsion was drawn into the capillary pipette which was discharged into a small test tube. This small tube was then placed inside of a large tube which contained Pyrogalllic acid, a cork was inserted in the mouth of the large test tube and sealed with paraffin. The time and date were noted and the tube placed in the incubator. After 48 hours the tube was removed from the incubator and bacillary types of organisms were isolated and planted as in Methods 4, 6 and 7. One notes on examining the chart that no growth of the micro-bacillus noted in the smears, was obtained. With this evidence it is rational to make the statement that the

One notes on reviewing the literature that a gram fast
micro-bacil



- a - Sealed end of pipette
- b - Pyrogallic acid.
- c. culture media in pipette
- d - cotton which fits pipette exact.
- E - Paraffin which seals cork and tube
- F. card.
- g. calcium jelly.

micro-bacillus noted in the smears made in each experiment, although morphologically the same as described by other workers, is not culturally the same. (See chart.)

Having failed to grow this organism and accepting the postulate of Unna, a new series of experiments was commenced in which no effort was made to culture the organism but to determine the action of vaccines made from the comedones and pus. The following experiments were pursued.

Experiment No. 1. The skin preparation was the same as previously described; the active pustules were evacuated and placed on a ground glass slide; 1.5 c.c. of steril salt solution of 0.85% was added and the pustule contents was thoroughly mixed and macerated with the salt solution. A smear of this emulsion was made and stained by Grams method. Gram fast micro-bacilli and staphylococci were noted, the latter greatly outnumbering the former. Some of the emulsion was then drawn into a fine capillary pipette and was discharged into a steril tube. As soon as the emulsion was transferred with the pipette to the small tube it was placed inside of a larger tube which contained Pyrogallic acid. The tube was corked and sealed with paraffin. Time and date were noted and the tube was placed in the incubator for 24 hours. At the expiration of this time the tube containing the emulsion was removed from the incubator and the inner tube was taken out.

Technique for Standardization.

A small capillary pipette such as is used in making the opsonic index, was made. The point of the pipette was immersed in the pus emulsion and as soon as the pus ceased to enter the pipette it was ^{removed} ~~drawn~~ from the tube and a mark was made at the bottom of the

~~I do not wish it understood~~

meniscus. The object of this line was to act as a guide in quantity. The contents of the pipette was then discharged into the tube containing the emulsion. The technique for obtaining blood was as follows:- The finger was thoroughly washed with soap and water and thoroughly rinsed in water at 60°C., this was followed by immersing that portion of the finger from which the blood was to be obtained in a 50% alcohol solution for three minutes. The finger was then wrapped with a piece of bandage and a puncture was made at the root of the nail with a sharp bistuary. The first two drops were allowed to escape after which the remaining portion of blood was collected in a small test tube which contained an 0.85% salt solution. The tube was placed in the centrifuge until all of the corpuscles had been precipitated after which the supernatant fluid was removed, and .5 of one c.c. was placed in the tube and the tube thoroughly rolled between the hands to insure a good mix. This step having been completed the opsonizing pipette was again allowed to fill with the emulsion up to the mark made on the fine capillary portion. The pipette was then removed from the tube containing the emulsion and the blood emulsion was drawn into the pipette up to the mark. The ^{or} ~~blood~~ ^{Comedopus} blood mixture was then thoroughly mixed by discharging the pipette from three to five ^{on a sterile slide} times. A smear of the completed mixture was made analagous to ^{and by Gram's Method} a blood smear which when dry, was stained with Wrights stain. From this smear a count was made of the number of red blood cells ^{Micro and Staphylococci. And by} ~~and~~ ^{or Staphylococci} bacilli ^{or Staphylococci} according to the following proportion:- The number of red blood cells counted is to the number of bacilli counted as 5,000,000 red blood cells is to X. The number of bacilli ^{or Staphylococci} contained in the emulsion was determined and the dilution made

according to the results desired. (For results see patient's chart #1).

Experiment No. 2. In this experiment the technique for the preparation of the skin was the same as previously described. The comedones were extracted and placed on a ground glass slide after which they were crushed and pestled to a fine pulpy consistency. On completion of this step 2 c.c. of an 0.85% salt solution was added and the pestleing continued until a thorough mix had been obtained. The emulsion was then transferred from the slide with a capillary pipette to a small steril test tube which was placed inside of a large tube that contained Pyrogallic acid, the cork was inserted and the tube sealed with paraffin. The time and date were noted and the tube was placed in the incubator for 24 hours. The tube was then removed from the large tube and the emulsion standardized as described in Experiment No. 1. (For results see patient ~~#1~~ ^{#5} chart ~~#1~~)

Experiment No. 3. In this experiment the technique described in Experiments No. 1 and 2, were combined and the emulsion placed in the incubator for 24 hours. The tube was then removed and contents standardized as in Experiment No. 1. See patient's Chart # ~~2~~ - ~~1~~ #4 - #5

Experiment No. 4. In this experiment the skin preparation was the same as previously described. The pustules were evacuated and placed on a cover glass such as is used for isolation. The cover glass was inverted and placed on a ground glass slide in the concavity of which was placed a droplet of water in which Pyrogallic acid had been dissolved. The surface of the hollow ground slide was then smeared with vaseline and the slide was then placed in a wide mouthed bottle which was placed in the incubator for 24 hours.

After taking the slide from the bottle the cover was removed from the cell and the pus transferred to a small test tube. An emulsion was made of the pus with .5c.c. of an 0.85% salt solution after which it was standardized as previously described. See Chart No. 2-

In 275 pustules and 500 comedones extracted and studied in the smear and culturally in the preceding experiments, it was found that the micro-bacillus was noted in 115 pustules and in 90 comedones. In one case noted the pustule did not contain any of the micro-bacilli but a pure culture of staphylococcus epidermus albus was noted. In none of the pustules or the comedones was there a pure culture of the micro-bacillus noted, this being the case animal experimentation was impossible with pus from the pustule or an emulsion of the comedo.

The value of the vaccines therapy in this malady therefore had to be tried experimentally on the patient and the results determined by clinical observation and the reaction noted after vaccination. It is noted on examination of the charts that ^{Some} ~~some~~ of the patients were at first treated with a vaccine made from a culture of staphylococcus epidermus albus. With this vaccine the face of the patient showed marked improvement up to a certain point after which the dose could be increased to any dose and the patient no longer responded. If the vaccine was then discontinued for a week it was noted that the patient's face rapidly returned to its original condition. Noting this fact vaccines were then made and tried as described in Experiments No. 1, 2, 3, and 4. For results of these experiments see patients' charts.

The skin of patients suffering with this malady studied in

these experiments presented the following, namely:- The skin was very thick and coarse in texture; the pores of the skin were very large and many, were occluded; the skin was very oily and markedly hyperimic as the skin blanched on pressure. The comedones were very irregular in size and generally presented by a small black spot which was the point of occlusion of the gland duct. In many cases, however, there were no comedones and the ducts of the sebaceous glands were occluded, this type of lesion was excellently described by Sabaraud. In one case ~~there~~^{there} were few pustules and comedones ~~were~~^{were} & marked ~~increase~~^{by} of hard nodular lesions deep in the thickened skin. The skin surrounding the nodules was markedly hyperimic and the nodule was very painful on pressure. Some of these nodules were intentionally bruised to determine if bruising them would produce pustules. In some instances a pustule did result, but in the greater portion thus treated, a pustule did not develop but a marked increase in size was noted. These nodular lesions were punctured and on pressure showed they contained nothing. The skin ~~the~~ⁱⁿ areas not involved in this malady, was thick, leathery, coarse, brownish in color and very oily. In many of the old pustular lesions it was found that the skin at the point of the lesion if healed had contracted and ~~some~~ scar tissue was noted. In other lesions which had been chronic in type the area at and about the lesion was bluish in color and a puncture made at this point showed a cavity contained in the skin which was filled with necrotic detritus and blood which is very dark in color. In each of the following cases a case history was taken as completely as in any of the grave diseases.

Case No. 1. Patient, J.C.H.; Age, 20.; Sex, male.; Occupation, salesman.; Civil State, single.; Race, white; American. The date of first examination was June 20, 1910. First appearance of the malady was in 1905. The malady was confined to the face and neck. The pustules when in the process of formation are sometimes slightly painful.

Subjective History.

The patient stated that when the pustules were fully formed the skin overlying the pustule had a very tense feeling and on slightest pressure was painful. After the pustules were opened the skin in the area of the pustule felt very easy but after a few hours a sensation of itching was experienced. The patient observed that in some instances when the itching open pustule was scratched new pustules would develop a short distance from the original one. One questions this statement of the patient ^{for} ~~as~~ in many instances no new pustules developed. There was an increased number of pustules when the patient was constipated. He also noted that greasy food would ^{Sometimes} produce pustules. The patient has been suffering constantly with this malady since its first appearance.

Previous Diseases. Has had all the diseases of childhood.

Family History. Negative.

Appetite, good.; Condition of the bowels, constipated.;

Urination, good.; Does not use alcohol, tobacco, tea or coffee.;

Digestion good.

Objective Observation.

Inspection. The patient's face shows many contracted scars

of healed Acne lesions. The skin was thick, tense, oily, coarse and many of the pores were greatly enlarged some of which were occluded. The comedones were variable in size and generally presented by a black pinpoint spot. The pustules also varied in size and in some instances did not point. The skin surrounding the pustule was generally markedly inflamed and thickened. The pustules which did not point, the patient stated, were more painful than those which pointed.

Palpation. On palpation the skin surrounding the inflamed pustules and comedones was found to be very hard and tense and very painful, the intensity of the pain depending on the extent of the inflammation and the pressure exerted. As soon as the acute stage of the inflammation had subsided the skin was no longer tense and the pustule was compressable.

Microscopic examination of the pustule and the comedo in this case showed the ^{contents of Pustules & comedones} pus to be composed of a few gram fast ^{Micro-} bacilli and large numbers of staphylococcus epidermus albus. (For cultures see chart, Method No.)

Differential blood count showed, Polys 72, Large Lymph. 13, Small Lymph. 12, Transitionals 2, Degenerates 1, Leucocyte Count 8,525, Erythrocytes 5,000,000. Hemaglobin 92 (Sale.)

Examination of urine. Acidity, slight; Alkalinity, none; Color, golden yellow; S.G. 1019; Sugar, none; Albumin, none; A few epithelial cells; Casts, none.

The patient was treated with a vaccine made from a culture of staphylococcus epidermus albus which at first yielded excellent results. After a definite time this vaccine had little or no effect

Case No 1

Condition of face before Vaccination	Date, Dose of Vaccination Accessory Treatment and Point of Vaccination	Condition of face after Vaccination
Written report the skin was as described caused severe inflammation, and many dentures were noted. 10/9	10/9 Staph vaccine, dose 250,000, cc. Right arm Dorsolateral.	Face showed no change. 10/9
Pustules not as numerous as noted 10/9. Skin inflamed, caused area inflamed.	Staph vaccine, dose 250,000, cc. Right arm dorsolateral.	Face about same as noted 10/10
10/10/10 No. of pustules, 7 less than noted 10/9 Skin is still inflamed, caused area inflamed.	10/10/10 Staph vaccine, dose 250,000, cc Right arm dorsolateral.	10/14 Face shows improvement, caused area inflamed as noted 10/27/10, skin only slightly inflamed.
10/12 Very few pustules noted, caused area only slightly inflamed. Skin shows very slight inflammation.	10/12 Staph vaccine, dose 250,000, cc Right arm dorsolateral.	10/21/10 Most marked improvement noted since vaccine 1st. even commenced. Skin only slightly inflamed, caused area inflammation.
10/24/10 condition of face about same as noted	10/24 Staph vaccine, dose 250,000, cc Right arm dorsolateral.	10/27 condition of face about same as noted
10/27	10/30 Staph vaccine, dose 250,000, cc Right arm dorsolateral.	11/2 Face is not as free from dentures, and inflammation as noted 10/27.
10/30 condition of face same as noted 10/24	11/5 Staph vaccine, dose 500,000, cc Right arm dorsolateral.	11/9 condition of face very bad, patient appears to be in negative stage.
11/5 condition of face about same as noted	11/15 Staph vaccine, dose 400,000, cc Left arm dorsolateral.	11/18 Face with the exception of a few very small caused area in excellent condition
11/15 Face shows marked improvement. Dentures few in number, caused area slightly inflamed. Skin slight inflamed.	11/24 Staph vaccine, dose 500,000, cc Right arm dorsolateral.	11/27 condition of face same as noted 11/15
11/24 condition of face about same as noted	12/15 Staph vaccine, dose 500,000, cc Left arm dorsolateral.	12/18 Face does not appear to be as bad as noted 11/9.
11/27 condition of face about same as noted	12/24 Vaccine same as Exp #1 dose 100,000, cc Staph 400,000, cc K. am dors lat.	1/9 Most marked improvement noted. Inflam- mation of chin gone, inflammation of caused area gone. dentures few in number, and small.
12/15 No change noted in condition of face same as 11/27	1/2 Vaccine same as Exp #1 dose do 1/9 Right arm dors lat.	1/10 Dentures in chin have increased and caused area show no inflammation and a few small dentures are present.
12/24 Patient was out of zone, condition of face about as bad as noted when treatment was commenced.	1/2 Vaccine same as Exp #1 dose do 1/9 Right arm dors lat.	1/11 Skin is not free from all inflammation caused area only very slightly inflamed and the dentures are very small, few in number, and scattered.
1/2 Face shows considerable improvement.	1/9 Vaccine same as Exp #1 dose do 1/9 Right arm dors lat.	1/11 condition of face do 1/11
1/2 condition of face about same as	1/18 Vaccine same as Exp #1 dose do 1/9 Right arm dors lat.	1/18 condition of face same as 1/10
1/10 Skin about free from inflammation. No change noted.	2/25 Vaccine same as Exp #1 dose 1/9 Left arm dorsolateral	3/3 condition of face same as 3/11
1/15 condition of face do 1/21	3/11 Vaccine same as Exp #1 dose do 1/9	3/17 Skin is now quite clear, 3 small dentures noted, no new dentures in process of develop.
1/27 condition of face same as 1/11	4/22 Vaccine had been discontinued to observe condition of skin	4/30 1 small denture noted, this denture is at the junction and in observation to note if skin is going to remain clear or if relapse of pustules is going to occur
3/10 Skin about free from inflammation. No change noted.		
3/15 caused area no longer show any sign of inflammation, and dentures are very small, and few in number		
3/11 condition of face do 3/11		
3/21 Skin quite clear, one small denture noted		

on the Acne lesions. (See Chart #1.) This fact may be accounted for in that the patient may have developed a tolerance to the organism used in the vaccine. The experiment being unsatisfactory up to this point a new series of experiments was commenced as previously described. (See chart for results)

Case No. 2. Patient K.T.; Age 18; Sex, female; Occupation, clerk; Civil State, Single; Race, white; American. Date of first examination was Oct. 2, 1910.

Subjective History.

The first appearance of this malady was at the age of fourteen which was coincident with puberty. The malady was confined to the face and neck. The pustules when in the process of formation cause the patient a great deal of discomfort. The skin overlying the developing pustule feels very tense and is inelastic and any movement of the skin is accompanied with slight pain. Soon after opening the pustules tension of the skin was relieved. A few hours later the patient experienced a sensation of itching and scratched the open pustule and the adjacent skin but on being questioned ^{she} was unable to state positively that new pustules formed. The patient stated that constipation and the menstrual cycle had a marked effect on the production of pustules. Since the onset of this malady at the age of fourteen the patient's face has at no time been free of pustules.

Previous Diseases. Has had all the diseases of childhood.

Family History. Parental history, negative. She has three sisters and one brother. Oldest sister 23, was the first to suffer with this malady, youngest sister 14, also has this malady. One

sister 21, and the brother who is 11 show no evidence of this disease.

Appetite, good; Condition of the bowels, generally constipated; Urination, good; Digestion, fair; Uses coffee and tea.

Objective Observation.

Inspection. The skin of the patient was very red, thick, inelastic, oily and many of the pores were occluded with a cheesy like material. All stages of pustule development were noted commencing in the early stages of the pustule and comedones which in many cases developed into pustules. From the observation in these experiments the comedo was not in all of the pustules. From personal observation I do not believe that the micro-bacillus and the staphylococcus epidermus albus were primarily the etiological factors in the production of this malady in this case but that the patient is suffering from some metabolic disturbance, probably an insufficiency of an internal secretion from the ovaries. This belief was strengthened by a statement from the patient that the approach of the menstrual cycle caused an increase in the number of pustules which process was accompanied in the first few days of the cycle by a general exacerbation. In the interval between the menstrual periods the patient yielded readily to a staphylococcus vaccine but as soon as the vaccine was discontinued the patient's face returned to its original condition. This being the case and if compared with patient No. 1, it is noted that the staphylococcus vaccine in this case served the patient in the same way. The patient being a female the ovarian extract was tried in conjunction with the vaccine, the results obtained with the mixed treatment were far better than when the staphylococcus vaccine was given alone, however as the action of

Case No. 2.

Condition of Face before Vaccination	Date, Dose of Vaccine Accessory Treatment and Point of Vaccination	Condition of Face after Vaccination
A large crop of pustules were noted and the skin and conjunctivae were highly inflamed. 10/9/10	Staph. vaccine dose 500,000,000 Right arm dorso lateral 10/9/10	Condition of face worse than noted when first seen. So probably in a negative stage. Such pointed Mentzer's cycle. 10/12/10
Face in better condition than noted 10/12. Many pustules and conjunctivae are still present. 10/15	Staph vaccine dose 500,000,000 Left arm dorso lateral 10/15	Condition of skin about same as noted 10/15. 10/18
Condition of skin about same as 10/15. 10/21	Staph vaccine. 300,000,000 Right arm dorso lateral 10/21	Slight improvement noted. Still noted not as marked, conjunctivae skin inflamed. 10/24
About same as 10/24. 10/27	Staph vaccine, dose 300,000,000 Left arm dorso lateral 10/27	Skin shows more improvement at this time than at any previous time, still noted. Skin is more or less clear, pustules not as numerous and as personally noted 10/30
Skin shows very little inflammation and conjunctivae very slightly inflamed. Number of pustules about same as noted 10/30. 11/3	Staph vaccine dose 300,000,000 Right arm dorso lateral. 11/3	No inflammation of conjunctivae, and skin noted. Pustules of a small type present in considerable nos. 11/6
Condition of skin do. 11/4. No of pustules seems to about same as 11/6. 11/9	Staph vaccine dose 300,000,000 Right arm dorso lateral 11/9	Condition of conjunctivae and skin as 11/6. The pustules continuing to be present. 11/12
Condition of skin & conjunctivae do 11/16. Pustules smaller in size still present in. 11/15	Staph vaccine dose 300,000,000 Left arm dorso lateral 11/15	Condition of skin and conjunctivae do 11/16. Pustules same as noted 11/15. 11/18
Condition of skin same as 11/16. Many pustules still present. 11/21	Staph vaccine dose 300,000,000 Left arm dorso lateral X Boerhaave ext. 5 gr. 11/21	No change noted. do 11/21. 11/24
Condition of skin appears to be clearer than 11/21. Pustules about of same number. 11/27	Staph vaccine dose, 500,000,000 Right arm dorso lateral. X Boerhaave ext. 5 gr. 11/27	Condition of face do 11/27. 11/30
Condition of face worse than noted 11/27. Pustules small and numerous. Patient states in due to Mantoux 12/4. 12/3	Staph vaccine dose 500,000,000 Right arm dorso lateral. X Boerhaave ext. 5 gr. 12/3	Condition of face not as bad as noted 10/12. Pustules of small size, and fewer in no. Skin only slightly inflamed, conjunctivae slightly inflamed. 12/6
Gen. condition of face do 12/6. 12/9	Staph vaccine dose 300,000,000 Left arm dorso lateral X Boerhaave ext. 5 gr. 12/9	Condition of skin, and conjunctivae slight inflammation. Pustules of same size as 12/4. 12/12
Gen condition same as 12/9. 12/15	Staph vaccine dose, 300,000,000 Right arm dorso lateral X Boerhaave ext. 5 gr. 12/15	Gen. condition do 12/9. 12/18
Gen condition 12/9. 12/21	Staph vaccine dose 300,000,000 Left arm dorso lateral. X Boerhaave ext. 5 gr. 12/21	Gen. condition do 12/9. 12/24
Gen condition same as 12/9. The action of the vaccine appears no longer to effect pustules. 12/27	see exp. # 3. Staph 200,000,000 Micro-10 a. l. 100,000. Right arm dorso lateral X Boerhaave ext. 5 gr. 12/27	Gen condition do 12/9. 12/30
Condition of skin, conjunctivae good. Pustules present. in small numbers. 11/2	vaccine dose 12/27 Left arm dorso lateral X Boerhaave ext. 5 gr. 11/2	Skin and conjunctivae do 11/2. Pustules few in number, and small in size. In active stage of vaccination. 11/5
Condition of skin do 11/2. Pustules same as noted. slight increase in no of pustules. 11/8	vaccine do 12/27 Right arm dorso lateral X Boerhaave ext. 5 gr. 11/8	General condition do 11/5. 11/11
Condition of skin do 11/8. Pustules are few in number, and no longer come on in crops. 11/14	vaccine do 12/27 Left arm dorso lateral X Boerhaave ext. 5 gr. 11/14	Skin is clear and the pustules greatly diminished in number. 11/17
Gen condition of skin do 11/17. 11/20	vaccine do 12/27 Right arm dorso lateral X Boerhaave ext. 5 gr. 11/20	Gen condition do 11/17. 11/23
Gen condition skin do 11/17. 11/26	vaccine do 12/27 Right arm dorso lateral X Boerhaave ext. 5 gr. 11/26	Gen condition skin do 11/17. 11/29
Gen condition skin 11/17. 12/1	vaccine do 12/27. Staph 200,000,000 Micro-10 a. l. 200,000. Right arm dorso lateral X Boerhaave ext. 5 gr. 12/1	No change noted, condition of skin do 11/17. Slight increase in pustules but not as great as noted 10-15 in active series of Mantoux's. 12/4
Gen condition of skin 11/17. Pustules noted 2/3 have healed, and few scattered pustules noted. 12/7	vaccine do 2/1 Left arm dorso lateral X Boerhaave ext. 5 gr. 12/7	Gen condition of skin & conjunctivae do 11/17. Pustules do 2/4. 12/10
Gen condition of skin do 1/8. 12/20	vaccine do 2/1 Right arm dorso lateral. 12/20	Gen condition of skin do 1/8. 12/23
Gen condition of skin do 1/8. 12/25	vaccine do 2/1 Right arm dorso lateral 12/25	Gen condition of skin do 1/8. 12/28
Gen condition of skin 1/8. 12/31	vaccine do 2/1 Left arm dorso lateral 12/31	Skin & conjunctivae do 1/8. Pustules slightly increased in no. (Painful Mantoux.) 12/30
Skin & conjunctivae do 1/8. Pustules few in no than 3/30. 1/6	vaccine 2/1 Right arm dorso lateral X Boerhaave ext. 1/6	Gen condition of face do 4/6. (Patient is still under observation. The pustules are at this time present in very small numbers. Vaccination stopped) 4/17

the skin was no longer tense and the patient was greatly relieved. From 12 to 24 hours after the pustule had been opened the patient experienced a sensation of itching. The crops of the pustules varied with the general condition of the patient. The patient when constipated noted more pustules than when the bowels were regular.

Present state of health of the patient is good.

Previous Diseases, All of the common children's diseases.

Family History, Negative.

Appetite, Good; Condition of the bowels, Inclined to be constipated; Urination, good; Digestion, Fairly good except when greasy food is eaten; Digestive disturbances, Greasy food causes marked metabolic disturbances with a tendency to an increase in the number of pustules; Chews and smokes tobacco; Uses alcohol in moderation; Coffee, one cup a day.

Objective Observation.

Inspection. The skin of the patient was very red, thick, inelastic and oily. The comedones were large and presented generally by a small round black spot. The pustules were large, the base was very red the redness extending well out into the surrounding tissue. The pustules generally pointed toward a small round well defined black spot which was the original site of the comedo.

Palpation. On palpating the inflamed comedones there was noted a marked thickening of the surrounding skin which was very tense and painful in many of the comedones examined. The pustules which were in the acute stage of development were sharply outlined by an area of inflammation which was of a darker red than noted in the comedones. On palpating the pustule it was difficult to move

Case No 3

Condition of Face before Vaccination	Date, Dose of Vaccine, Accessory Treatment, and Point of Vaccination.	Condition of Face after Vaccination
At this time the patient is suffering with a large crop of pustules on back, in a region of Scapulars. 10/9	Staph vaccine dose 500,000,000 L arm axo lateral 10/9	No change noted. 10/12
Patient again returned with a large crop of pustules which are very large in size 11/5	Staph vaccine dose 500,000,000 R right arm axo lateral 11/5	Condition of face do 11/5 11/18
Condition of face do 11/5 11/15	Staph vaccine dose 500,000,000 L left arm axo lateral 11/15	Slight improvement of disfigured skin no other change noted. 11/20
Condition about same as noted 11/20 11/29	Staph vaccine dose 400,000,000 Right arm axo lateral 11/29	Skin not as inflamed as noted 11/20 pustules about same size as noted 11/20 11/25
Condition of skin less inflamed than noted 2/3. Pustules noted 2/3 show rapid healing. considerable number of new pustules noted. 2/9	Staph vaccine 400,000,000 L left arm axo lateral 2/9	a marked general improvement is noted. pustules are fewer in number than at any previous time. 2/14
Skin has in about normal. Pustules are not developing as rapidly as previously noted. 2/20	Staph vaccine dose 400,000,000 Right arm axo lateral 2/20	Condition about same as 2/20 2/24
Skin is no longer inflamed. Pustules have changed in type from large to small variety, and are not as numerous as 2/20 2/24	Staph vaccine dose 400,000,000 L left arm axo lateral 2/24	Condition of skin of back do. 3/4 3/14
Condition of skin do 3/4 3/24	Staph vaccine dose 400,000,000 Right arm axo lateral 3/24	Skin of back appears entirely normal. Pustules are small, few in number and scattered. 4/3
General condition do 4/3 4/9	Staph vaccine dose 400,000,000 L left arm axo lateral 4/9	General condition do 4/3 4/12
Redness of skin no longer present. Pustules are very few in number and are rapidly cleared 4/15	Staph vaccine dose 400,000,000 Right arm axo lateral 4/15	General condition. do 4/15 4/18
General condition do 4/15 4/21	Staph vaccine dose 400,000,000 L left arm axo lateral 4/21	General condition 4/15 4/24
General condition of skin do 4/15. Pustules are now few in number, and at times back in face of pustules. 4/27	Staph vaccine dose 400,000,000 Right arm axo lateral 4/27	General condition do 4/27. Patient is still under observation but is no longer being vaccinated. 4/30

the pustule because of the tenseness of the skin. The process of acute inflammation was followed by the stage of necrosis in from 12 to 36 hours. At the expiration of this time the pustule showed a very active process of necrosis with pointing which was approximately at the site of an irritated comedo. After the pustule had pointed the skin overlying its apex was compressable. The patient complained of pressure when applied latterly or upon compression of the pustule.

Microscopic examination of the pus showed a pure culture of staphylococcus epidermus albus. In this case no micro-bacilli were noted in any of the pustules or comedones examined. A culture was planted from which a vaccine was made with which the patient was treated. (For results see patient's chart #)

Differential Blood Count. Polys, 76; Large Lymphs. 6; Small Lymphs, 15; Eosinophiles, 1; Transitionals, 2; Leucocyte count, 9,000; Hemaglobin, 90;

Examination of urine. Acidity, slight; Alkklinity, none; Color, Golden yellow; S. G., 1020; Sugar, none; Albumin, none.

Microscopic examination, negative.

Case No. 4. Patient. V. T.; Age, 14; Occupation, schoolgirl; Civil State, single; Race, white; American. Date of first examination Jan. 6, 1911. First appearance of the malady at 13 years was coincident with puberty.

Subjective History.

Malady was confined to the face and forehead. The pustules when in the process of formation caused the patient little discomfort. The skin overlying the pustules feels tense and the skin is moved with difficulty which is at times accompanied by slight

pain. The pustules when opened relieved the patient markedly. No sensation of itching was experienced after opening the pustules as noted in the former cases. The patient being very young no reliance could be placed on a statement as to the possibility of a transference of this malady from an open pustule to an adjacent area but she stated that the pustules were constantly forming. The patient is a sufferer from constipation which when most marked is accompanied by a large crop of pustules. In this case I was unable to get a good history as to the relation of the menstrual cycle to the increase of pustules of this malady.

Previous Diseases. She has had all of the diseases of childhood.

Family History. The patient is the youngest of three sisters suffering with this malady. (See case No. 2).

Appetite, Good; Condition of the bowels, generally constipated; Urination, good; Digestion, fair; Uses tea and coffee.

Objective Observation.

Inspection. The skin of the patient was very coarse, red, thick, inelastic and many of the pores were occluded. In various places there were noted dark blue hard endured areas which were very painful on slightest pressure. A puncture of one of these spots showed it to be filled with a dark bluish-black thick material which showed an active process of a chronic necrosis in the parts in which it was located. The comedones were small as a rule and generally pointed by a small black spot. Most of the pustules developed around the comedo and in the process of development pointed approximately at the small round black spot of the comedo. Some

of the pustules examined however, did not develop around the comedo, but in the follicle of the sebaceous gland. This type of pustule on pressure was very sensitive and rarely pointed. On palpation of the inflamed comedones it was noted that they were situated in the deeper structures of the skin and that pressure made latterlyor compression was quite painful. The pustules when palpated in the acute stage were very painful when of the typw which did not point but in that type which did point considerable pressure could be exerted before the patient objected. The areas of inflamation and redness noted in the comedo in this case were limited to the tissue immediately surrounding it while in that type of pustule which pointed the area of inflamation and redness extended a short distance into the adjacent tissue. but in that type of pustule which did not point the area of redness was very extensive, in some instances the transverse diameter of the inflamed area measured approximately from 25 to 30m.m..

Microscopic examination in this case showed micro-bacilli and staphylococcus epidermus albus in large numbers.

Differential blood count. Polys, 75; Large lymph. 7; Small lymph, 16; Eosinophiles, none; Transitionals, 2; Leucocyte count, 9,000.; Erethrocytes, 5,000,000.; Hemaglobin, 80.

Examination urine. Acidity, slight; Alklinity, none; Color, Golden yellow; S. G. 1018; Sugar, none; Albumin, none;

Microscopic examination of urine, negative.

Case No. 5. Patient C.E.B.; Age, 20.; Sex, Male; Occupation, Clerk; Civil State, single; Race, white; American. Date of first examination, Feb. 5, 1911. First appearance of this malady was noted at the age of 15 and was not coincident with puberty.

Case No 4

Condition of Face before Vaccination	Date, Dose of Vaccine Accessory Treatment and Point of Vaccination	Condition of Face after Vaccination
Pustules were large, comedones were inflamed. Skin red and inflamed. Long black areas noted on both cheeks 2/5	Vaccine injct 1/5 (S. 200,000,000,000 microbs. 100,000. (K. amundson, lat.) K. Brown ext 1/5 gr. Z. amundson ext. 2/5	No change noted. do 2/5 4/4
No change noted do 2/5	do vac 4/5 (K. amundson lateral K. Brown ext 1/5 gr. Not clothed on face. 4/14	Slight change in skin noted, comedones not as inflamed as noted 2/5. Pustules noted 2/5 healing, many new pustules. 2/20
Condition of face do 2/20	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr.	marked change of skin noted a decrease rapidly dis appearing. Comedones not as inflamed as noted 2/20. No change in character of pustules, which are of about 3/4
Skin is quite clear, comedones slightly inflamed. No developing pustules noted as large as those noted 2/5	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr. Not clothed on face. 5/7	Skin and comedones no longer inflamed. Pustules small, and greatly diminished in number. 5/12
Good condition of skin do 5/12	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr. Cathartix (C. amundson 1/5 gr.) Not clothed on face. 5/16	Slight gain improvement of skin. 5/20
Skin now quite clear, no inflamed comedones. Pustules very few in number. 5/24	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr. C. amundson 1/5 gr. Not clothed on face. 5/24	Condition of skin and pustules about same as 5/24 5/29
Skin is clear, comedones show no inflammation, pustules small and few in number, black areas softening & fading 4/4	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr. C. amundson 1/5 gr. Not clothed on face. 4/4	Skin, comedones, & pustules same as 4/4. Black areas of left cheek had all appeared, and turning yellow on right cheek black areas almost gone 4/19
Good condition same as 4/19	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr. C. amundson 1/5 gr. Not clothed on face. 4/22	Skin normal in color, and quite clear comedones not inflamed at all occasional pustules noted small in size, black areas of right cheek fading rapidly. 4/25
Skin & comedones normal. One small pustule noted, black areas of right cheek faint and indistinct. 5/1	do vac. 2/5 (K. amundson lateral) K. Brown ext 1/5 gr. C. amundson 1/5 gr. Not clothed on face. 5/1	Skin and comedones show no inflammation, small pustules. Black areas about same as 5/1 (Patient is still under observation) 5/8 <small>(vaccine action has been stopped)</small>

The malady was confined to the face, neck and back in the region of the scapulae. The pustules when in the process of formation in any of the above locations were painful.

Subjective History.

The pustules when fully formed were very painful on slight pressure. The skin covering and adjacent to the pustule was tense and was very painful on squeezing. After the pustules were opened this feeling of tenseness no longer existed and from 12 to 24 hours a sensation of itching was experienced. The patient had not noted that when an itching open pustule was scratched and the hand not washed and an adjacent skin area scratched that new pustules developed. The number of pustules was increased when the patient was constipated. He also noted that greasy food would produce the number of pustules.

Previous Diseases. Has had Measles, Chickenpox, Mumps.

Family History, Negative.

Appetite, good.; Condition of the bowels, Inclined to chronic constipation; Urination, good; Digestion, good; Smokes and chews tobacco.; Uses tea and coffee.

Objective Observation.

Inspection. Shows a well nourished muscular young man. Skin in the parts involved in the malady is red, thick, coarse, oily and many of the pores are large and occluded. the comedones on the back are very large and point through the skin by small round black spots. The comedones when inflamed are surrounded by an area of inflammation which is darker in color than noted in any of the previous cases described. The comedo when in the active stage of inflammation

are very painful on slight pressure. The pustules in this case rarely pointed and were very large. The skin adjacent to the developing pustule was bluish-red in color. This type of pustule when opened contained a considerable quantity of a thick creamy pus which varied in amount from .25 to .5 c.c. Some of these pustules when opened did not always contain pus but were filled with a dark reddish-brown substance which was very thick.

Palpation. On palpating any of the comedones it was noted that the comedones were located in the deeper structures of the skin. The pustules when palpated were hard nodular masses and on compression did not yield.

Microscopic examination of the pustules and the comedones showed the following:- Microbacilli were few in number and in many instances were not noted at all. The staphylococcus epidermus albus was noted in large numbers and was always present. For results of vaccination see patient' chart #.

Differential blood count. Polys, 78; Large lymph. 8; Small lymph. 12; Transitionals, 2; Eosinophiles, none; Mast cells, none; Leucocyte count, 9,200.; Erythrocytes, 5,500,000.; Hemaglobin 95. Sale.

Examination of the urine. Acidity, slight; alkalinity, none; color, golden yellow; S. C. 1020; Sugar, none;

Microscopic examination of urine, Negative.

One notes on examination of the preceding histories that in males in these observations the malady did not appear coincident with puberty but in the history of the females the malady did appear coincident with puberty. In all of the cases it is noted that constipation is a predisposing factor in the production of

Case No 5

Condition of face before Vaccination	Date, Dose of Vaccine, Accessory Treatment, and Point of Vaccination	Condition of face after Vaccination
Many large highly inflamed curdness of beard. Pusicles large and numerous. Skin very red & inflamed. 2/5	Voc. Exp. # 2 Right arm dorso-laterally 2/14	No change noted do 2/8 2/11
No change noted do 2/4 4/14	Voc. Exp. # 2 Right arm dorso-laterally 2/14	No change noted do 2/8 2/17
No change noted do 2/9 4/20	Voc. Exp. # 2 Right arm dorso-laterally 4/20	No change noted do 2/8 4/23
No change noted do 2/4 4/24	Voc. Exp. # 3 Slight arm dorso-laterally 4/24	Slight improvement of color of skin. Curdness do 2/4. Pusicles numerous and large. 5/4
Skin shows marked improvement - redness and inflammation less than 3/4. Curdness less inflamed. Pusicles large and numerous. 3/9	Voc. Exp. # 3 Left arm dorso-laterally 3/9	marked change in skin is almost clean and redness only slightly inflamed. Pusicles not numerous as noted 3/9. but are very large. 5/12
Condition of skin and curdness do 3/12. Pusicles not as large as 3/12. 5/17	Voc. Exp. # 3 Left arm dorso-laterally 5/17	No inflammation of skin or curdness noted. Pusicles few in number and are variable in size. 5/20
Gen. condit. do 3/20 3/24	Voc. Exp. # 3 Left arm dorso-laterally 5/24	Condition of skin and curdness do 3/20. Pusicles much smaller in size. and numbers in number. 5/27
Condition of skin, beard, & pusicles do 3/27 4/2	Voc. Exp. # 3 Left arm dorso-laterally 4/2	Condition of skin & curdness do 3/27. Pusicles small, few in number and scattered. 4/5
General condition of face do 4/5 4/10	Voc. Exp. # 3 Right arm dorso-laterally 4/10	General condition of face do 4/5 4/13
Condition of skin and curdness good. Pusicles are not constantly present. 4/14	Voc. Exp. # 3 Left arm dorso-laterally 4/14	General condition of face do 4/14. Patient attended on observation, all vaccination however has been stopped. 4/22

pustules. In case No. 3 and 5 it is noted that when greasy food is taken the patient soon afterward developed a crop of pustules. In case No. 2, one notes that the menstrual cycle is accompanied by a marked increase in the number of pustules. In the beginning of the treatment of all of these patients a vaccine made from a culture of the staphylococcus epidermus albus was used which at first yielded good results but did not entirely rid the skin of pustules and if discontinued for a short time in cases Nos. 1, 2 4 and 5. the skin returned to its original condition at an early date. In case No. 3, however, no micro-bacilli were found in the pustules or the comedones. In this case the staphylococcus vaccine yielded excellent results up to the present, no recurrence of the malady. Having failed to get results with the staphylococcic vaccine, vaccines were then made as previously described and used in all cases with the exception of case No. 3. (For results see charts). From the evidence presented by these charts, I believe, that the micro-bacilli though few in number with the staphylococci yield definite results which will eventually cure the patient of this malady.

I wish to thank Dr. H. M. Lyle for his kindness in furnishing me with patients on which to carry out these experiments.

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Love Joy and Haskings.