P E M P H I G U S N E O N A T O R U M

by

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PEMPHIGUS NEONATORUM.

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PART I.

INTRODUCTION.

INTRODUCTION.

PEMPHIGUS NEONATORUM

(πέμφιξ , a bladder or blister, νέος new, natus, born).

In selecting for this thesis, the title "pemphigus neonatorum", one has adhered to the term which is already in common use in many countries, which is literally correct (blister of the newly born), and which is less unwieldy than most of the alternative appellations. like "impetigo contagiosa bullosa neonatorum" etc.. At the same time, one realizes that the name may be misleading if it be thought to infer that there is any true relation between this disease and the "pemphigus" group of skin affections regarding which a brief note is given below.

Pemphigus neonatorum is a contagious nonsyphilitic disease characterized by a bullous eruption which attacks infants usually from the third to the fourteenth day of life. It is inoculable and auto-inoculable and frequently occurs in epidemic form in the practice of midwives or in maternity hospitals.

Until the last few years, it was considered to be rare in this country, and it is so described in the various textbooks on dermatology, but it will be seen from this thesis that there have been fourteen outbreaks in the County of Glamorgan alone during the years 1921-1926. Recent epidemics have occurred in London, Manchester, Stockport and many other areas all over the country, and the position has become so serious that in 1925 the Ministry of Health issued a special memorandum on the subject. It seems, therefore, that either the/

the affection has become much more common recently, or it is becoming more generally recognized.

Pemphigus:- The word "pemphigus" was at one time very loosely used to include all bullous eruptions, but as knowledge advanced, it was found that some of these were distinct clinical entities and they were, therefore, reclassified outside the pemphigus group (e.g. dermatitis herpetiformis, the bullous syphilide of the new-born and pemphigus neonatorum).

At the present time there is much difference of opinion among dermatologists regarding the varieties which should still be classed as pemphigus. Most authorities agree that pemphigus acutus, pemphigus vulgaris, pemphigus vegetans and pemphigus foliaceus should still be included; but many regard adult acute pemphigus as a septicaemia, while others agree with Unna in taking exception to pemphigus vegetans.

Stelwagon refers to the classification of pemphigus as being chaotic and few authors attempt to give an actual definition. Stelwagon defines pemphigus as "an acute or chronic bullous disease, characterised by the formation of scanty or numerous irregularly scattered, variously sized, rounded or oval blebs, arising from apparently normal or moderately reddened skin, and which may or may not be accompanied by mild or severe constitutional disturbance." "Pemphigus is a malady in which the lesions consist, primarily at least, of distinct watery rounded blebs, of more or less general distribution, without ring or other peculiar formation or special tendency to group, and appearing irregularly or in successive crops and, as a rule, running a chronic course with exacerbations."

According/

According to Malcolm Morris, "Pemphigus may be defined as a condition characterized by the eruption of bullae on previously healthy skin. Fresh crops of bullae come out, not only on the skin, but sometimes on one or other of the mucous membranes either continuously or at irregular intervals" . . . . . "

Such definitions might not necessarily exclude pemphigus neonatorum but this is done by others, who point out that pemphigus is a heterogeneous group of bullous skin diseases which are neither inoculable nor auto inoculable.

Opinion is now unanimous that pemphigus neonatorum has nothing in common with "true pemphigus" (pemphigus vulgaris, vegetans, foliacus) except a resemblance in clinical picture and that it is more closely allied to the impetigo contagiosa group.

Impetigo:- As many modern authorities on dermatology, including Stelwagon, Graham Little, Sequeira, Malcolm Morris, Hyde and Norman Walker, have accepted the theory that pemphigus neonatorum is merely impetigo contagiosa modified by the nature of the infant skin, it seems to be worth while to give some brief consideration to the latter disease. Impetigo was, at one time, another ill-defined group, comprising all kinds of pustular inflammation of the skin, until in 1864 Tilbury Fox reduced the confusion by dividing the group into (1) impetigo contagiosa and (2) impetigo or impetigo simplex. Unna described several varieties - vulgaris, staphylogenes, circinata and streptogenes but more recently in 1900, Sabouraud, after much bacteriological investigation, decided that there were two diseases (a) the pustular impetigo of Bockhart which is caused by staphylococci, (b) the vesicular impetigo contagiosa of Tilbury Fox which is due to streptococci.

Sabouraud's theory has been widely adopted and as pemphigus neonatorum/

neonatorum is essentially vesicular or phlyctenular in character, it has been accepted as a form of the impetigo of Tilbury Fox by most of the leading dermatologists. To support this contention, cases have been cited where adult impetigo has been associated with pemphigus neonatorum but it will be seen in this thesis that there are some striking facts against this theory, which I venture to assert is not wholly correct.

There are very few detailed reports of epidemics or of individual cases of pemphigus neonatorum in the literature especially of this country, where, apart from the brief notes of Rigby in 1835 and Barnes in 1852, the only publications of importance on the subject have been those of Maguire and Adamson in 1903. The report of Wanklyn & Macrory in 1912 dealt chiefly with the administrative aspect of the problem and the memorandum of the Ministry of Health in 1925, although admirably drawn up for its purpose, did not attempt to deal with matters of controversy.

After carefully perusing the entire literature on the subject, most of which has been published in France, Germany and America, one comes to the conclusion that there are so many obscure points and so many conflicting opinions that further observations are demanded.

The present thesis is based upon the study of fourteen recent outbreaks of pemphigus neonatorum in the County of Glamorgan, 79 cases in all, of which 49 were under my own personal observation. In it an attempt has been made to arrive at an accurate clinical picture of the disease, and to throw light upon its incidence, epidemiology and aetiology, its bacteriology and pathology, its treatment and prevention.

A great deal of time has had to be devoted to the accompanying bibliography and the historical outline of the literature on the subject. The/

The necessity for this was indicated by the extreme difficulty which I encountered when I first tried to obtain some information regarding pemphigus neonatorum. Textbooks on dermatology dismissed the matter in a few lines as a rare disease, which should be differentiated from congenital syphilis, while one or two of the larger works added that it was a form of impetigo contagiosa and quoted a few references, most of which had no bearing on the condition. It is true that lists of references have been given by Legrand, Hervieux, Marfan and others in France, and by Falls, Cole and Ruh, Foerster and others in America, but these are all very incomplete and most investigators have referred only to work done in the immediate past in their own country. Richter's bibliography, drawn up in German in 1901, which included 17 pages of references alone, is the only one that is comprehensive and it is most complete regarding German work.

By far the majority of the reports on pemphigus neonatorum are scattered through the medical journals of France, Germany and America, and it has been necessary to study several hundreds of these in order to compile the following bibliography which I believe to be by far the most complete in the literature.

In the historical outline only a brief summary of the most outstanding work is given, with the observations which have, from time to time, thrown fresh light upon the subject. Leading textbooks on dermatology are only mentioned if they contain original monographs on the disease. I believe that this thesis contains a much more complete resumé of all the essential work on pemphigus neonatorum than has been given in any previous report.

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PART II.

HISTORICAL OUTLINE OF LITERATURE.

HISTORICAL OUTLINE.

The expression, pemphigus, was introduced by Hippocrates who spoke of πυρετὸς πέμφιγωδέες, but exactly what he meant by this is not clear either from his own or from Galen's writings. Sauvages reintroduced the term, pemphigus, in 1760 but the name "pemphigus neonatorum" was not used until 1794, when Osiander described a small outbreak which he attributed to salt fish eaten by the mothers during pregnancy.

It is said that Schenck reported a German epidemic in 1588, that Thierry described a bullous epidemic among French soldiers in Prague in 1736, and that Langhans reported a similar outbreak in Switzerland in 1775, which seem to have been pemphigus contagiosus.

Richter in his "Ueber Pemphigus Neonatorum" mentions these and quotes many phrases from the Latin writings of the 16th. 17th and 18th centuries which seem to refer to pemphigus neonatorum, but as the disease was at that time confused with syphilis, true pemphigus and many other affections, the references are sometimes doubtful. Oehme, writing in 1773, mentioned the malady, which was more fully described in 1791 by Wichmann who attributed it to syphilis. In 1810, Von Eckhout in describing acute and chronic pemphigus, quoted pemphigus neonatorum under the acute form.

Since the epidemic described by Stokes was not pemphigus neonatorum and the cases of Krauss (1834-8) were probably syphilitic judging/

judging from their history, the first incontestable record of an epidemic is that of Rigby who reported in the London Medical Gazette, 1835, the occurrence of pemphigus infantilis which had prevailed for a year among the children born in a certain hospital. Most of the babies recovered but two or three died, and Rigby gives a detailed description of one fatal case with a report of the post-mortem examination during which he accidentally pricked himself. He developed spots on his face and chest which caused pain and irritation but, unfortunately, he does not describe his own lesions. Several of the mothers were affected.

Scharlot, in 1841, described a case of pemphigus neonatorum in an infant 4 days old, from whom the mother, the midwife, a girl aged eight, and another baby, were infected.

Trousseau (1842) reported an epidemic of varicelle pemphigoide.

In 1852, Robert Barnes published in The Lancet a description of five cases of "a remarkable form of bullous disease". He pointed aut that they were not syphilitic, and from his notes it is evident that they were examples of pemphigus neonatorum.

In 1863, an important contribution to the subject was made by Ollivier and Ranvier who published a paper on "pemphigus des nouveau-nés". They summarised the opinions of previous authorities, dividing them into 3 groups.

(1)/

(1) those who believed that pemphigus neonatorum was always due to syphilis.
(e.g. Dugès, Cruveilhier, Dubois, Depaul, Cazenave, Vidal)

(2) those who believed that pemphigus neonatorum was always due to cachexia
(e.g. Krauss, Trousseau and Lasègue, Cazeaux)

(3) those who believed that pemphigus neonatorum was sometimes due to syphilis and sometimes to cachexia.
(e.g. Ricord, Lagneau, Gubler).

Ollivier and Ranvier, themselves, described a number of cases, discussed the symptoms, diagnosis, prognosis etc., and came to the important conclusion that there were two types involved.

(1) A mild nonsyphilitic affection in which the palms and soles escape and in which the course may be either febrile or nonfebrile.

(2) A syphilitic affection in which the palms and soles are attacked and in which the prognosis is grave.

It was some time before the truth of this valuable observation was universally recognized.

In 1852, Hervieux had published an "Étude Bibliographique sur le pemphigus congénital", in which he concluded that congenital pemphigus was due to syphilis and was a grave condition, but he was uncertain whether there was a nonsyphilitic form. He published an interesting case of Dubreuilh where a woman after infection from a nursling, gave birth to ten children in succession, who all developed syphilitic pemphigus. Later, in 1868, Hervieux reported the first carefully studied epidemic of pemphigus neonatorum - an extensive epidemic in which 150 cases occurred within 6 months in a maternity hospital. He gave detailed descriptions of the lesions of 17 cases as they appeared on one particular day. He inoculated one weakly and two healthy children without success and he failed to get any result from the inoculation of an affected child with its own sero-pus.

Two years later, Olshausen and Mekus described two epidemics affecting hundreds of babies and involving certain midwives. They made unsuccessful attempts to inoculate rabbits, a midwife, and a baby already affected.

Ahlfeld (1872) was the first to suggest bacterial infection. He described an outbreak of 25 cases, and took exception to the title, pemphigus.

Brochin and Homolle (1874) described an epidemic in which some cases had the whitlow type of lesions on fingers and toes.

Moldenhauer described an epidemic at Leipsic in the same year. He failed to transmit the disease to rabbits but infected a mother by inoculating her with fluid from a child's vesicle.

In 1875, Koch reported an outbreak in a midwife's practice.

In 1876, an important advance was made by Vidal who successfully inoculated his pupil Roeser with bullous fluid. The first inoculation was made with the sero-purulent fluid from a bulla 6 hours old, two pricks being made, one deep and one superficial but neither drawing blood. This was followed almost immediately by a diffuse redness which disappeared in 2 hours to reappear next day; on the 4th day there was marked itching followed two hours later by the formation of a bulla which gradually increased in size; next day the bulla ruptured at one point and on the 6th day the lesion was

1.5 cm. x 1 cm. and the liquid (sero purulent and alkaline) was evacuated, leaving exposed the vividly red dermis; on the 7th day the lesion was fading and by the 10th day there remained only a red surface which became paler on pressure, a thin new scaly epidermis covering the lesion. The second prick was not followed by bullous formation but only by superficial exfoliation and erythema. Other inoculations were made with varying results but Vidal was successful in his inoculation of the leg with liquid from a bulla on the forearm. He, therefore, proved that the disease is inoculable and auto-inoculable.

Roeser, the pupil of Vidal and the subject of his inoculation experiments, submitted a thesis on pemphigus neonatorum in 1876. He desfribed the inoculation experiments and noted that the result was always a bulla and never a pustule. He gave a description of several cases and referred to the frequency with which the neck was affected, a possible explanation of this being the rubbing of the neck by the bonnet-strings.

He made a further contribution to the subject by finding cocci in the smears of bullous fluid.

This last finding was confirmed by Gibier in 1882 in the same year as Demme reported the discovery of a nonchromogenic diplococcus in the bullous fluid taken from a child 7 years old suffering from acute contagious pemphigus.

In 1884, Colrat described a small epidemic of pemphigus neonatorum. He confirmed the results of Vidal and Roeser regarding auto/

auto-inoculability, and added the observation that the bulla obtained, was smaller than the spontaneous one and that bullae of a third generation were still smaller than those of the second. He suggested that there was some resemblance to fungus affections, but he failed to find a fungus. He recovered cocci, which appeared in groups of eight (en 8 de chiffres like ceux du rouget du porc). His inoculation experiment resulted in pustules but he admitted that the child from whom the material was taken had septic bullae. On three occasions he inoculated a rabbit's ear and failed to get bullae but from the slightly indurated area which resulted he recovered the "micrococcus en 8". He compared pemphigus neonatorum with chicken-pox, in which auto-inoculation experiments failed, and he could find no micro-organisms.

Kilham (1889) described "an epidemic of pemphigus neonatorum" in the New York Infirmary for women and children.

Strelitz (1890) isolated a white coccus and also a yellow coccus.

In the same year, Faber observed and reported cases where impetigo contagiosa of the adult was associated with pemphigus neonatorum of the child and he concluded that the two diseases were identical - a belief that is largely held at the present day.

Almquist in 1891, made a valuable contribution to the subject when he isolated a diplococcus, the micrococcus pemphigi neonatorum, which resembled the staphylococcus pyogenes aureus in culture/

culture - forming a yellow streak on agar, liquefying gelatine, and producing turbidity with a yellow deposit in broth. This grew well at 20°C. and poorly at 15°C.; and Almquist found that it was viable after being dried on silk threads for one and a half months. He successfully inoculated himself with a 20 days' culture of the organism.

In 1892, Trautenroth, in his thesis, reported cases where bullae occurred near a septic umbilical cord, pure staphylococcus aureus being recovered from both the cord and the bullae.

Harris (1898) mentioned an epidemic of 14 cases of pemphigus neonatorum at Southampton.

In 1899 a new light was thrown upon the problem by Munro who pointed out that pemphigus contagiosus was endemic in Japan, China and Southern Asia and that it was probably identical with pemphigus neonatorum. He described the lesions and referred to Manson's description in his "Hygiene and Diseases of Warm Climates." He confirmed Manson's finding of a micrococcus which tended to form diplococci and reported that on agar-agar the colonies were characteristic with a highly polished white surface and a peculiar ringed appearance owing to the reflection of the light. In bouillon the colonies grew slowly at the bottom of the tube and retained their white colour. Although he was assisted by a skilled veterinary surgeon, he failed to reproduce the disease in animals but he succeeded in inoculating a patient already infected and obtained pure cultures from the lesion artificially/

artificially produced. He agreed with Manson that the disease was probably distinct from impetigo contagiosa and did not agree with Sichel who attributed pemphigus contagiosus to excessive sweating.

Manson's article in his Tropical Diseases, (1900) is much to the same effect. He states that the pemphigus contagiosus of China, Straits Settlements, Madras, Japan, North Queensland and America, corresponds to the impetigo contagiosa of temperate countries. It occurs in epidemics and frequently attacks schools. He reports the finding of the diplococcus but does not know whether this is the causal organism.

The lesions, as described by Munro and Manson, resemble the lesions of pemphigus neonatorum in their appearance and evolution.

In 1900, Sabouraud's famous work on impetigo contagiosa was reported. He described two forms of impetigo (1) the impetigo of Bockhart which is a pustular condition of the hair follicles due to the staphyloccus and (2) the impetigo contagiosa of Tilbury Fox, the lesion in which is essentially phlyctenular or vesicular and which he showed is due to the streptococcus. Sabouraud stated that previous workers found the staphyloccus in Fox's impetigo because they used lesions after they were secondarily infected and because they used a technique which inhibited the streptococcus and allowed it to be outgrown by the staphylocoocus, which is a frequent inhabitant of the skin. He, therefore, devised a new technique to encourage the growth of the streptococcus. He used 3 media (1) ascitic serum which inhibits staphylococcus (2) neutral broth and (3) a mixture of equal parts ascitic serum and neutral broth. To obtain the slightly anaerobic/

anaerobic conditions which would favour streptococci he used a sterile pipette, with which he took up a drop of serum from underneath the phlyctenular crust of an early lesion and then aspirated 1 - 2 ccs. of the liquid medium. He then sealed the pipette and put it in an incubator at 37°C. for 2 days. His results were as follows:-

(1) With ascitic serum	Streptococci.
(2) With ascitic serum and neutral bouillon.	Streptococci with some masses of staphylococci.
(3) With neutral bouillon	Staphylococci among which were more or less numerous streptococci.

Special care was required for the prevesicular lesions, it being found necessary to use the superficial pellicle, the exuded liquid and the scrapings together to get a result which was only obtained once in 3 - 10 attempts.

Sabouraud concluded that the impetigo contagiosa of Tilbury Fox was due to the streptococcus, the staphylococcus being a secondary infection, and his teaching has held the field ever since.

Meanwhile, in the same year, Bloch reported the most extensive epidemic in the literature of severe cases of pemphigus neonatorum - 15 children of a foundling hospital were affected and they all died. Bloch found staphylococci in the skin lesions and streptococci in the heart blood but he believed that the streptococci were secondary because the blood cultures of the non-fatal cases he examined were sterile. He suggested that the infection might be due to inoculation of abrasions, to umbilical infection or to infection from the mother's nipple as most cases were breast-fed. In his description of the lesions it appears that/

that the palms and soles became affected after the face and limbs, and this rather throws doubt upon the diagnosis, although he states the parents were healthy and showed no sign of syphilis.

Matzenauer reported in the same year a case where the mother had impetigo contagiosa and the baby, pemphigus neonatorum. He believed that these diseases were identical and that both were due to staphylococcus infection. He gave reports of careful bacteriological and histological examinations.

In 1902, Paul Richter published his "Ueber Pemphigus Neonatorum" which contained an extensive bibliography and a well-compiled table of the various epidemics in institutions and towns. He concluded that pemphigus neonatorum (apart from pemphigus syphiliticus) was the result of accidental or intentional contagion and was characterized by the presence of staphylococci. It occurred sporadically and in epidemics and showed both benign and malignant forms. Ritter's disease, he believed to be only a variety of pemphigus neonatorum which was allied to impetigo contagiosa but modified by the anatomical and physiological differences in the infant skin. He suggested that severe cases became infected with streptococci.

Meanwhile, in 1901. Engman published an important paper on "Impetigo Contagiosa Bullosa". He pointed out that diseases, especially skin diseases, may vary according to the climate, customs, geographical position etc.. In Europe, he reported, the common type of impetigo was that of Tilbury Fox while in New York, the circinate variety of Unna was also prevalent. In St.Louis, the usual form

in/

in summer was the mixed bullous impetigo while Unna's circinate type and Fox's variety prevailed in winter. He observed that bullous impetigo usually reproduced bullous impetigo and was frequently associated with whitlows and with eye, nose or ear discharge. It occurred frequently in foundling asylums. It sometimes resembled pemphigus from which it could be differentiated by the lack of eosinophilia. Engman studied the disease in 8 infants. In one case he found a streptococccus and a short bacillus which inhabits normal skin. In the other 7 cases, he recovered an organism which seemed, on agar-agar, to be identical with the staphylococcus pyogenes aureus, but occurred as a diplococcus or in short chains when cultured on bouillon (i.e. an organism such as Almquist described). He inoculated the skin of 3 infants and also the skin of his own arm with the third generation of this coccus. Two babies showed no result, but the third showed a small vesicle in 24 hours which quickly crusted and healed. On Engman's arm, a clear vesicle appeared within two days and increased to the size of a coffee bean and although, unfortunately, the vesicle was accidentally broken, the original staphylococcus-like organism was recovered when the lesion filled up again. Control experiments, where the same steps were taken but no organisms used, were negative.

The following year saw an important article by Brocq on Pemphigus Epidémique which he assumed was simply a bullous variety of the impetigo contagiosa of Tilbury Fox. He described the typical lesion and observed that the bullous liquid was usually alkaline, sometimes neutral, never acid, and that it was very rarely reabsorbed. The disease was usually mild but might give place to grave general staphylococcic/

staphylococcic or streptococcic infection. He reported two cases where the mothers were affected, one developing late bullae on neck and face, but both showing the first lesion on the thigh. He tried auto-inoculation of one of these mothers without result but was successful when he repeated the test with fluid from the infant's lesion. He reports the work done by his pupil Roeser who inoculated himself with bullous fluid and got second generations of bullae, but only on very rare occasions got a rudimentary and aborted third. Another pupil, Coudoin, inoculated his own forearm with liquid from one of Roeser's inoculation bullae - result, negative. He repeated the experiment with infant's fluid and got a typical lesion in 36 hours. Brocq gives a description of the inoculation bullae which appeared in about 24 to 48 hours (usually 36) after inoculation. The small bulla filled with clear yellowish liquid reached its full development on the second or third day and withered and dried from the fifth to the eighth day when it disappeared promptly leaving no traces. Brocq pointed out that true pemphigus is neither inoculable nor auto-inoculable and that the results of these experiments in pemphigus neonatorum explain the occurrence of epidemics and the spread of the disease in the individual. He gave some advice regarding treatment - touching with l'eau d'Alibour diluted 1-6 to 1-21, or with silver nitrate 20% to 100% followed by inert powder dressing or ointment. Confluent patches, he treated like burns with picric acid 100%.

In 1903, Whitfield published two cases in the B.M.J.. One was an infant who developed pemphigus neonatorum on the 13th day of life, and whose mother developed a typical impetiginous lesion on the forehead two days later. The lesion of the child showed initially pure streptococcus/

streptococcus while that of the mother yielded pure streptococcus with a few staphylococci. The other case was a typical example of Ritter's disease, the P.M. examination of which discovered enormous dilatation of the superficial blood-vessels beneath the epidermis; there was no perivascular infiltration and no excess of leucocytes; the deep epithelium was oedematous and the superficial horny layer was raised in sheets beneath which were masses of cocci. Whitfield states that he lost the opportunity of recovering the organism in the second case and he, therefore, seems to base his confirmation of Sabourand's findings on the first case alone. It is, therefore, surprising to see that many later writers quote his conclusion as being authoritative.

Macleod's opinion, also, that the causal organism was a streptococcus seems to have been based on his recovery of this microbe by Sabouraud's ascitic serum method from one fatal case of pemphigus neonatorum.

In the same year, Maguire published in the British Journal of Dermatology his valuable paper on "Acute Contagious Pemphigus in the Newly Born." He reported an extensive epidemic in Richmond, Surrey, which occurred in the outdoor practice of a lying-in charity, the infection being conveyed from case to case by two of the midwives. The one midwife delivered many mothers during August without any pemphigus arising and yet out of her twenty cases in September and October seventeen infants developed pemphigus neonatorum. Maguire gave the history of 18 cases in detail and summarised the essential points in tabular form. Midwife A had handled 17 of the babies either at

delivery or at later visits. The eighteenth child (X) was visited by another midwife (Z) who was attending to all the infected infants, but who on the other hand was also in attendance on two babies who remained unaffected; it is, therefore assumed that X was probably laid on an apron which had been used for one of the previous pemphigus cases.

Several examples of adult infection are given. After the first case the mother, her son, and the person who washed the baby's clothes were all attacked. In the second case, the mother developed itching vesicles under her chin which remained for 7 days. In the third case, the affected infant's diaper was used for a boy two years old who developed bullae on the buttock and back. Three mothers had bullae on their hands. The neighbour who washed the 5th baby conveyed the infection to her own child of 7½ months; he developed first a large bulla on the thigh and later a generalised eruption; and from this a girl of twelve was infected. One infant's two-year-old brother had a vesicle which, after reaching the bullous stage, left a large red weeping patch of denuded derma. Finally, in the last case of all, the mother developed a tiny vesicle on the right breast. The midwife Z and a fellow-pupil developed vesicles.

The origin of the epidemic was not clear for although the midwife chiefly concerned suffered from a chronic pustular acne, she had had deliveries in August without pemphigus neonatorum. Maguire suggested that the insanitary surroundings of the first case were worth consideration. He suggested that the infection was conveyed by the midwife's hands, the first lesion having usually appeared on the neck, etc. which is grasped when bathing the child.

To find what micro-organism was involved, Maguire drew the contents of/

of one bulla into a sterilised capillary tube and sent it, hermetically sealed, to G.L.Eastes, who reported as follows:- "The serum from pemphigus bulla . . . was inoculated into various culture media, and incubated aerobically and anaerobically, and pure cultures of the staphylococcus pyogenes aureus have been obtained"; no other organisms had appeared at the end of one month. Similarly some bullous fluid was taken from one of the mothers - the amount of fluid was too small for a definite report but the culture on agar-agar showed staphylococcus aureus only.

The incubation period was worked out as being 2 - 4 days. It was noted that the first lesion usually occurred where there had been friction or pressure while the later lesions arose from local contagion. Sections of the skin of fatal cases showed that exfoliation was due to horizontal cleavage of the epidermis between the stratified and the Malpighian layers.

Maguire found that in all his fatal cases, there was evidence of umbilical sepsis - the still unhealed stump becoming inflamed and swollen until it simulated an umbilical hernia. Only one of the cases that recovered, had a lesion at the umbilicus and in this one the stump had been previously completely healed. At one of the P.M. examinations, the umbilicus, with a portion of the round ligament, was removed and the report on the specimen was as follows:- "In the deeper parts of the fibrous tissue removed with the umbilical scar is seen a cleft resembling a lymphatic space, but without any definite endothelial lining. Along the edges of this are to be found a few scattered micrococci which stain by Gram's method . . . . . These facts suggest that the original point of infection was the umbilicus itself."