Tattooing Considered as a Means of Inoculating Disease, especially Tuberculosis— with Cases.

being

A Thesis for the Degree of M.D.

by

William Murray, M.B., C.M.
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Tattooing Considered as a Means of Inoculating Disease, especially Tuberculosis, with Cases.

It is well known that a tattooer, using his saliva as a medium for mixing his pigments or for wiping blood from the part operated on, may easily, if he happen to be suffering from a disease which would render his saliva infective, transmit that disease to the person on whom he operates. Even if the saliva is quite healthy, if the needle he uses is not aseptic, the material on the dirty needle on being introduced under the skin may give rise to disease.

The commonest disease to be so inoculated is no doubt syphilis and numerous cases of this nature have been published from time to time in the Medical Journals.

Blood poisoning probably of a pyaemic, septicaemic or encephalitic nature, has no doubt, often followed the operation judging from remarks in the reports of Navy & Army Medical Officers. The inoculation of tuberculin is by
this means, although a few cases have been published, is a much rarer thing. A series of cases of this nature came under my care some time ago and having seen many examples of the tattooer's art and knowing how rare complications of this special kind are they seemed to me to be worthy of recording.

If a substance of a septic or infective nature is present either as a medium for mixing the colour, or is used as a means of cleansing the skin, or happens in any way to be on the instruments employed, then assuredly no more certain means of inoculating that material could be used than the ordinary process of tattooing. Each line is gone over repeatedly, the instrument in most cases consisting of many needles fired in a row and as it is only advanced a little at each prick the needles behind go over the ground already punctured by the ones in front.

We see in ordinary vaccination where only a few punctures or scratch are made, how in the great majority of cases inoculation takes place. How much more perfect the inoculation by tattooing must be can be best appreciated if we accept the pigment left in the
Skin as an indicator of the presence also at one time of the medium with which it was mixed and granted that that medium is of a character that, if introduced beneath the skin, it would cause disease or if the needle which bears it has on it repulsive or infective material, then it is almost impossible that the tattoo's unfortunate victim can escape.

The transmission of syphilis by tattooing is comparatively common and I shall endeavour to show by quoting cases already published that it constitutes a real danger in our Naval and Military services where large numbers of men avail themselves of the skill of a comrade who has established his reputation as a tattoo-branding. No doubt it breaks the monotony of shipboard or barrack life but if the operator be suffering from an infective form of syphilis at the time, if no greater precaution is taken than is usually the case the person tattooed runs an excellent chance of being inoculated. If one comrade tattoos another, whether in the Naval, Military or Merchant services then saliva is freely used and absolutely no care is taken as to the cleanliness.
of the instruments or the after-treatment of the wounded surface.

The following extracts from published cases are quite sufficient to show that the danger is not overestimated.

The Lancet of Mar. 23rd 1878 quotes a series of cases published by Dr. Maury and Duley of Philadelphia in the American Journal of the Medical Sciences.

In this series syphilis was transmitted to no fewer than fourteen persons. The operator contracted syphilis in Feb. 1877 and was under treatment until Mar. 1877. In April (when the tattooing took place) he had mucous patches in his mouth and condylomatous tumors round the anus. In the fourteen cases saliva was used either to mix the pigment (indian ink and vermillion) or came in contact with the needles by the latter being introduced into the mouth. In all he tattooed twenty-two persons. Fourteen undoubtedly contracted syphilis, three escaped, and the rest were doubtful.


A young soldier of the Scots Guards was tattooed on the forearm by a comrade the professional tattooer of the regiment. The pattern was a figure of the Goddess of War.
Two circular patches appeared on the design and in a few weeks the occurrence of the ordinary secondaries revealed their true nature. Although the tattoo was well known the actual source of infection was never discovered.

In the British Medical Journal of Dec. 10th 1887 Surgeon R. Porter gives the case of a Lance Corporal of the Middlesex regiment who was admitted to the station hospital at Dover in 1886 suffering from two ulcers on the left forearm. A week previously he had been tattooed by a comrade who had only been discharged from hospital a fortnight, having been under treatment for a well marked attack of syphilis. The ulcers looked like chancreos and eight weeks afterwards a copious specific rash broke out on his body. During the process the operator spat on his arm and rubbed it in order to remove the blood which flowed at each puncture of the needle. There was no evidence of a primary sore previous to this and the symptoms disappeared under the usual treatment.

Surgeon Carlton gives an analogous case in the British Medical Journal of Dec. 24th 1887. The patient had been ad
milled into the station hospital at Glenelg and had been tattooed on both forearms. On each there was a large chancre the size of half a crown. The axillary glands on the left side became inflamed and suppurred from the primary irritation before there were any local signs of syphilis.

Both men were in hospital together; the tattooer with well marked syphilis; and his victim a young soldier who had never had a venereal disease in his life before. The operator spat on the punctured part during the tattooing. The infection appeared to come from a mucopurulent discharge which came from the post-nasal region of the operator. He had no sores in his mouth.

In the British Medical Journal of May 1889 Surgeon Barker, M.B. describes a series of cases which came under his care at the station hospital at Portsea in Oct. 1888. The operator had well-marked secondaries. The whole of the buccal mucous membrane was covered with mucous ulcerules and the soft and hard palates were ulcerated. In all he tattooed twenty-three men. In twelve of these undoubted constitutional
Syphilis followed; the primary manifestation being on the seat of the tattoo marks either in the form of Hunterian chancre or rupture ulcers and in number from one to four. It was discovered that of the eleven men who escaped the Medical History Sheets showed that four had had syphilis previously. It was denied that the operator either put the needles in his mouth or used saliva in any form during the operation. Two deserted previous to the investigation but were said by their comrades to have had commencing bad arms.

In the British Medical Journal for Sept. 14th, 1887 Surgeon W. R. Whitfield, M.R.C.S. gives an account of a similar though smaller outbreak which occurred in 1887 at Landour in the Himalaya range. The tattooer was a private who had a hard chancre in '86 and well marked secondaries in '87. In all he tattooed twelve men and of those five developed syphilis, in each case the sore being a true Hunterian chancre. In these five cases he had used saliva to clean the surface. That the importance of the danger
has been recognized can be inferred from the following which appeared in the *Lancet* of Mar. 31st 1860.

"The custom of tattooing has been highly condemned by the Medical Authorities of the French Navy on account of severe accidents, as the loss of an arm or even of life which have been the consequence of this habit. The practice is to be quite given up."

After giving the cases published by Dr. Maury & DuLesse the *Lancet* went on denouncing the practice and said that it might easily be stopped were it not for the fact that the War Office were in favour of it as it had an influence against desertion. It suggested that it would be necessary to anoint a superior officer for its supervision; the needles to be kept as scrupulously clean as ordinary surgical instruments and that nothing but water be used for moistening the pigments.

I understand that at the present time, the Japanese amongst whom syphilis is extremely prevalent are doing their best to prohibit tattooing not only in their Navy and Army.
but amongst civilians as well in order to lessen if possible the spread of the disease, and that it is unlawful for a Japanese subject to be tattooed. Nowadays in Japan where undoubtedly tattooing was more in vogue and more artistic than anywhere else, professional tattooers are only found hanging round European hotels and foreign settlements as they can only practice their art on foreign residents and visitors.

In my own experience I have never seen a case of syphilis follow tattooing by a Japanese tattooer although I have in the course of my service in the East as a surgeon to the Peninsular and Oriental Steamship Navigation Company had peculiar advantages for seeing tattooing operations performed many times, in all but three cases without any antiseptic precautions, and also of witnessing the results of operations performed months or years before. In the three operations to which I take exception I attempted to diminish the pain by hypodermic injections of cocaine and I insisted that the operator should render his instruments antiseptic. As a matter
of fact the cocaine injections were practically useless as in an operation which may take hours to accomplish its effect is too evanescent to give much relief. To be effective it would have to be repeated so often that a dangerous quantity of the drug would be absorbed. I have seen at work tattoo-branders many of them demanding high remuneration and although they did not use their saliva in the wholesale way that a private or sailor would in tattooing the arm of a comrade, probably from race prejudice as a European of whatever class would object to the saliva of an Asiatic being used for the purpose of cleansing his skin when water was to be had, yet I have repeatedly seen them put the brush they used for the preliminary outlining of the pattern in their mouths as well as the needles with which they pricked the pigment into the skin. That all the cases I have seen either being done or afterwards escaped without syphilis is probably due to the fact that the operator did not happen to have that
disease in an infectious form at the time. I have never seen them use their saliva for moistening the pigment in the way the operator did in the cases of transmitted tuberculosis which later will be described but then I have never seen a native tattooing a native and in such a case racial objections would probably be laid aside and saliva as freely used as it undoubtedly is in tattooing amongst our own lower classes.

The great majority of our sailors and soldiers who get tattooed abroad are done by natives, either Japanese, Burmese, Caffirs, Nindos or Maoris and I have not been successful in finding a single published case of syphilis having been inoculated in a European by a native and this I would ascribe to the less frequent use of saliva in consequence of the difference of race as it certainly cannot be ascribed to the less frequent occurrence of that disease amongst them.

Leaving Syphilis we next consider shortly other forms of blood-poisoning
e.g. erysipelas, pyaemia and their possible result—gangrene. The published records of these to be found in our own Journals are vague but are sufficient to show that such things by no means infrequently follow the operation.

The Medical Times and Gazette for Mar. 31st, 1860, in commenting on the report of the Medical Inspector General of the French Navy says, "Several examples show that in some cases the loss of a limb or even death itself may be the result of lathing, &c.; while as regards lesser accidents proceeding from the practice their number is considerable. The Naval Authorities have issued a recommendation to the sailors to discontinue this deplorable practice."

The Lancet of Dec. 28th, 1861 quotes a case from the "Union Medicale de la Gironde" in which a young cavalry soldier had his arm amputated at the shoulder from gangrene following lathing. He was covered by devices done in Hospital while under treatment for Rheumatism. The British Medical Journal for
Dec. 1st 1894 records a death from
tattooing which occurred in a suburb
of Berlin. Common red paint had
been used to rub in the design; blood
poisoning set in and the victim,
a lad of eighteen, died after great
suffering.

In this last case it seems to
me that probably the catastrophe
happened by the irritant nature of
the paint so injuring the vitality
of the tissues that they became a
suitable ground for injurious organisms.

That these were introduced with the
paint is unlikely if the paint was
used in a liquid state as paint when
mixed, contains quite a sufficient
quantity of impurities to incite its
being acetone. The poison had probably
not rubbed into the inflamed surface
after the operation.

The wonder is that cases like the
above are not more common than
they are when one considers that usually
the after treatment of even a large
tattooed surface is absolutely nil.

The following photograph illustrates
well the extensive area of skin
which can in the space of a few
hours be brought into a most favourable condition for the reception and development of organisms. The tattooing represented was the work of a Caffin. It was done in Pietermaritzburg in

1885 at one sitting of seven and a half hours. The instrument used consisted of nine needles fixed in a holder. Indian Ink and Vermillion were used
and very little inflammation ensued.

To give an idea of how much can be done in one hour I have inserted another photograph the subject of which is the work of a professor.

Alphanese tattooer and was done in Shanghai in 1893. I witnessed the operation. It was commenced and finished within an hour. The colours
used were Indian ink, vermillion, and a brown of the nature of which I am ignorant. The instruments employed were of two kinds; a row of needles tied together for the outlining and a quantity of needles tied in a bunch for the shading. I may add that both of these photographs are coloured from nature.

As a rule after the operator has finished the part is wiped with a wet sponge or rag and then the shirt, which may be clean or may be dirty, according to its owners habits is slipped on and the injured surface is left to take care of itself.

Normally, if seen immediately after the operation, the tattooed surface is inflamed and raised above the surrounding skin. Lymph exudes and mixes with any redundant colour, desquamated epithelium and hairs from the shirt and forms a scab. For a day or two the part is painful to the touch and the pressure of clothes is rather irksome. The inflammation subsides and in four or five days the scab begins to chip off bit by bit leaving the skin as before
with the exception of the deposit of pigment beneath it.

A "sore arm" often follows, sometimes severe enough to force its possessor to seek medical advice. This condition as a rule consists of local cellulitis with coincident enlargement and tenderness of the glands in the neighborhood and ordinary treatment usually allays it in the course of a few days.

As to the seat of the pigment

[Image]

A glance at the accompanying photomicrograph which is from a section of skin tattooed years before shows that it mostly lies in the deeper layers of the corium and that
the lymphatics of the skin and subcutaneous tissue must be opened into during the process cannot be denied. An additional proof that the lymphatics must be opened into is the fact that pigment can almost invariably be found in the lymphatic glands through which the lymph from the tattooed area has to pass.

This must be due to the pigment passing directly into the injured lymphatics as all those colours which are indelible and so selected by tattooers are insoluble substances and could not be absorbed in the usual manner. If they could then there would be no reason why tattoo marks should not disappear in time. Experience teaches us that this never happens.

Such a surface without doubt, by reason of the multiple wounds and the consequent quantity of decomposed tissue would greatly favour the reception of organisms and the spread of inflammation of an endopelitinous or cellulitic nature.

No doubt the lesser accidents of the French report were of this kind.
When we come to consider the inoculation of tuberculosis by tattooing the preceding remarks as to the suitability of the operation for the inoculation of any virus of Course, hold good. That tissue deprived by injury or disease is more liable to the attack of tubercle is notorious and it has already been shown that if an area of skin has been tattooed it must have been considerably damaged.

The conditions favouring the introduction of the syphilitic poison or ordinary septic organisms will also be the conditions which will favour the introduction of the tubercle bacilli.

Since Villemin in 1865 published his first series of experiments on the "Inoculation of Tuberculosis," using tubercular material from phthisical patients and inoculating with it rabbits and guineapigs and producing both local and general tuberculosis, the mass of evidence both experimental and clinical has accumulated to such an extent that nowadays no one would think of disputing that tubercle was inoculable, not only
from man to animals but from man to man.

The evidence of the inoculation from man to man is necessarily mostly of a clinical nature (in one case which has been published it was experimental) although in many cases borne out by microscopic examination or physiological experiment.

In the case of inoculation from man to animals we can verify that by direct experiment; taking tubercular malle from a tubercular patient and straightway inoculating with it an animal or series of animals and producing tubercular disease in them demonstrating by the microscope the typical tubercular structure of the nodules and the presence of the bacillus of Koch.

So certain has the fact become that if tuberculous matter be injected into an animal subject to tuberculosis the animal becomes affected with the disease that there have been many advocates in the profession for this being adopted as a handy means of verifying our diagnosis of tubercular disease.
Guineapigs and rabbits are usually chosen as they have been proved to be especially liable to tubercular disease.

In the Medical Times and Gazette for Sept. 28th 1867 is a paper which was read before the Royal Medical and Chirurgical Society in which D'Arcy gives the results of experiments (based on those of Villemin) performed by himself with a view to prove the extreme value of this method of diagnosis. In his conclusions, he states that he considers (with reservations which are outside our subject) that the method is a valuable one and that the inoculation of guineapigs with the excretions of persons suffering from phthisis will, at all events, in a certain stage of the disease, and possibly throughout give rise to the formation of tubercles in the animals operated on.

More pertinent however, to the subject under discussion, is the following from a lecture delivered before the Royal College of Surgeons by E. J. Barker, F.R.C.S. Professor of...
Surgery and Pathology to that body and recorded in the British Medical 
Journal for June 9th, 1888. After describing the ordinary experiment of 
inculcating the eye of a rabbit with tubercular matter, as practised by 
Baumgarten proving that inoculation of tubercular matter caused local and 
general tuberculidosis he says, "The "question now arises, Can we produce "any clear evidence that this direct "inoculation of tubercle on the eye of the body ever takes place in "the human subject? This question "can, I venture to say be answered "distinctively in the affirmative; "both as regards children and adults. "Numerous cases have been put on "record in the last few years."

He then relates a few cases of which the following is an abstract. In a Continental town containing a Jewish community of 9000 souls, there were during the months of from February to March, inclusive, nineteen children subjected to the rite of circumcision. Sixteen were operated on by one man and the remaining three by
others. In every case the bleeding was stopped by applying the mouth to the prepuce and sucking it. The man mentioned sucked ten of the cases. The other nine were sucked by other persons. All these nine cases recovered completely but the ten sucked by the operator all manifested serious disease between the eighth and twelfth day. The scars in the prepuce became the seat of nodules, then of unhealthy spreading ulcers. The inguinal glands became enlarged in spite of antirrhilitis treatment, Dr. Lehman, under whose care the cases were, and who most carefully records the outbreak having first diagnosed that disease. In three cases the glands did not suppurate but the patients died of tubercular meningitis within a few months. In the remaining seven the glands suppurated and four of these died, one of diphtheria and three of "marasmus". Three of the ten recovered but only after years of suppuration and boring of sinuses underneath the skin. The operator at the time
was suffering from advanced phthisis. Although he circumcised nineteen he only applied his mouth to ten and in the other cases no evil results followed. There is no doubt that the disease produced was local and in some cases general tuberculosis and that it was inoculated into the prepuce from the mouth of the operator.

The lecturer also mentioned cases by Merklem, Holot, Fleender, and Pfeiffer.

Pfeiffer's case was that of a healthy veterinary surgeon who punctured the joint of his left thumb while dissecting a tubercular cow. The wound healed but the rear became indurated and the joint underwent the typical changes of serous and tuberculous synovitis but without sinuses. He died in eighteen months from tubercular phthisis. The joint when examined was typically tubercular and large numbers of bacilli were found.

"Such cases," Professor Barker said, "leave no room for doubt that tuberculosis can be inoculated on
any part of the surface of the body
and may spread from the original
point of entry through the whole
system until a fatal amount of
general disease is produced." He
remarked that children were more
liable than adults and those whose
tissues were lowered by injury or dis-
ease than healthy persons.

M. Verneuil at a meeting of
the Académie de Médecine related
the following case which was reported
in the British Medical Journal for
Feb. 2nd, 1884.

A house surgeon at the St. Eugénie
Hospital who did all the p.m.'s
noticed a papule at the base of
the nail of his third finger. The
papule presented a white spot and
pus escaped. It was frequently
cauterized but the phalanges
became attacked and a cold abscess
formed over the back of the hand
and after three years treatment
M. Verneuil amputated the finger.

Three years afterwards he was at-
lected by a cold abscess in the
lumbar region and M. Verneuil
operated a second time. M. Verneuil
was convinced that he was inoculated while performing a p.m.
Laënnec, the Journal for the same date remarked, had a similar
misfortune, slightly cutting himself
with a saw in operating on a tuberculous patient. Swelling appeared
which was cauterized. He died twenty
years later, from tuberculosis.

The British Medical Journal
for Mar. 5th, 1887 gives the case which
was published by Dr. Elsberg in the
Berlin Klin. Wochenschr. No. 35, 1886

A child born of healthy parents
developed tubercular disease of inguinal glands after circumcision
and section by a phthisical
operator. Tubercular bacilli were
demonstrated. Abscesses formed
and the child died.

The British Medical Journal
for Nov. 29th, 1890 gives other two
cases one of which is more than
usually interesting as far as the
present paper goes in so much
that the case is analogous to
those that came under my own
observation.

Dr. Jadaschon published in
121, vol. 7, Virchow's Archives, the
two cases. The first was that of
a butcher's assistant who cut himself
at work and developed ulcers of
the nature of lupus on his finger
and upper arm. Microscopically
they had the appearance of lupus
and two bacilli were found in the
material taken from the ulcers on
the finger.

The other case is the one which
is more or less analogous to my
own.

An otherwise healthy woman aged 30
was tattooed on left forearm by
a man who afterwards died of
consumption. The Indian ink was
moistened with the man's saliva
on part of the tattooed surface
were found patches of a dark red
colour two of them covered by
small scabs and one covered by
a crust which on being removed
brought into view a shallow sharp
bordered ulcer. On the margin of
the soft and yielding patches here
and there were typical lupus nodules.
Lupus was diagnosed and the
affected parts excised. The microsco
revealed typical lupus tissue and two bacilli. There was no relapse a year afterwards.

Another case of the same nature as this was published in the Medical Press and Circular of Sept. 11th, 1889, under the head of "Tattoo Maladies." Dr. Journier of Lyons reports the case. In 1887 the patient was tattooed with Indian Ink, mixed with saliva. The operation was followed by an eruption of little tubercles succeeded by intractable ulceration. In June '89 a wardy scrofulide was found on back of hand, and there were small ulcerations on front of arm. Bacteriological examination failed to support diagnosis; although subsequent ly the patient died of phthisis which left little doubt as to the fact of tubercle having been inoculated.

The Lancet of April 26th, 1890, gives the case of a nurse in Vienna who pricked her finger when sewing up a phthisical corpse and who developed tubercular nodules on his arm in which the tubercle bacilli was demonstrated. She eventually
died of miliary tuberculosis.

Lieberman quotes a case published by Dr. Veneke of Hamburg in the Deutsch.

Medizin Wochen. of Mar. 27th 1890.

A child fell and struck with its

head a utensil into which its philat-

ical mother had been accustomed
to spit, breaking it. Bacilli were
demonstrated in the esophagus. The
child had three superficial cuts on
its head which healed but later two
of the scars broke down and bacilli were
demonstrated in the pus. The child
died four months later and caseous

glands were found in the neck and
mucosa and nodules in the spleen.

Dr. Andrew in the third of

the Lumelian series of lectures on the

"Aetiology of Phthisis" published in the

Lancet for May 10th 1884 mentions a

case of inoculation of tubercular ma-
terial in a man which is unique in
so much that it was done as a direct

experiment. The experiment was con-
ducted by Demel, Parackeva and

Yalonius in Syra, Greece.

The patient was suffering from
gangrene of the big toe of the left foot
due to obliteration of the femoral artery.
He would not submit to amputation of the limb. The doctors considering his death inevitable after satisfying themselves that his lungs were healthy inoculated him in the upper part of left thigh with a quantity of sputum from a phthisical patient. Three weeks afterwards physical examination revealed commencing disease of lungs and when he died thirty-eight days later from the primary disease tubercles were found in both lungs and in liver all in the first stage of development. Their limited number, stage and size offered a direct relation to the brief interval intervening since inoculation.

There are more cases on record notably those of Dever of Halle and Manst of the Hospital Penon at Paris but the ones I have quoted are the principle and are quite sufficient for my purpose, that is to prove that the inoculation of tuberele in man is a possible and well recognized, if not fairly common occurrence. What makes these records the more valuable is that
in nearly all the cases the true nature of the disease was demonstrated and the diagnosis confirmed by the finding of the tubercle bacillus. The series of cases recorded by Lehman have not this advantage because published as they were in 1879 Koch had not then made his famous discovery which was not published until three years later, viz. 1882. But after studying the reports and comparing them with analogous cases little doubt can exist as to the truth of the diagnosis.

Exception might be taken to the case of Lænne. Although we know that he had a warty patch on his hand for years, probably of tubercular origin, can we be sure that this was the source of the tubercular disease which caused his death? He must have had many opportunities of being infected in the course of the twenty years which elapsed between his inoculation and death.

Having from a consideration of the preceding cases come to
the conclusion that the inoculation of tuberculosis from man to man may be possible and even well recognised event I shall now give a description of the cases which I was fortunate enough to have the case of for a time. In two of the cases I have already quoted we have seen that the inoculation was brought about by means of tattooing but I think I am justified in saying that my own series of cases are more worthy of notice as in it no fewer than three persons had the misfortune to be inoculated as compared to one in the case published by Jadaoshn and one in that by Gourner.

I hope to publish them shortly in the British Medical Journal in conjunction with my colleague Dr. W. Collings. Notes on them by Mr. Jonathan Hutchinson will be found in the Clinical Journal for Jan. 23rd 1895. I had the privilege of showing them to him at his Clinical Museum and it is amongst the notes of cases published in connection with that Institution that
records of these cases will be found. They came under my notice in the Out-patient Department of the Goldenham Hospital.

The last of these was Henry N., aged 15, who died of advanced phthisis pulmonalis on Oct. 21st 1894. I verified the fact of his having died from phthisis by finding out the doctor who attended him in his last illness. This was Dr. Martin of Goldenham, and according to his account it was a well marked case of advanced phthisis with cavities in the lungs and the characteristic eruption.

In tattooing two of the cases about to be detailed (those of his brothers) he made use of his own saliva to moisten the Indian ink and mixed it in the palm of his hand.

In the other case, that of J. N. he had water in a saucer for moistening the colour but it says that he may have put the needles in his mouth or used saliva for wiping the arm although he cannot say that he noticed him do so.

Case I. J. N., aged 15, a friend of the consumptive boy, came to
the Hospital on Nov. 7th 1894. He had a good family history with the exception that his grandfather was said to have died of phthisis, and was a sturdy healthy looking boy.

He complained of a sore arm and stated that N. W. had cut it on the right forearm on Oct. 18th 1894, that is, three days before the death of the latter. The inflammation which ensued after the operation had persisted and, in consequence, he came to the Hospital for advice. The condition of his arm then is represented by the water colour on the preceding page. The whole design which consisted of a heart and two crossed flags was raised, indurated and covered with scabs. The epitrochlea and axillary glands were enlarged and tender. He was told to foment his arm in order to remove the scabs and to come again next day. However, he did not appear for nearly a week and had assiduously applied fomentations in the interval.

The following photograph
shows the condition of the arm when seen on Nov. 12th after the casts had been removed. The lines of the design presented deep ulceration. This was especially marked on the flag. The edges of the ulcers were hard, round and smooth the floors being covered with granulations which bled freely. The whole pattern was raised above the surrounding skin.
the sides of the elevation being erythematous. There were a few punctules on the front of the arm which were ascribed to poulticing.

From this time he was treated with the local application of Ung. Iodiformi until Dec. 10th when he was shown at the Clinical Museum.

It is noteworthy that although this is the only case on which any doubt was thrown as to relics having been used practically no part of the design escaped.

Case II Mr. M., aet. 13 a brother of the deceased boy was treated by him on the right forearm on Dec. 14th four days before his death.

The design was the same as in the previous case with the addition of a rose situated beneath the heart and crossed flags. The family history was not so good, the brother having died of phthisis. The day after the operation the arm became red and swollen and some days later punctules appeared on the design, being especially numerous on the
side of the rose. Scabbing followed, the scales being removed by poultice. He was first seen on Nov. 12th and the watercolour on the preceding page represents the condition of things on that date. He had a puncture on one of the flaps and the upper and inner angle of the other was red and indurated. The rose was the seat of a mass of punctules roughly following the outline of the design, here and there it was scarred and in parts there were white scales on the surface. The prevailing colour was reddish brown. The axillary and epicondylar flaps were enlarged and tender. On the anterior and external aspects of arm were many punctules with red bases and yellow heads. As in the preceding case these last were said only to have appeared after a poultice had been applied.

Case III Alfred N. aged 10 also a brother of the deceased boy was vaccinated on Nov. 11th, i.e. ten days before his death. The design
was the same as that of the first case, a heart with two flaps crossed. It was situated on the right forearm. He was first seen on Nov. 12th. The pattern was mostly faintly marked and the lesions were mostly confined to the flaps which were covered with scales. The surface of the affected portion was raised above that of the surrounding skin which was considerably inflamed. There was a line of punctures on one of the flagstaffs. Unfortunately the photograph taken of this case was not a success and I did not have an opportunity of having a water-colour done. The latter lines in this case were much fainter than those of the others and the lesions were much more limited and less severe. The pattern being faint means that the punctures necessary to prick the colour into the skin had either been very numerous or very deep and consequently we would expect that extensive inoculation would not take place.
of which are represented in the following watercolours.

In each section examined there were tubercles in the corium im-
mediately under the Malphigian layer. Two or three typical giant cells were seen in each section and although it is doubtful whether tubercle bacilli existed in the nodules, yet the tubercular nature of the lesion admitted of no question. The skin of the other two cases was not examined as they would not allow specimens to be taken but as the clinical appearance and history of all the cases were almost identical I think that I am justified in saying that had an examination been made the same condition would have been revealed.

The fact that bacilli were not actually found can hardly be put down as being against the diagnosis when we consider the well known scarcity of these in lupus and tuberculosis of the skin.

Considering the appearances and history of the cases and the undoubtedly tubercular nature of the sections examined combined with the opinion of
Mr. Jonathan Hutchinson no reasonable doubt can be entertained as
to their having been true examples
of inoculated tuberculosis.

Treatment:—From the first we
wished to excise the affected
portions of skin but this the
parents of the boys would not
consent to. Up to Dec. 10th they
were treated with Ung. Iodoformi
but as the arms, after the primary
rather severe inflammation had
subsided, were not painful and
gave the boys very little trouble
we had the greatest difficulty
in getting them to attend with
anything approaching regularity.

After seeing Mr. Hutchinson,
at his suggestion we meant to
apply the acid nitrate of mercury
until all doubtful looking
tissue was destroyed. We
applied it once to N. (case)
but as it hurt him considerably
he never turned up to have it
repeated and no doubt informed
the other two of the pain he
had suffered. In spite of our
repeatedly impressing on the
parents (who were ignorant people) the gravity of the condition and the chances the boys ran of it becoming constitutional they did not use their influence to make them submit to treatment and I am sorry to say that since then i.e. the middle of Dec. 1894 we have seen nothing of them. I understand however that they are in status quo.

What the ultimate result will be is of course problematical but with (in two of the cases) a family history showing a phthisical tendency and considering the proportion of cases, judging from published records, in which the disease becomes general the chances are greatly in favour of their developing phthisis or other tubercular manifestations.

In reviewing these diseases which, to borrow the Lancer's expression we may call "Tattoo Maladies" it is at once evident that some of them e.g. erysipelas and cellulitis follow
tattooing in the same way that they would follow any other wound. A certain proportion of all wounds in which care is not taken to have asepsis established and maintained become affected by these and consequently we cannot hope that tattoo wounds should escape.

In syphilis on the other hand we have a disease which is only communicable by inoculation and that inoculation is usually brought about by direct contact of a diseased surface with a healthy one; the products from the diseased surface finding a weak place and effecting an entrance. For a long time it has been recognised that saliva which has been in contact with secondary eruptions in the mouth of a syphilitic person is highly contagious. This is borne out by innumerable examples amongst which I may mention the cases published of syphilitic inoculation of the prepuces of Jewish children.
due to the sucking process having been carried out by an infected person and those where hard chancre have developed on the nipples of nurses through sucking syphilitic children.

Syphilis is undoubtedly common in our Naval, Military and Merchant services. There may also be looked on as the chief home of tattooing. Salvia is freely used when tattooing is performed by the members of these services. Can it be wondered at that the practice claims many victims?

A perusal of the following table which is compiled from published cases gives one an idea of the risk a person runs of contracting syphilis if he undergoes the operation of tattooing at the hands of a person suffering from an infective form of that disease. That this may be an uncommon event can be gathered from the fact that since the repeal of the C. D. act as many as half the strength of a regiment
have been hors de combat from venereal disease at one time.
Allowing that this may be a gross exaggeration, that such a remark can be made with even a semblance of truth means that there must be a very grave amount of venereal disease amongst our soldiers and sailors.

Table showing Proportion of Cases Infected when Tattooing performed by Syphilitic Tatoosers

<table>
<thead>
<tr>
<th>Recorded by</th>
<th>Number operated on</th>
<th>Number previously infected</th>
<th>Number infected operator</th>
<th>Number doubtful infected</th>
<th>Number escaping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maury &amp; Pullee</td>
<td>22</td>
<td>-</td>
<td>14</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Surgeon Porter A.M.S.</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Surgeon Banks A.M.S.</td>
<td>23</td>
<td>4</td>
<td>12</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Surgeon Whitehead A.M.S.</td>
<td>12</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Surg. Maj. Robinson A.M.S.</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Surgeon Carlton A.M.S.</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Totals</td>
<td>60</td>
<td>4</td>
<td>34</td>
<td>7</td>
<td>15</td>
</tr>
</tbody>
</table>
This table is an epitome of the cases of no fewer than sixty persons treated by syphilitic operators. Of these sixty persons four had already had syphilis and so were immune. These can be disregarded and that leaves fifty-six persons exposed to the danger. Of these fifty-six it was doubtful in seven cases whether the disease was contracted or not, fifteen escaped but in the remaining thirty-four cases undoubted signs of syphilis appeared. That means that if none exposed to the danger no fewer than 60% became victims.

Tuberculosis is a disease due to the presence of a specific bacillus and usually occurs without a cutaneous lesion in a person hereditarily predisposed. Although as a rule it is through the respiratory tract that the bacillus enters the body it has been definitely proved that the disease can be inoculated through a cutaneous lesion.
It is well known that the tubercle bacillus (as has been previously mentioned) if injected under the skin of certain of the lower animals known to be susceptible will produce local and general tuberculosis. The cases referred to previously show that without doubt similar inoculation in man, although uncommon, produces similar results.

After making a careful examination of the literature of the subject and tabulating the results obtained, it is interesting to notice with what certainty tubercular lesions follow the inoculation although the methods by which the bacilli are introduced are very varied.

Owing to the incompleteness of the reports at my disposal it is almost impossible to find out whether the patients were predisposed or not although it is worthy of remark that only in two cases (that of Beneke and the case of the mother kissing her consumptive daughter) can it
In directly inferred that the patient who had the misfortune to be inoculated already possessed the tubercular diathesis.

It may seem somewhat outside the subject of, "Pathony Considered as a means of inoculating disease," to form a table drawn from cases of inoculation of tuberculars by whatever means. But as I have only been able to find two published cases beside my own three where the accident happened through pathony it is the only way in which conclusions can be drawn.

The table no doubt is faulty and incomplete but yet it serves very well to show the points I wish particularly to emphasize i.e. the extreme gravity of inoculated tuberculos of the skin.

The table comprises no fewer than twenty-seven cases and in seventeen of these (omitting that of the man who was practically moribund before the inoculation took place) death occurred.
<table>
<thead>
<tr>
<th>Person Inoculated</th>
<th>Nature &amp; Site of Inocul.</th>
<th>Tubercular Manifestation</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verneuil A house surgeon</td>
<td>P.M. wound of finger</td>
<td>Tuberculin 2 skins. Tuberculin ulceration back of hand.</td>
<td>2.</td>
</tr>
<tr>
<td>Venneke</td>
<td>A child</td>
<td>Tubercular Ulceration. Death from Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>?</td>
<td>Vienna P.M. pule, P.M. wound of finger, Eulcition of P.R.E. after consumption</td>
<td>Tubercular Ulceration. Death from miliary tub.</td>
<td></td>
</tr>
<tr>
<td>Eisenberg</td>
<td>A child</td>
<td>Tubercular Ulceration. Death.</td>
<td></td>
</tr>
<tr>
<td>Lindman</td>
<td>Two children</td>
<td>Do.</td>
<td>Tubercular Ulceration, in preauricular, one death, from phthisis tub. 1 death from bidewill. 3 from &quot;Marasmus.&quot;</td>
</tr>
<tr>
<td>Lehman</td>
<td>Seven children</td>
<td>Do.</td>
<td>Ulcers on preauricular tub. 3 deaths from Tub. Memphis.</td>
</tr>
<tr>
<td>Lehman</td>
<td>Three children</td>
<td>Do.</td>
<td>Ulcers on spine and arm.</td>
</tr>
<tr>
<td>Jadachon</td>
<td>Butcher Assistant</td>
<td>Cut finger at work</td>
<td>2.</td>
</tr>
<tr>
<td>Recorded by</td>
<td>Person Inoculated</td>
<td>Nature and Site of Inoculation</td>
<td>Subcutaneous Manifestation</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------</td>
<td>--------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Padawson</td>
<td>A healthy woman</td>
<td>Tattooed on forearm by phthisic man</td>
<td>Lupus patch</td>
</tr>
<tr>
<td>Pfeiffer</td>
<td>Veterinary Surgeon</td>
<td>P.M. Wound of Shamus</td>
<td>Tubercular joint</td>
</tr>
<tr>
<td>Holech</td>
<td>Attendant on phthisic patient through cone of nose</td>
<td>Tubercular Abscessation</td>
<td>?</td>
</tr>
<tr>
<td>Hansel</td>
<td>Man</td>
<td>?</td>
<td>Tubercular ulcer on tongue</td>
</tr>
<tr>
<td>?</td>
<td>Red nurse</td>
<td>In large from mouth of phthisis Child Sub. Ulcer on tongue</td>
<td>Death from phthisis</td>
</tr>
<tr>
<td>?</td>
<td>Mother</td>
<td>Kissing of phthisis at eye, Sub. Ulcer on tongue</td>
<td>Death from phthisis</td>
</tr>
<tr>
<td>Yournie</td>
<td>Man</td>
<td>Tattooed in forearm and phthisic Spots on infected into back of hand</td>
<td>Death from phthisis</td>
</tr>
<tr>
<td>Werner</td>
<td>Man</td>
<td>Subcutaneous ulcer on little and limp</td>
<td>Death from gangrene</td>
</tr>
<tr>
<td>Lee</td>
<td>Woman previously healthy</td>
<td>Round of Shưum</td>
<td>Tubercular abscess in middle finger &amp; tubercular abscess</td>
</tr>
</tbody>
</table>
In twelve of these it is definitely stated that tubercular disease was the cause. The other five all suffered from tubercular sequelae following the inoculation and if we except the case mentioned by Lehman which died of intercurrent diphtheria we are left to infer that in the other four deaths also was due either directly or indirectly to tubercular disease. This is putting it at its very lowest limit as many of the other ten cases were reported before the disease had time to come to a fatal termination.

It strikes one forcibly that the only case in which cure is definitely stated to have taken place is one in which prompt surgical measures were taken from the first and even in this case the statement was made too soon after the accident (twelve months) to have much weight. It however emphasizes the point that whenever the condition is diagnosed excision or drastic treatment by cautery
of the affected area should at once be adapted if we are to confine the lesion to its primary seat and prevent the bacilli travelling to distant organs and setting up its specific mischief.

The warty patches found on the hands of persons accustomed to working in a pre-modern room have often been described, notably by Virks, Rheil & Pateley, the two latter giving them the name of *Subcutaneous Veronicae Cutis*. Whatever they may be called they differ distinctly from ordinary lupus. Lupus no doubt is a tubercular disease but as a rule there is no history of an inoculation from which the mischief starts. Persons suffering from lupus rarely develop tubercular disease whilst those suffering from inoculated tuberculin seem invariably to do so sooner or later.

Given a diabetic who is in that stage of pancreas in which his excretion is plentiful and crowded with bacilli and that
he uses it in his operations it
stands to reason that he exposes
the person he operates on to very
serious risk. We have already seen
that if the necessary virus be
present tattooing is a most effic-
cient method of inoculating it.
If the person becomes in-
oculated the consequences are likely
to be much more serious than
in those cases previously dis-
cussed where syphilis was the
result. The inoculation of tubercle
seems invariably or almost in-
variably to lead to the formation
of tubercles in various parts of
the body with all the resulting sym-
ptoms and not infrequently to
death itself.
Tattooing is a relic of
barbarism. It is entirely
unnecessary and as a rule
it lacks even meric merit
which might make it excusable.
We seldom meet with persons
of mature years who have been
tattooed in their youth that
do not repent having had it
done. Often it is a source of
billed, regret. I'd may have the advantage of affording a ready means of identification of the bodies of three whose occupation renders it possible that large numbers may be swept out of existence at a single stroke, e.g. our sailors and soldiers and no doubt a person who was tattooed to any extent would think twice before deserting from one of the Services but on the other hand before branding deserters was done away with it afforded a means of a deserter rejoining a passing as a respectable member of society as a pronounced tattooed design was a favourite method of obliterating the shameful D.

When we consider all its well-known disadvantages and add to those the chance of acquiring a disease which may make life not worth living or even put an end to it, it were well were it to be discouraged even more so than it is at present.