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C Human Treponematosi

Carate (Pinta), Yaws, Endemic Syphilis and Venereal Syphilis

Human treponematosi, notwithstanding extensive research which especially during recent years gave interesting results, has still a number of unsolved problems.

In the following the four diseases will be dealt with separately. Their assumed origin, their characteristics and relationships are briefly presented in the introduction.

Introduction

It is certain that the four diseases are closely connected so that a number of authors, among them BUTLER, 1936; GRIN, 1935; E. H. HUDSON, 1946; believe that yaws and syphilis are caused by the same organism which in their opinion, as WILLCOX, 1960, p. 84, expressed it "produces a different clinical picture because of environmental and immuno-biological influences within and without the host exerted during countless passages through the centuries".

The following may be stated:

1) The treponemes of carate, yaws, endemic and venereal syphilis are with present-day techniques microscopically undistinguishable.

2) The clinical syndromes of the four diseases are in typical cases sufficiently distinct to allow a differential diagnosis.

3) Carate which is restricted to Central- and South America has certain characteristics which are different from those found in the three other forms of human treponematosi. Up to the present the treponeme of Carate has not been adapted to growth in any animal apart from man.

4) Although yaws, endemic and venereal syphilis are as a rule distinct and can be differentiated, they show occasionally varia-

tions of their clinical pictures which make a differentiation difficult or impossible.

5) In prehistoric bones, lesions regarded as characteristic for syphilis are gummatous and proliferative periostitis of the calvarium with jagged stellate scarring of the external surface, osteoperiostitis of the long bones, and circumferential enlargement of the shaft with increased density. (Regarding publications on observations in America, see: J. H. MEANS, 1925; H. U. WILLIAMS, 1936; W. L. HALTOM and A. R. SHANDS, Jr. 1938; H. S. DENNINGER, 1938; T. D. STEWART, 1940; G. W. GOFF, 1953; H. N. COLE et al., 1955). Similar pathological changes have been found in some cases in which they were regarded as due to yaws (T. D. STEWART and A. SPOEHR, 1952). For a brief clear presentation of the difficulties connected with the diagnosis of syphilis from dried bones, see S. JARCHO, 1964, and T. D. STEWART, 1941.

6) 'Leprosy' was during the Middle Ages following the crusades and especially in the century before the discovery of Columbus extremely frequent and widespread in Europe. In the opinion of a number of modern writers, for example E. H. HUDSON, 1961, leprosy at that time was only in part Hansen's disease and to a considerable extent treponematosi, leaving out some other skin diseases of different aetiology which somewhat resembled leprosy (E. H. HUDSON, 1963 a).

One reason for this opinion is that 'leprosy' had the reputation of being highly contagious so that people, apart from being isolated in 'leper houses', had to wear clappers 'Chama Lazarus' (note 1) to warn passers-by to keep away from them. It is nowadays well known that Hansen's disease is not highly contagious and if an infection takes place, it needs as a rule a considerable time, often several years, until definite clinical symptoms develop. The great majority of crusaders returned from the East comparatively soon within a period too short for leprosy to develop and show clinical symptoms.

True leprosy is not a venereal disease, but 'leprosy' of the Middle Ages was associated with sex. In the thirteenth century, Theodorus stated that 'leprosy' women were venereally contagious (GOODMAN, 1944), and in 1303 Bernard de Gordon stated that 'leprosy' was associated with prostitutes (HUDSON, 1958, p. 17; HOLCOMB, 1935).

Another reason to assume that in many cases it was not Hansen's disease but treponematosi, is the fact reported by contem-

porary authors that the returning crusaders not only brought 'leprosy' home, but also its remedy, the 'Saracen ointment', which was used with good result against the 'Arabic leprosy'. This ointment consisted of mercury in a fatty base. Cinnabar (mercury sulfide) was highly valued by the Arabs, who knew that mercury could be obtained by heating cinnabar (E. G. BROWNE, 1921). It was found that a certain type of 'leprosy' healed comparatively rapidly under mercury treatment. Probably under the influence of Arabian physicians this treatment was used in the medical school of Salerno to which Constantinus Africanus became attached (note 2). In Salerno crusaders after their return were treated for their 'leprosy'. The number of leper houses, where lepers were isolated, was in Europe very great (many thousands) after the crusades.

Toward the end of the fifteenth and in the first part of the sixteenth century 'leprosy' showed a marked decrease¹ simultaneous with the rapid spread of a disease which became known by different names, such as morbus gallicus, bubas, pocks, grosse verole, spanish disease, disease of Naples etc. (SINGER and UNDERWOOD, 1962). This disease was syphilis (notes 3 and 4) which by the severity of its symptoms attracted general attention. The clinical syndromes were studied and with increasing knowledge a better differential diagnosis was possible, so that many cases which formerly would have been regarded as leprosy, were diagnosed as bubas or morbus gallicus.

Furthermore we have to realize that for very long periods one did not know the connection of the manifestations of syphilis in the different stages of the disease and therefore did not know that they were due to the same infection. As a result, the different manifestations were regarded and described as different diseases.

Apart from the venereal form, endemic syphilis was also present and known under various names.

7) The reason for the development of a particularly severe form of syphilis in the last decade of the fifteenth and the first part of the sixteenth century is still to-day not entirely clear and different explanations have been given. One has assumed the possibility of a new strain of treponemes developing in Europe or having been introduced from the West Indies. In the latter case, yaws treponemes might have been introduced. It is of special interest that examination of bones in the south-eastern part of North America has shown that a disease, either syphilis or yaws, must have been

¹ There were apparently several causes of this decrease.

very frequent among Indians not long after the arrival of the Spaniards (STEWART, 1940), so that one might assume that *treponema* strains had been exchanged against which Indians and Europeans had no immunity.

Numerous writers in commenting on syphilis as it showed itself toward the end of the 15th century declared that it was a new disease. Actually it was an old disease which for reasons which are even nowadays not clear changed its character and became temporarily an acute malignant disease which caused considerable destructions. Within 40–50 years the symptoms had become much milder and the disease took a character which corresponded more to syphilis as it is known to-day.

Already at the time of Columbus some physicians denied that it was a new disease. Niccolò Leonicensis (1428–1524), for example, stated that the disease was the same which the peasants in Lombardy called 'brosulas' (HUDSON, 1961), which was probably a form of endemic syphilis². It must have existed long enough that it had an established name among the population. According to SUDHOFF (1926), the name 'mal franzoso' was used in northern Italy for about half a century before Columbus.

8) Evolution of human treponematosis

Yaws

Treponemes took their origin probably from saprophytic spirochaetes which lived in decaying vegetation (HUDSON, 1958). There is a certain probability that this happened in the rain-forests of Central Africa where human beings lived already in very ancient times. Old endemic areas of yaws are found there to-day among the most primitive tribes. Central Africa was an enormous reservoir of yaws since remote times. Yaws is a non-venereal treponematosis which is usually acquired during childhood among primitive people by direct contact of naked bodies; contaminated fingers probably play an important rôle (HACKETT, 1957). Observation has shown that skin lesions in yaws are often to some degree different during the very humid rainy season and the dry season. RAMSAY, 1925, in Assam found that people in the plains had typical lesions of yaws in the wet season, which changed in the dry season, so that they could be taken for syphilis, and the longer a person with yaws stayed in the hills with a drier climate, the more his lesions appeared as those of syphilis (HUDSON, 1963 b). THOMSON,

² Libellus de epidemia quam Itali morbum gallicum vocant vulgo brossulas, Venice, 1497.

1819, reported that apparently healthy West-Indian negroes developed symptoms of yaws after they had been removed from a cooler mountainous area to a sugar estate with a warm humid climate (WILLCOX, 1960, p. 84).

During the great migrations of man in the Pleistocene, people may have carried yaws with them from Central Africa through Arabia, India, Malaya to Australia and Oceania. There were also migrations through China across the Aleutian bridge through North-, Central- and South America, where carate, which may be regarded as a special variety of human treponematosis, became isolated.

Endemic syphilis

When yaws was carried from hot humid to cooler and drier subtropical regions, the disease syndromes of yaws, as already mentioned, changed to what is nowadays known as endemic syphilis³. The treponemes which in yaws existed in highly infective ulcerations and papules all over the body were in endemic syphilis localized in comparatively warm regions of the body surface where perspiration dried more slowly, such as the folds of the neck, the arms, legs, groins around the anus, and especially also in lesions of the buccal mucosa. General skin-to-skin infection as in yaws became more rare, as clothes began to be used. Endemic syphilis was still essentially a non venereal, juvenile disease which was especially transmitted from mouth to mouth by fondling and kissing of children, by unhygienic eating habits and infected eating utensils (McFADZEAN and McCOURT, 1954; E. H. HUDSON, 1958; WILLCOX, 1960). Such conditions exist still nowadays in parts of the Middle East where HUDSON in arid regions of Syria studied 'bejel' among the Bedouins.

Venereal syphilis

The evolution of venereal syphilis is connected with the development in prehistoric and early historic times of larger towns and cities and of urban life. In consequence of better organization of the family, better clothing, better nutrition and better personal hygiene, endemic syphilis could not spread as in primitive rural communities. Although infection by simple contact of naked bodies as in endemic syphilis was still possible, the chances of infection by

³ The appearance of lesions in treponematosis of experimentally infected animals after many passages has been described by TURNER & HOLLANDER, 1957.

these ways decreased. The transmission which was independent from climatic conditions, the wearing of clothes, unhygienic eating habits and infected eating utensils was sexual intercourse, and gradually this form of infection developed and treponematoses transmitted by the sexual act — venereal syphilis — spread to different countries over the globe. It had its principal centers in larger cities and communities with a sophisticated population.

The just outlined evolution of human treponematoses corresponds essentially to the hypothesis of E. H. HUDSON, 1958. Opinions similar in some respects are found in the publications of HACKETT, 1963, WILLCOX, 1960, COCKBURN, 1961, and of a number of other writers on human treponematoses.

There remains still the question whether carate, yaws, endemic and venereal syphilis are caused by one and the same organism which acts differently under environmental and immunobiological influences, or whether there are four very closely related different species of treponemes which developed by mutations. In the first case one had to speak of human trepanomatoses, in the second of four trepanomatoses. Probably this question can finally only be settled by experiments with human volunteers, as suggested by WILLCOX, 1960.

Typical cases of yaws, endemic and venereal syphilis appear clinically as distinctly different diseases. One has on the other hand to keep in mind that transitions have been observed under different conditions, so that the assumption of different strains of the same treponema instead of different treponema species gives in the writer's opinion a better and more plausible explanation.

African slaves which from remote times were carried in millions by land and sea to Europe, Asia and later to the Western Hemisphere played undoubtedly a very important rôle in the distribution of treponematoses all over the world. In carrying yaws from the African rain forest to countries with similar climatic conditions they introduced yaws; in more dry climates their yaws changed into endemic syphilis, which they also transmitted directly from arid African regions bordering on the hot humid zones of the rain-forest.

From the middle of the 15th century on Portuguese shipped slaves from the Guinea coast. For many centuries African slaves had been transported already by land over the old caravan routes to North Africa, Sicily, Portugal, Spain, Egypt, and the Near East. In these cooler, less humid countries yaws either disappeared or became endemic syphilis, which for many centuries existed there under various names and ultimately was in the larger cities replaced by venereal syphilis. Nowadays, with improvement of hygiene and

the general living standard, such diseases as sabbens, button scurvy and other forms of endemic syphilis in Europe of the 17th, the 18th and the first part of the 19th century have disappeared but exist still in parts of the Near East and Africa.

Notes

1) The clapper of the lepers, 'Chama Lazarus', was often made of the shells of mussels, fastened in a way that they could be used as a clapper.

2) Constantinus Africanus, born in North Africa, probably in Tunis, became famous by translating Arabian works into Latin and in this way introduced them to scholars in Western Europe. He died at Monte Cassino about A.D. 1087.

MORITZ STEINSCHNEIDER published an article on his work in Virchow's Arch. 37, 351–410, Berlin, 1866.

3) The name 'Syphilis' is taken from the famous poem "Syphilis sive morbus Gallicus" (Verona, 1530) by GEROLAMO FRACASTORO (1478–1553). The poem became very popular and was published in many editions and different languages.

4) The disturbed political situation and the wars in Europe, especially the expedition of the French king Charles VIII to Italy and the occupation of Naples, contributed to the spread of venereal syphilis, especially as the soldiers on their return from the war carried the infection to various countries (see regarding Switzerland: MEYER-AHRENS, 1841).

It is of interest that diseases which apparently were venereal syphilis in a severe form were observed and reported from distant countries such as Persia, China and Japan at the beginning of the 16th century (ELGOOD, 1951; SIGERIST, 1926; DOHI, 1926). These reports indicate that a severe form of syphilis was observed shortly after its appearance in Europe, but they do not exclude the possibility of the existence of the infection in these countries at very much earlier times (WONG and WU, 1932).

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I

Carate – Mal del Pinto – Pinta

Documentation in the New World: Carate is widespread in Central- and South America, in the West Indies and Mexico where it is mostly found in warm, humid regions. According to LUIS A. LEÓN, 1942, carate existed in America in pre-Columbian times; for additional historical data, see MAZZOTTI, 1966. The disease is here mentioned, as some authors, for example the Jesuit historian JUAN DE VELASCO (1727–1819) from Ecuador in his *Historia del Reino de Quito*, 1789, and writers from Columbia claimed in their publications that carate had been introduced into America from Africa by negro slaves in the first part of the sixteenth century.

Two facts speak against this view:

1. Carate apparently did not exist in Africa in historical times, and should it be present, it is so rare that practically it could not have played a rôle in a transmission. Furthermore, the few cases which have been reported from Africa in the past, are doubtful and may have represented diseases with similar skin alterations but of a different aetiology.

2. In Mexico and in Central- and South America there are regions in which the native population, although heavily infected with carate, had never any contact with negroes. This, for example, is the case with the population in some parts of Mexico and with tribes in the forests of Brazil; furthermore, according to CHAVARRÍA and SHIPLEY, 1925, with the Tunebos who live in the plains of eastern Columbia.

There are also no reports on negroes in America infected with carate.

The first reference to carate was apparently given by FRIAR ROMÁN PANE, who accompanied Columbus on his second voyage and having spent some time on Espaniola, wrote a report on the beliefs and folklore of the local Indians (WEISS, 1947). His report is included in *La Historia del Almirante Don Christoval Colon* written by his son Fernando. ROMÁN PANE tells of an Indian myth which describes how Indians in need of women tried to catch some mythical beings without male or female sexual characteristics (they afterwards became women) but failed to hold them. Subsequently they employed Indians with carate who succeeded in catching them, as the skin on the palms of their hands was very rough in consequence of the disease (note 1).

OVIEDO in his *Historia General y Natural de las Indias*, 1535, refers to carate, although he does not mention the colour changes of the skin. He states that prominent persons and caciques in the region of Castillo de Oro (nowadays a part of Columbia) used to be carried by slaves in hammocks and that they used by preference slaves with carate, as they were especially strong (note 2).

It should here be pointed out that FRANCISCO HERNÁNDEZ¹ did not refer to carate. He mentions in his *Historia Natural de la Nueva España* a disease which the Aztecs called Tzatzayanaliztli and which was regarded by some modern authors, for example CHAVARRÍA and SHIPLEY (1925) as carate. This erroneous interpretation is due to an incorrect translation of the respective paragraph of HERNÁNDEZ by J. J. LEÓN. According to the symptoms of Tzatzayanaliztli as described by HERNÁNDEZ, it cannot have been carate (note 3).

¹ FRANCISCO HERNÁNDEZ (1517–1587), the famous naturalist, was sent by Philip II to New Spain (Mexico) where he spent a number of years in the preparation of his great work. The manuscript with a great number of illustrations remained unpublished for a very long time after the author's death. A part dealing with medical botany was printed by the famous Ibarra Press at Madrid in 1790. Recently, starting in 1959, an excellent complete edition has been published in Mexico D.F. under the title *Obras completas del Dr. Francisco Hernández*, edited by the Universidad Nacional de Mexico (see note 3).

*The pretended letter by Cortés supposed to have been written to the emperor Charles V about the existence of carate in Mexico*²

During about the last hundred years a number of authors dealing with carate, among them HERREJÓN, 1938, and FRANCISCO LEÓN Y BLANCO, 1942, one of the best specialists of carate, gave as a proof that the disease was autochthonous in America a passage from a letter supposed to have been written by CORTÉS to the emperor Charles V. This passage mentions different colours of the skin in the same person characteristic of carate as observed in Indians.

The first author who referred to this letter was, as far as the present writer is aware, the Mexican FRANCISCO ITURBIDE in *El Porvenir*, 1870. The passage in question reads: "En este país de ventura existen rarezas en el color de sus habitantes presentando variedades en el mismo individuo." In the opinion of a Spanish scholar familiar with the writings of CORTÉS, whom the present author consulted, the phrase is not in the style of CORTÉS.

ITURBIDE did not state the date of the letter nor the place where it had supposedly been written.

The letters by CORTÉS to Charles V (five very long ones, and a short one) have been published several times and there exists also a facsimile edition. The most recent edition is that by Prof. Mario Hernández Sánchez-Bárba of the University of Madrid in the Colección Porrúa, Mexico D.F., 1963. This edition is apparently the most complete one. Notwithstanding a careful check, the passage quoted before could not be found in any of the letters.

In 1925 CHAVARRÍA and SHIPLEY published a paper on carate and therein mentioned the letter of CORTÉS. They stated that in order to verify the authenticity of the letter, they had written to Cadiz for information and had received a personal communication from the secretary of the Archives at Cadiz that the letter containing the quoted passage was authentic and was kept there with nineteen (!!) other letters by CORTÉS to the emperor Charles V.

The present author, during a four months' stay in Mexico D.F., tried to locate the letter by CORTÉS or a copy of it in the Archivo General de la Nación, but without success. During a subsequent four months' stay in Madrid he realized after some futile personal attempts to find the letter that the most hopeful procedure would be to have some Spanish authority approach officially the various archives where the letter might be kept, as in this way persons

² As this letter has been referred to by various authors in the past, the results of the investigation by the present writer are reported in note 4.

familiar with the contents of the respective archives might find the letter among the large number of documents.

Dn. José López de Toro, Académico de número de la Real Academia de la Historia, was very helpful and approached the respective important Spanish archives and libraries requesting information about the mentioned letter³. The answers of the various officials showed that they had carefully carried out the investigations. All their answers, however, were negative (note 4).

In the archives of Simancas (Valladolid), a letter by CORTÉS to Charles V is kept, but this letter merely announces his visit to Spain in 1528. The letters of CORTÉS to the emperor, kept in the Archivo General de Indias (Sevilla), have been published in the Porrua edition and none of those letters contains the quoted phrase.

Regarding the statement in the publication of CHAVARRÍA and SHIPLEY (1925) that information had been received from Cadiz about the letter in question which, it was stated, existed there and was kept together with nineteen other letters by CORTÉS to Charles V, it may be mentioned that a recent enquiry showed that not a single letter by CORTÉS was kept in the archives of Cadiz.

As a result of all these investigations, which were carried out by persons familiar with the respective archives, one may state that it is extremely unlikely that a letter by CORTÉS to Charles V describing symptoms of carate exists.

The foregoing has been given in some detail as from time to time for nearly one hundred years the letter by CORTÉS has been mentioned in publications on carate as a proof that carate existed in America before the Spanish Conquest. This proof, however, is not valid and not even needed as for reasons discussed before (OVIEDO, ROMÁN PANE) carate has to be regarded as autochthonous in America; it was not introduced in historical time by negro slaves from Africa.

COCKBURN, 1963, suggested that carate is the result of geographical isolation and the reason for its existence only in Central America is that not only the treponeme of carate differs from those in other parts of the world but also the human host there in his reaction to the carate treponeme is different.

About an old theory of the origin of carate in Mexico, see note 5.

³ The author wishes to thank Dn. José López de Toro, Académico de número de la Real Academia de la Historia in Madrid for his very great and efficient assistance.

Notes

1. "... viendo, que no podían cogerlas; para que las guardasen i buscasen, para cada una un Indio caracarcol, que tenía muy asperas las manos, i que así las tendrón estrechamente, sin que se les escurriesen; dijeron al carique que había cuatro de estos caracarcoles, y los llevaron. Es el caracarcol una enfermedad como Tiña, que causa gran aspereza en el cuerpo. En efecto las cogieron, i habiendo tenido Consejo sobre el modo de hacer estos Personas mugeres, por faltarles naturaleza de ellas i de Hombre..."

They fastened the persons who had been caught to trees, and a bird (Pico) mistaking them for trees, picked an opening in their bodies, where the missing female sexual opening should be.

Escritura de FR. ROMÁN PANE del Orden de San Geronimo. De la Antigüedad de los Indios etc. in: *Historiadores Primitivos de las Indias Occidentales*... edit. Gonzales Barcia, Madrid, 1749, t. I, p. 63, de la *Historia del Almirante Don Cristobal Colón*...

2. "Estos indios que en lo ques dicho sirven de las hamacas buscanlos que sean carates. GONZALO FERNÁNDEZ DE OVIEDO Y VALDÉS. *Historia General y Natural de las Indias, Islas y Tierra-Firme del Mar Océano (1535)*. T. III, lib. XXIX, cap. XXVI, p. 126, edic. de la R. Academia de la Historia, Madrid, 1853.

3. The *Obras completas del Dr. Francisco Hernández* (1959) contain in the second and third volume the *Historia Natural de la Nueva España*, which has the paragraph of the treatment of a disease, erroneously assumed to be carate. HERNÁNDEZ states cap. XIX, p. 405, that the plant Ixenextic is used to treat Tzatzayanalitzli. This disease causes, according to HERNÁNDEZ, a hardening and cracking of the skin of the whole body. The patchy changes in colour and the subsequent depigmentation of the skin, characteristic of carate, are not mentioned. Based on the erroneous translation by J. J. LEÓN, CHAVARRÍA and SHIPLEY (1925) attributed to HERNÁNDEZ the statement: "Llamaba la atencion de una nueva enfermedad que los aztecas llamaban Tzalzavalistli (sic.) que daba a los habitantes colores variados."

Regarding the early publications of HERNÁNDEZ' work, 1649 and 1790, see the excellent detailed *Bibliografia del Dr. Francisco Hernández* by GERMÁN SOMOLINOS D'ARDOIS to whom the present author is greatly indebted for valuable information.

4. During the investigation regarding the existence of a letter by CORTÉS to Charles V mentioning carate, the following institutions were approached:

- a. Archivo General de Indias, Sevilla.
- b. Archivo General de Simancas (Valladolid).

- c. La Colegiata de Jerez.
 - d. La Cartuja de Jerez.
 - e. La Real Academia Hispano-Americana de Artes, Ciencias y Letras de Cadiz.
 - f. Don Augusto Conte y Lacave, correspondent of the Real Academia de la Historia. He has a very great knowledge of the historical documents kept at Cadiz.
 - g. Centro Coordinador de Bibliotecas at Cadiz.
 - h. Guia de Fuentes para la Historia de Ibero America, Comisión Española.
 - i. La Coleccion Muñoz in the Real Academia de la Historia in Madrid (examined by the present writer).
5. In Mexico Padre ALZATE, 1797, discussing the cause of the colour of the negroes, mentions the presence of 'Curicua' (carate) in the neighbourhood of the volcano Jorullo and in San Juan Hue-tano (Michoacán). He believed that the disease was due to atmospheric disturbances caused by the eruption of the volcano in 1759.

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- Historia del Almirante Don Christoval Colón que compuso en Castellano Don Fernando Colón, su hijo, y traduxo en Toscano Alfonso de Ulloa, vuelta a traducir en Castellano, por no paracer el original. pp. 1-128; contains pp. 62-71 'Escritura de Fr. Román'.
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II

*Yaws – Framboesia – Pian*¹

A clear differentiation between the clinical syndromes of yaws and venereal syphilis was up to the 19th century generally not made, so that it is often difficult or impossible to decide from the descriptions given in publications of the 16th to the beginning of the 19th centuries whether the mentioned diseases were yaws or syphilis.

This difficulty is still increased by the old terminology which applied the name 'bubas' (spelled in various ways) sometimes to yaws, sometimes to venereal syphilis and not seldom to both. In Brazil 'boubas' was used for yaws.

Yaws occurs in different parts of the world between the tropics of cancer and capricorn in regions with abundant rainfall. It is usually found at low altitudes, but has been observed in some places, for example in the Philippines, up to 2000 meters. Yaws is absent in arid mountainous regions.

Yaws is a non-venereal juvenile disease which occurs among native people with a low living standard. Usually the infection takes place through direct contact of naked bodies covered with highly infectious papules and ulcerations. Children who touch or scratch their papules may transmit treponemes to their playmates (for details see HACKETT, 1957).

¹ 'Yaws' is a transliterated African name used at the Guinea coast; 'framboesia' derived from framboise = raspberry, was proposed by F. BOISSIER DE SAUVAGES in 1768 for this disease; 'pian' originated from the Caribbean word 'epian'.

Less important but frequently mentioned, especially in the earlier literature, is the rôle of flies which may transmit treponemes from an ulceration to superficial skin lesions of a healthy person (BARNARD, 1952²). The first author who pointed out this kind of transmission of yaws was GABRIEL SOARES DE SOUSA, 1587 (note 1) (FRANÇA, 1921).

One had apparently observed since long that the disease takes usually a milder course, if contracted in childhood. In consequence in Fiji mothers formerly inoculated their children with yaws (Arch. Surg. 1896, teste WILLCOX, 1960). Similar observations have been reported from Africa (MASON, 1831; FINDLAY, 1946).

When persons with yaws went to cooler regions with a more arid climate, the clinical symptoms changed to those of endemic syphilis. It has been pointed out by a number of authors that yaws, although certainly often introduced from the tropics into regions with a more dry and cooler climate, never gained a foothold as yaws.

Africa

Yaws existed in Africa from remote times. Indications are the finding of prehistoric bones with pathological changes attributed to yaws, some sculptures, for example a terracotta head of about the fourteenth century, showing mutilation probably caused by 'gangosa' (tertiary yaws)³ discovered in Ife, Nigeria, numerous wooden African masks with signs of gangosa, dating back several centuries, furthermore old local names for yaws.

The Portuguese on their first exploration of the African west coast at about the middle of the 15th century observed the occurrence of a disease which to judge from their description was yaws (AZURARA, 1896, 1898).

Numerous writers from the sixteenth to the nineteenth century pointed out the frequency of yaws among negroes in Africa, but it was often not clearly differentiated from syphilis. Among early authors who mention yaws in Africa are: WINTERBOTTOM, 1803 (note 2); JAMES BRUCE, 1805, who found it in Abyssinia; GUYON, 1853, who mentions that the Tebib, the native practitioners in Algeria, regarded yaws as a kind of syphilis and treated it correspondingly. BOYLE, 1831, refers to its occurrence on the African west coast, and BRYSON, 1847, described yaws from slave ships

² BARNARD, 1952, gives a complete review of the literature with numerous quotations.

³ 'Gangosa' means muffled voice, it was used by the Spaniards for tertiary yaws with destruction of nose, mouth and pharynx.

(note 3); PINTO ROQUETE, 1868, reported the occurrence of yaws in Mozambique.

'Goundou'⁴, an osteitis of the facial bones, especially the nasal bones with usually symmetrical exostoses, is nowadays by most investigators regarded as due to yaws. In the second half of the nineteenth century MACALISTER, 1883, and LAMPREY, 1887, drew attention to the existence of 'horned men' in Africa by their publications. MACLAUD in 1895 gave the name 'goundou' or 'anakhre' to this pathological condition. CHALMERS in 1900 published five cases of goundou. Subsequently numerous additional cases have been reported mainly from Africa, but also from various other tropical countries.

BOTREAU-ROUSSEL, who had opportunities to study many cases of goundou, observed 1934–1936 the appearance and development of goundou during the secondary eruption of yaws in 32 patients. His observations have been confirmed by a number of other investigators, among them CLAPIER in equatorial Africa and HACKETT in Uganda (BOTREAU-ROUSSEL, 1952, 1961, 1962).

America

From the results of recent investigations one may conclude that yaws was widespread in the tropics from ancient times. Prehistoric skeletal remains with pathological alterations regarded as caused by yaws have been found on the island of Tinian (Mariana Islands) in the western Pacific, by T. D. STEWART and A. SPOEHR, 1952. Captain J. COOK (COOK & KING), 1784, stated that the people of Hawaii were infected by yaws before the arrival of the white man.

ANTONIO PIGAFETTA (about 1491 – died after 1534), who accompanied Magellan on the first circumnavigation of the globe (1519–1522) reports in his description of the voyage that 'lo mal de S. Jop' (Syphilis) was frequently seen in the Malay archipelago, especially on the island of Timor. As Magellan's ship 'Victoria', the only one which completed the circumnavigation, returned in autumn of 1522, it was probably not syphilis, as VIRCHOW, 1871, assumed, but yaws.

Yaws was first definitely mentioned as a special disease by JACOBUS BONTIUS (1592–1631) from Amboyna and the Moluccas (note 4). The first edition (in Latin) of his work was posthumously published in Leiden (1642) under the title: *De medicina Indorum*. BONTIUS regarded yaws as different from the 'Spanish pocks'

⁴ N'goundou in Agni dialect on the Ivory Coast signifies 'big nose' or 'enlargement of the nose'.

(syphilis); he observed that it is usually not transmitted by sexual intercourse.

From the Western Hemisphere we have several early references to 'buas' or 'bubas' which although formerly often regarded as venereal syphilis were probably in many cases yaws. The term 'bubas' caused much confusion in the literature. In Brazil bubas (boubas) meant yaws, in other parts of South America, the West Indies and Mexico bubas referred to syphilis or to both yaws and syphilis⁵. In the present writer's opinion and contrary to HACKETT's view, yaws existed in Espaniola and South America before the arrival of Columbus.

A very early reference is found in the *Escritura* of Fray ROMÁN PANE contained in the *Historia del Almirante Don Christoval Colón* written by his son Fernando Colón (1488–1539). We have already mentioned Fr. ROMÁN PANE in dealing with carate. He collected old myths of the Indians in Espaniola and relates that a famous mythical hero Guagagiona, a kind of great ancestor of the Indians, fell in love with a beautiful woman, but as he suffered from a disease which as ROMÁN PANE stated was known to the Spaniards as the 'French disease', he had first to stay away from her and treat himself in a secluded place until he was cured. His bubas may have been yaws and not venereal syphilis.

OVIEDO in his *Historia general y natural de las Indias*, 1535, refers to the bubas and to their treatment by the Indians with decoction of Guaiac wood. He states that the Spaniards got the infection from the Indian women.

SIGAUD, teste HIRSCH vol. II, 1885, p. 107, mentions a manuscript from the year 1587 which refers to yaws in Brazil⁶ and is preserved in the (former) Royal Library at Rio de Janeiro.

A description of yaws and its differentiation from syphilis was given by G. PISO (note 5) (WILLEM PIES, 1611–1678) in a valuable work, jointly published with G. MARKGRAF (1610–1644): *Historia naturalis Brasiliae*, 1648. This publication contains twelve books, the first four are by PISO: *De medicina Brasiliense*; the following eight books are by MARKGRAF: *Historia rerum naturalium Brasiliae*.

In the 17th and especially in the 18th and the 19th century, quite a number of physicians on the American mainland and in the West Indies dealt in their publications with yaws. We will give only a

⁵ It has to be added that the term bubas was occasionally even used by some authors for diseases with an entirely different aetiology, for example cutaneous leishmaniasis.

⁶ The author of this manuscript who is not mentioned was perhaps GABRIEL SOARES DE SOUSA (see note 1).

small selection of authors. They all realized the great similarity of yaws and syphilis but did not agree on the question whether they were two different diseases or whether yaws merely represented syphilis modified by climatic conditions and possibly also influenced by racial factors. HILLARY, 1759, who made his observations in Barbados, regarded yaws as syphilis changed by the tropical climate. Père LABAT⁷ in the French Antilles held yaws to be syphilis (note 6). SCHILLING, 1770 (note 7), and likewise WINTERBOTTOM, 1803 (note 2), regarded yaws and syphilis as different diseases. DU TERTRE, 1667, 1671, was of the opinion that yaws was an especially malignant syphilis, he considered the possible influence of food. DAZILLE, 1776, and POUPPÉ DESPORTES, 1770, likewise held yaws for a particularly malignant syphilis. BAJON, 1777, described yaws from Cayenne and pointed out the introduction of yaws by negro slaves from Africa (note 8). BOISSIER DE SAUVAGES in his *Nosologia methodica*, 1768, suggested the name *Framboesia*. BRICKELL, 1737, was the first American author who wrote about yaws (note 9).

The number of negroes suffering from yaws who worked in the Antilles and in South- and Central America gradually became so great that many plantations had their yaws houses (yaws huts) where the infected slaves had to live and were treated. When after the liberation of the slaves the inmates of the yaws houses became free, the disease spread among the population until a systematic control and treatment of the yaws patients, for example in Jamaica, caused a great reduction of the disease (GENTLE, 1965).

For treatment of yaws, the Indians used decoctions prepared from Guaiac wood, various roots and barks and certain berries. Later mercury in different preparations was introduced by foreign physicians. As a curiosity, it may be mentioned that REECE, 1817, recommended intentional infection of the patient with smallpox, as this disease supposedly caused yaws to disappear.

As mentioned before, yaws in the present writer's opinion existed in parts of the American mainland and in some of the Antilles in pre-Columbian times. It is, however, in any case certain that many cases were introduced from Africa by negro slaves after the discovery of Columbus.

Notes

1. Digamos logo dos mosquitos, a que chamam nhitinga; e são muito pequenos e da feição das moscas; os quaes não mordem, mas

⁷ JEAN-BAPTISTE LABAT (1663–1737) was a French Dominican missionary who was sent to the West Indies.

são muito enfadonhos, porque se põem nos olhos nos narizes; a não deixam dormir de dia no campo, se não faz vento. Estes são amigos de chagas, e chupam-lhe a peçonha que tem; e se se vão pôr em qualquer cossadura de pessoa sã, deixam-lhe a peçonha n'ella, do que se vem muitas pessoas a encher de boubas. — GABRIEL SOARES DE SOUSA, *Tratado Descriptivo do Brasil em 1587*. Capitulo XCIII. Que trata dos mosquitos, grillos, bizouros e brocas que ha na Bahia. Third edition, São Paulo, 1938.

From the identical Portuguese text of chapter 93 in 'Noticia do Brasil', São Paulo, 1945, Clifford Dobell gave the following translation (see BARNARD, 1952):

"We must now refer to those mosquitoes which are called nhitinga, and which are very small and of the form of flies (i.e. house flies); these do not bite but are very troublesome, because they settle on the eyes and in the nostrils, and will not let one sleep in the open unless there will be a wind. They are very fond of sores, and suck the poison which is in them; and if they there go and settle upon any abrasion on a healthy person, they leave the poison in it, and hence many people are seen covered with boubas."

2. Of all the diseases which are supposed to have originated in Africa, the only one which can be said with any degree of certainty to be indigenous in that continent is the Yaws. It frequently occurs among the slaves in the West India islands and America, by whom it has been imported from Africa into those countries; it is almost unknown in Europe, for though it has sometimes been imported, it has never spread.

The yaws is called by the Bulloms *Bihl*, by the Timmanees *Tirree* or *Catirree*, by the Mandingos *Mansera*, and by the Soosoos *Dokkettee* or *Kota*. It is called by the Portuguese on the coast *Boba*, and by the French *Pianes*. — TH. M. WINTERBOTTOM, *An Account of the Native Africans, etc.*, 1803, Chapt. VIII, p. 139 Yaws.

3. Yaws is the only disease which occasionally proves troublesome amongst this class of people (slaves); like craw-craws (sic) it is engendered by filth, insufficient food, and the over-crowding of many people into a small, badly-ventilated space; it it also propagated by contact. — A. BRYSON, *Report on the Climate and Principal Diseases of the African Station*, 1847.

4. In Amboyna and especially in the Molucca islands there is a general plague occurring frequently, similar in its attacks to the Spanish pocks. Yet it is different in so far as there is no Venus play in its aetiology, it being usually propagated in the folowing way:

First spots appear on the face, and tophi and swellings on the arms and legs, which are hard and scirrous from the beginning and occur as frequently over the whole body as warts and corns do on

hands and feet in our own country; and if they ulcerate, then a tough gumlike substance is excreted, which is so sharp and biting that deep ulcerations are excavated with hard horny and subverted edges. (Translated from the Dutch.) – BONTIUS, PISO EN MARKGRAEF, Oost- en West-Indische Waranda, Amsterdam 1694 and 1734 (quoted from E. H. HERMANS, 1831).

5. PISO, G. *Historia naturalis Brasiliae*, Lugd. Batavorum 1648. Apud Lud. Elzevirium.

Contains:

- I. GUILIELMI PISONIS M.D. *De medicina Brasiliense libri quatuor* and
- II. GEORGI MARCGRAVI DE LIEBSTAD MISNICI GERMANI. *Historiae rerum naturalium Brasiliae libri octo*.

In I, p. 35. Cap. XIX De Lue Venerea.

Lues quaedam ex coitu non tantum per contagium, vel parentum haereditario malo in liberos, sed ex leviori attactu atque per se contrahitur, orta potissimum ex alimento foetido & salso, potu rancido & corrupto. Inter Afros non solum atque Indos, sed Lusitanos & Belgas quoque saevit, tumoribusque schirrosis & virulentis ulceribus totum corpus infestat. Quae quidam lues huic regioni est Endemia & Bubas ab Hispanis & Brasilianis appellatur.

6. De l'Epian, maladie ordinaire des Sauvages. "Les Caraïbes sont fort sujets à l'Epian. On doit avouer que cette maladie est particulière à l'Amerique, elle y est naturelle, tous ceux qui y naissent Negres ou Caraïbes de quelque sexe qu'ils soient, en sont attaquez presque en venant au monde, quoique leurs pères, leurs meres & leur nourrices soient très sains, ou de moins qu'ils paroissent tels.

L'Epian est réellement ce que les François appellent le mal de Naples, & que les Italiens nomment le mal François. Tout le monde le connoît sous le nom de mal Venerien, & on devoit avec justice l'appeler le mal Ameriquain, puisqu'il est né dans ce Pais-la, & que c'est de là que les Espagnoles premiers conquerans de ce nouveau Monde l'ont apporté en Europe.» – JEAN-BAPTISTE LABAT, *Nouveau Voyage aux Isles de l'Amérique*, vol. IV (1700), p. 358.

7. This disease (framboesia) is prevalent among the niggers and infects all manner of persons, young and old, male and female, of all kinds of dispositions: childhood being, however, the most susceptible to it. – SCHILLING, G. W., 1770 (quoted from HERMANS, 1931).

8. La maladie désignée sous ce nom, est tout-à-fait inconnue en Europe; elle semble être particulière à ces Noirs, qui naissent sous des climats brûlants de l'Afrique, et qui par leur émigration l'ont portée dans toutes les parties de l'Amérique méridionale où elle est

actuellement, peut-être plus commune qu'en Afrique même. — BAJON, 1777, vol. I, Mémoire IX, *Sur les Pians*.

9. The Yaws are a Disorder not well known in Europe, but very common and familiar here; it is like the Lues venerea, having most of the Symptoms that attend the Pox . . . This Distemper was brought hither by the Negroes from Guinea where it is a common Distemper amongst them. — BRICKELL, *Natural History of North Carolina*, 1737, p. 48 (copied from BUTLER, 1936).

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III

Endemic Syphilis

Disease syndromes resembling to a large extent those of venereal syphilis have been described under various names in Europe in the 18th and early 19th centuries. Similar diseases have been found in different parts of the world, where they evidently existed for many centuries, to judge from the old names used by the native population.

Modern studies which started at about 1928 (GRÖN, 1928; HUDSON, 1928; GRIN, 1935) have provided clinical and epidemiological characteristics, so that the name of 'endemic syphilis' was generally accepted and replaced the various names formerly used for these so-called syphiloids.

Endemic syphilis is a non-venereal syphilis contracted usually in childhood. A primary lesion is often not found, generalized secondary lesions are comparatively rare, lesions of the buccal mucosa are frequent and tertiary lesions may be very extensive and destructive. Congenital syphilis, cardio-vascular and neurological involvement apparently do either not occur or are very rare. TURNER and HOLLANDER, 1957, made animal experiments with different strains of treponemes of syphilis and of yaws; these experiments gave interesting results regarding the relationship of these diseases.

In endemic syphilis the main source of infection are the lesions of the mucosa of the mouth wherefrom children by putting their fingers in the mouth may carry treponemes to the fingers or the mouth of other children. They may also transfer the treponemes directly by kissing. Furthermore eating utensils, drinking-cups, spoons, etc. which are not properly cleaned and are shared by several persons may transmit the infection (MCFADZEAN and McCOURT, 1954).

In Europe endemic syphilis occurred as the 'sibbens' of Scotland (GILCHRIST, 1771; CARMICHAEL, 1814). It was known as Framboesia Cromwellia as it was originally regarded as venereal syphilis introduced by soldiers of Cromwell's army and which in the view of some authors continued in the non-venereal form as endemic syphilis (WILLCOX, 1960, p. 87). Similar diseases were the 'button scurvy' of Ireland (CARMICHAEL, 1814; FAYE, 1842), the 'radesyge' of Norway (BÖCKER, 1809; HÜNEFELD, 1828), the 'salt-fluss' of Sweden (BÖCKER, 1809), the 'Dithmarsh evil' (HÜBENER, 1835), the 'pian de Nérac' (CAVAILLON, 1958) and the 'spirocolon' of Greece (LANCEREAUX, 1868).

In Bosnia endemic syphilis was known as 'skerljevo', and it existed also in other parts of Yugoslavia (GLÜCK, 1888; GRIN, 1935, 1952, 1953, 1956, 1961; GUTHE, 1960).

Endemic syphilis gradually disappeared in most parts of Europe during the first half of the 19th century as economic and social conditions improved (GUTHE and LUGER, 1957).

In the Middle East cases of endemic syphilis have been found existing under various names (KAIL, 1955), 'bejel' in Syria and Iraq has been studied in detail by E. H. HUDSON, 1928. (See also VON DÜRING, 1918.)

Regarding Asia, endemic syphilis has been reported from Mongolia and Tibet (GUTHE and WILLCOX, 1954).

The disease syndromes have been reported also from Canada during the early settlements around St. Paul's Bay (CARMICHAEL, 1814; WRIGHT, 1855) and Lake Huron (LANCEREAUX, 1868).

Africa

In Africa endemic syphilis occurs among primitive tribes in arid areas near the Sahara desert and the Kalahari desert. It has been reported from Morocco (LÉVY-BING and GERBAY, 1917), Mauritania, Senegal (HACKETT, 1959), Gambia (MCFADZEAN and McCOURT, 1954), Sudan (HEWER, 1938; GRIN, 1961), former French Equatorial Africa (BAYLET, 1954) and Niger territory (MATHURIN, 1953). It was found in Northern Nigeria, in Abyssinia (MANSON-BAHR, 1941) and in Uganda (DAVIES, 1956). According to DAVIES, intentional protective inoculation of children with endemic syphilis was an old practice in Uganda.

From Southern Rhodesia the disease has been described as the 'njovera' (WILLCOX, 1951, 1960) and from Bechuanaland as the 'dichuchwa' (MURRAY et al., 1956; MERRIWEATHER, 1959)¹.

The Peuhls in former French West Africa called endemic syphilis 'pouzzé'. Along the Gambia in transitional climatic zones where both yaws and syphilis occur, endemic syphilis was called 'siti'.

It is very probable that before the discovery of the New World, when many African slaves were sent from North Africa to southern Europe, especially Portugal, Spain and Italy, cases of endemic syphilis and cases of yaws which changed into endemic syphilis were introduced and the disease became established in southern Europe.

¹ For additional references, see: GRIN, E. I., 1953; GUTHE, T. and WILLCOX, R. R., 1954; HACKETT, C. J., 1963; HUDSON, E. H., 1946; WILLCOX, R. R., 1960.

America

After Columbus' discovery, African slaves from Mauretania, Morocco, Algiers and Tunis were for a short period shipped to the New World, but this traffic was soon forbidden by the Spanish Government for religious motives. It was officially stated that muslim and newly baptized Christian slaves could not be introduced into the newly conquered territories of the Western Hemisphere.

The comparatively few slaves which at the beginning of the slave trade with America reached the New World either from the northern coast of Africa or from Lisbon and Sevilla will have brought endemic syphilis to Central America and Mexico. In the tropical regions endemic syphilis will – provided the above outlined hypothesis of evolution is correct – have changed to yaws, while in the cooler regions such as on the high plateau of Mexico it may have persisted as endemic syphilis and may also have developed into venereal syphilis. In later periods of the slave trade, when the slaves came mostly from equatorial Africa with a humid hot climate, they introduced yaws into the New World. There will, however, still have been a certain number of slaves taken from arid zones bordering on the African rain forest who carried endemic syphilis.

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IV

*Venereal Syphilis**Africa*

Whereas yaws was from ancient times a heavy burden for the population of equatorial Africa, it seems that venereal syphilis was noticed there comparatively late.

So far no papyri, inscriptions, works of art or pathological changes in mummies have been discovered which would give a definite documentation of the existence of venereal syphilis in ancient Egypt.

No prehistoric bones with lesions which might be attributed to syphilis but could not also be due to yaws have been found in Africa.

The Arabian literature has likewise not given proofs for the existence of venereal syphilis in Africa before the discovery of the New World. One has, however, to consider that there are still numerous Arabian works which have not been translated and therefore have not been used by western medical historians. It is possible that in some future indications regarding the existence of venereal syphilis in Africa will be found in such works. We know that the Arabs greatly valued mercury for the treatment of what was probably in part endemic syphilis, and it has been mentioned before that the 'Saracen ointment' was brought back from the Near East by the crusaders to cure their 'leprosy' (LENDRUM, 1952; MONTEJO, 1863).

It is in the present writer's opinion certain that endemic syphilis occurred already before the crusaders in parts of Africa and that also venereal syphilis existed, at least in North Africa. Leo Africanus, according to his 'Descrittione dell'Africa', saw in 1516–1517 many cases in Cairo (note 1).

He believed that venereal syphilis had been introduced into North Africa from Europe, especially from Spain. In the western part it was called the Spanish disease, in Tunis, Egypt and Syria the French disease.

Leo Africanus held the 'marranos', the Spanish Jews expelled from Spain in 1492, mainly responsible for the introduction of syphilis into North Africa, an opinion which has not been shared by modern investigators.

Ramusio (1485–1557) gives the report of a Portuguese pilot that already in the first half of the 16th century syphilis was present on the island of São Tomé (note 2).

The early references to the occurrence of venereal syphilis in

Africa were mostly given by non-medical men such as sea-captains, traders and explorers, who made no differentiation between syphilis and yaws. From about the 17th century on, the descriptions became more precise and allow to some extent a distinction between the two diseases. Endemic syphilis was not recognized as syphilis, although it was known to the local people in different regions under different names.

Venereal syphilis was frequent in North Africa, especially Egypt, due to the contact with southern Europe and the Near East.

The Portuguese were apparently responsible for the introduction of syphilis into Abyssinia in the 16th century where it gradually spread over the whole country.

The east African coast and the islands Réunion, Madagascar and especially Zanzibar (LOSTALOT-BACHOUÉ, 1876) gradually became centers of infection with venereal syphilis; the Portuguese and the Arabs were chiefly responsible for the introduction.

On the west coast, Angola got venereal syphilis after the Portuguese occupation (F. PIGAFETTA, 1591; DAPPER, 1686), (note 3).

The Guinea coast became heavily infected with venereal syphilis after foreigners had settled there and had built forts.

On the other hand, South Africa remained comparatively free until the first half of the 19th century.

LIVINGSTONE, 1857, expressed the opinion that syphilis did not get a foothold in populations of pure negro blood in the interior of Africa. In his *Missionary Travels*, 1857, he states (p. 128):

"A certain loathsome disease which decimates the North American Indians and threatens extirpation of the South Sea islanders dies out in the interior of Africa without the aid of medicine. And the Bangwaketse who brought it from the west coast, lost it when they came into their own land southwest of Kolobeng. It seems incapable of permanence in any form in persons of pure African blood anywhere in the centre of the country. In persons of mixed blood, it is otherwise; and the virulence of the secondary symptoms seemed to be in all the cases that came under my care, in exact proportion to the greater or less amount of European blood in the patient."

He had stated 1853 (LIVINGSTONE's *Private Journals*, 1960, p. 184): "The venereal disease abounds at the Barotse. It is called 'Manasa'. It was brought from the Bashukulompo."

FRITSCH, 1867, found syphilis rare in Bechuanaland but stated that there were sufficient cases to disprove LIVINGSTONE's opinion that the disease did not occur in pure negroes in the interior of Africa.

In the first half of the nineteenth century several authors stated

that syphilis was frequent along the coast where the native population came in contact with foreigners but the disease became increasingly rare if one went from the coast to the interior.

With a better knowledge of parts of Africa which had not been visited by foreigners interested in medical questions, the distribution of syphilis in the 18th and 19th centuries became more clear. There was a general agreement that the northern coast of Africa, especially Egypt, was heavily infected (MADDEN, 1904; LACAPÈRE, 1923). In Egypt the troops of Napoleon I were blamed for having introduced venereal syphilis which, however, existed there already for many centuries (Leo Africanus). The disease was called 'Marrad Affrangi', the disease of the Franks, a term applied to all foreigners (MADDEN, 1904). In Abyssinia venereal syphilis is nowadays spread over the whole country (NÄGELSBACH, 1926; MANSON-BAHR, 1941). Both endemic and venereal syphilis occur.

Regarding Uganda, DAVIES, 1956, expressed the opinion that endemic syphilis existed in southern Uganda for centuries. A certain indication is the old practice of vaccinating healthy infants with syphilis, as it was believed that the disease transmitted in this way produced immunity in the adult. With the rise of the living standard endemic syphilis disappeared and was replaced by venereal syphilis. There are different opinions regarding the early history of venereal syphilis in Uganda. G. T. WILSON and R. W. FELKIN, 1882, vol. I, p. 183, state: "Syphilis is extremely common, especially among the men." C. WRIGLEY, in an article in the *Economic History Review*, vol. X, no. I, p. 72, quotes Sir Apolo Kagwa and Nsimbi¹ as saying that syphilis was rife in Buganda in the 18th century.

T. H. PARKE, 1891, who took part in the Stanley expedition to the relief of Emin Pasha stated: "Syphilis is very common all over the Pasha's province" (later a part of S. Sudan and small parts of Nn. Uganda). He also reports (chapter XXII, p. 396): "The Pasha tells me that the Monbuttu tribe in his province inoculate with the virus of syphilis. The rash and all sequelae appear very rapidly but their course is not so virulent." (Compare with DAVIES.)

Sir HARRY JOHNSTON in *the Nile Quest*, 1903, speaking of the people in Uganda states: "Syphilis had wrought but slight ravages amongst them; indeed it was a disease of but recent introduction."

¹ Apolo Kagwa was the 'Prime Minister' of Buganda for about 25 years at the end of last century and first quarter of this. He wrote many books in Luganda which are regarded as authoritative traditional histories. Nsimbi is a more recent Buganda historian. The writer is indebted to Mr. Bryan Langlands for the information.

It was attributed to the first Nubian slave- and ivory trading caravans and also to the Zanzibar trading caravans.

The same author, 1908 (*Georg Grenfell and the Congo*, vol. II, p. 555) states: "Syphilis of relatively recent introduction is more common in the west, east and south than in the center and north; and among the riverain population of the main Congo rather than among the tribes removed from this great artery of travel. Syphilis in all probability was unknown in these regions till the seventeenth and eighteenth centuries, when Europeans – Dutch and Portuguese – introduced it into Angola and the lower Congo. It spread thence to the Luanda Empire but obtained no great hold."

In Senegambia HÉBERT, 1880, found venereal syphilis of frequent occurrence.

The Guinea coast was especially infected. DANIELL, 1849, speaking of the conditions on the bights of Benin and Biafra stated that syphilis was perhaps the most frequent and fatal of the diseases there.

Similar statements were given from the Gold coast (CLARKE, 1860; the Cameroon coast (GRIFFON DU BELLAY, 1864) and Gabon (ABELIN, 1872).

Concerning the Sudan, PRUNER, 1847, stated that Turkish troops had introduced the disease into Kordofan.

It has already been mentioned in the previous chapter that in South Africa endemic syphilis 'njovera' has been found in Southern Rhodesia (WILLCOX, 1951, 1960) and 'dichuchwa' in Bechuanaland (MURRAY et al., 1956; MERRIWEATHER, 1959).

Venereal syphilis is of comparatively recent introduction and the infection was due to the contact with the whites.

In the first half of the 19th century venereal syphilis was rare among the Hottentots and still more rare in Bechuanaland (FRITSCH, 1867). LICHTENSTEIN, 1812, travelling in South Africa between 1802 and 1806, could not find syphilis among the Xhosas; the statements of LIVINGSTONE have been mentioned before.

SAX, 1952, refers to the '*Report of the Contagious Diseases Commission of 1906-07*', which found that there were several native names for syphilis but they were names for a newly introduced disease.

The Zulus call syphilis 'isifo sabelungu' (disease of the white men) or 'isifo sedolopi' (disease of the town). According to SAX, 1952, there are many signs that syphilis was brought to the east African coast during the 16th century. The southward migrating Bantu people, however, had little contact with white men. Syphilis was carried northward by the white colonists during the northward expansion of the European settlement at the Cape of Good

Hope. Sailors and slaves introduced more and more syphilis into the Cape Colony.

Hottentots invading Bechuanaland in the second half of the eighteenth century are blamed for having brought syphilis to the Bechuana natives. This was on a comparatively small scale, but a rapid spread of venereal syphilis followed the opening of the diamond mines in 1866, which attracted many labourers from distant tribes.

The 1906 Contagious Diseases Commission obtained evidence that the introduction of syphilis among the native population was of comparatively recent date. The disease was brought to the native villages by natives who returned from work at the mining centers, especially Kimberley.

It could be shown that syphilis had been unknown to the Xhosas and to the Fingoes in the forties and that it had been unknown in Basutoland before 1876.

For more details, the reader is referred to SAX, 1952. He concluded that within 40 years after the migration of Bantu workers to South Africa's newly established industries, syphilis had spread all over the country and that the rapidity of spread is comparable to that of the 15th century epidemic syphilis in Europe.

America

Based on the results of modern research, the present author assumes the existence of venereal syphilis and yaws in the Western Hemisphere before Columbus (JARCHO, 1964). There are prehistoric skeletal remains, although not in great numbers with lesions which, even judged very critically, have to be regarded as due to syphilis; in some cases yaws may have been the aetiological agent (J. C. TELLO, 1909; J. H. MEANS, 1925; H. U. WILLIAMS, 1932, 1936; W. L. HALTOM and A. R. SHANDS, Jr., 1938; H. S. DENNINGER, 1938; H. N. COLE et al., 1955; C. W. GOFF, 1953; T. D. STEWART, 1940 and 1941). The difficulties of making a correct diagnosis have been pointed out by I. BLOCH, 1901, 1911; T. D. STEWART, 1941, and S. JARCHO, 1964.

As mentioned before, prehistoric skeletal remains with pathological changes apparently due to syphilis have been discovered comparatively rarely in the Western Hemisphere; on the other hand, post-Columbian bones with gummatous lesions apparently due to syphilis have been found quite often in the South East of North America, in areas where Indians and foreigners had come into frequent contact (T. D. STEWART, 1940).

Concerning old myths and folklore, we know that in Mexico Nanauáztin was regarded as connected with bubas. He somewhat

corresponded to Tapeu in Guatemala. Among the Quiché of Guatemala bubas were regarded as a sign of great and powerful persons who got the infection from their relations with many women. The disease proved their virility and at the same time their wealth and social status, as ordinary people could not afford to live in that way (SCHERZER, 1857).

The story of Guagagiona, the mythical Indian hero who wished to have sexual relations with a woman but had first to treat himself, because he suffered from bubas, as told in the *Escritura* of FRAY ROMÁN PANE, has already been mentioned in the chapter on yaws.

LAS CASAS states that he had asked the Indians of Espaniola, whether bubas was an old disease amongst them, and got the answer it had existed from very remote times.

Several of the early Spanish chroniclers who described the various conquests in the West Indies and on the American mainland mention that many Spaniards who had intercourse with Indian women got bubas. The Indians themselves apparently suffered less from them. They used Guaiac wood for treatment (FUCHS, 1953, and note 4). Later authors regarded the mentioned infection with bubas as a proof that the Spaniards got syphilis. However, one must keep in mind that the name 'bubas' was applied to diseases of a different aetiology.

We know that yaws is normally a juvenile non-venereal disease which, however, can be transmitted during sexual intercourse. It seems to the present writer more likely that the Indians in the Antilles, who had a low living standard and were more or less naked, suffered more from yaws than from syphilis, although venereal syphilis may have been introduced from cities with a high civilization of the Mexican empire.

A mural in a ruined temple of about A.D. 200 at Teotihuacán, near the city of Mexico, shows a man with deformed legs and with dark spots (ulcerations?) all over the body, called the 'Buboso' by the local people (plate VIII). The picture may represent a man with yaws, syphilis or exanthematic typhus.

Among the early chroniclers who describe the Spanish conquest and mention 'bubas' one of the best known is GONZALO FERNÁNDEZ DE OVIEDO Y VALDES, 1526, 1535. He was the first to suggest that bubas were carried by the Spaniards to Europe soon after the discovery of Columbus; for some other early chroniclers see note 5.

BERNARDINO DE SAHAGÚN states that the bubas were of two different kinds, one kind produces soft moist condylomata and ulcerations – possibly yaws, the other kind causes a dry exanthema – possibly syphilis.

We may be very brief in dealing with the old, often discussed question whether syphilis was carried from America, possibly by the sailors of Columbus to a syphilis-free Europe or vice versa. This old question which has still nowadays representatives of both opinions (note 6) has become rather irrelevant, as modern research has shown that human treponematosi existed in different parts of the world since ancient times. One is justified in assuming that syphilis, both endemic and venereal, was present in the Western Hemisphere and in the Old World. Therefore it makes no great difference whether some sailors of Columbus carried venereal syphilis or yaws to Europe, or whether Spaniards and Portuguese carried endemic or venereal syphilis to America. Skeletons with lesions which could be attributed to syphilis, dating from post-Columbian times, have been found in the south-eastern part of North America, as mentioned before.

However, these considerations leave one question open which also will probably not be answered and definitively settled in future: The reason why in the last years of the fifteenth century and in the first decades of the sixteenth century syphilis spread in a severe form in Europe, and to judge from the just mentioned skeletal remains, spread also on the southern coast of North America.

Even if one admits that the reports may have been exaggerated, one cannot deny that the disease appeared with very severe destructive syndromes regarding skin and bones and was carried in this severe form to different countries, often in consequence of war (note 7).

Within 40–50 years the spectacular skin manifestations became much milder and syphilis showed itself as we know it to-day.

From the contemporary descriptions we see that in its severe form syphilis of the 15th and 16th centuries caused ulcerations of the skin with mutilations and also involvement of the bones. There are, however, no indications that the central nervous system was also involved.

Among the different theories which attempt to explain the appearance of a severe syphilis shortly after the return of Columbus from his first voyage, is the hypothesis that new, especially virulent strains developed and that strains against which little or no immunity existed, were exchanged between the Europeans and Indians. This not unreasonable assumption cannot be proved or disproved at present and will probably also not be proved in the future (SINGER and UNDERWOOD, 1962; CASTIGLIONI, 1941).

It may be regarded as certain that the sailors of Columbus had sexual relations with Indian women in Espaniola and that in all

probability some became infected with yaws or syphilis and brought the infection back to Spain where, however, syphilis at least in the endemic form already existed. How far these few sailors influenced the evolution of a severe syphilis in the Iberian peninsula and in Italy is difficult to ascertain, just as it is difficult to know how far Spaniards who might have had endemic syphilis were responsible for the appearance of numerous cases of syphilis which were traced by the finding of diseased post-Columbian bones on the south-east coast of North-America.

As far as negro slaves are concerned, there can be no doubt that, especially during the later years of the slave trade, when venereal syphilis was present in many African ports, negroes with venereal syphilis were shipped to the New World. Generally speaking, negro slaves transported to the Western Hemisphere played a very important rôle in the introduction of human treponematoses. The transmission of yaws has been pointed out by contemporary writers dealing with slavery in the Antilles. Slaves originating from more arid zones bordering on the tropical rain forest will to some extent have introduced endemic syphilis. According to the hypothesis outlined before, these two diseases may have contributed by their evolution to the appearance of venereal syphilis, independent from cases of venereal syphilis directly introduced from Africa.

The close relationship of yaws and syphilis and the possibility of an exchange of the clinical syndromes from one disease to the other was recognized by some writers long ago. In this connection, SYDENHAM's theory may be mentioned: THOS. SYDENHAM (1624–1689) was of the opinion that the bubas (yaws) had been brought by negro slaves from the west coast of Africa to America. There they became transformed into venereal syphilis, which was then transmitted by Spaniards to Europe. Subsequently it was carried from Europe to the different parts of the World.

SYDENHAM's theory is interesting but it does not pay attention to the time-factor. The appearance of a malignant syphilis in Europe occurred very soon after Columbus' return from his first voyage (1493), whereas the first negro slaves in greater number were carried to the West Indies and the American mainland only in the first two decades of the sixteenth century. Therefore they could not be responsible for the appearance of a severe syphilis in Europe during the last years of the fifteenth century.

Already in the past some authors expressed the opinion that syphilis existed both in the Old and in the New World. Among them are PADILLA, 1861, and CASTIGLIONI, 1941.

Numerous details regarding the history of syphilis will be found in BLOCH, vol. I, 1901, and JEANSELME, vol. I, 1931.

Merely as a curiosity it may be mentioned that JAUREGUI and LANCELOTTI, 1924, claimed that syphilis had originally been a disease of the lamas in Peru and that man had first got it from them by sexual acts (note 8).

There exist very many publications on venereal syphilis; for an excellent bibliography, see J. K. PROKSCH, 1966.

Notes

1. LEO AFRICANUS, Al-Hasan ibn Muhammad al-Wazzān al-Zayyātī (or al Fāsī) ca. 1485–ca. 1554, born in Granada, was in Egypt in 1516–17. During his return he was captured by Christian pirates, brought to Rome and was presented as slave to Pope Leo X. He was baptised in 1520 and got the names Johannes and Leo. He returned to Africa sometime before 1530, and died a Moslem in Tunis. There are no traces of him after 1554.

In 1526 he completed in Rome his 'Descrittione dell'Africa', which is composed of nine books; book VII, Terra Negra, describes the then unknown regions south of the Sahara; book VIII deals with Egypt. The work was first published by G. B. RAMUSIO as vol. I of his *Navigazioni e viaggi* (1550) (condensed from Encyclopaedia Britannica, vol. 13, 1964).

2. GIAN BATTISTA RAMUSIO, 1485–1557. *Navigazioni e Viaggi*, 3 vols. Vol. I 1550; vol. II 1556; vol. III 1559.

3. OLFERT DAPPER, born ca. 1636–1637, died 1689. *Description de l'Afrique traduite du Flamand*. Amsterdam 1686. In chapter: Du Royaume d'Angola, Ambonde ou Dongo: maladies pp. 362–363: "Le mal de Naples y est fort fréquent & personne ne s'en scandalise: on tâche de le guérir, par des herbes & des frictions, mais ce n'est pas avec tant de succès qu'en Europe."

4. "About 1508 a Spaniard who was suffering from syphilis went to the island of San Domingo and discovered that the natives used for treatment a local product, guaiac wood. He was cured by its use, and he set up as a seller of the wood. Guaiac at once became a favorite remedy and it was regarded as a specific for syphilis for at least a century." CHARLES SINGER and E. ASHWORTH UNDERWOOD, *A Short History of Medicine*. Sec. edit. Oxford 1962, p. 108.

5. Among the early chroniclers of the Spanish conquests who refer to bubas the following may be mentioned: PEDRO MÁRTIR DE ANGLERIA; FRANCISCO LÓPEZ DE VILLALOBOS; GONZALO FERNÁN-

DEZ DE OVIEDO Y VALDES; RUY DIAZ DE ISLA; FERNANDO COLÓN; FRANCISCO LOPEZ DE GÓMARA; ANTONIO DE HERRERA; BERNAL DIAZ DEL CASTILLO; FRAY BARTOLOMÉ DE LAS CASAS; FRAY BERNARDINO DE SAHAGÚN.

6. Many authors have written about the old question, whether syphilis originated in the Western Hemisphere or in the Old World. Only a few early and some recent ones are given in the following:

A. Americanists: GONZALO FERNÁNDEZ DE OVIEDO Y VALDES, 1526, 1535; RODRIGO DIAZ DE ISLA, 1539, 1542; FRAY BARTOLOMÉ DE LAS CASAS, 1561, 1877; J. ASTRUC, 1740; I. BLOCH, 1901, 1911; W. A. PUSEY, 1933; L. W. HARRISON, 1959.

B. Anti-Americanists: NICOLÒ SCILLACIO, 1944; FRANCISCO DELICADO, 1529²; FR. MARTIN SARMIENTO, *manuscr.* 18th century Madrid; RAFAEL FLORANES, *manuscr.* 18th century Madrid; FR. J. CLAVIGERO, 1844; K. SUDHOFF, 1912, 1913; H. E. SIGERIST, 1926; R. C. HOLCOMB, 1937; E. ISLA CARANDE, 1945; P. GONZALEZ RODRIGUEZ DE VERA, 1956.

Among the authors who held the view that syphilis had existed from early times in both, the Western Hemisphere and Europe are M. PADILLA, 1861, and A. CASTIGLIONI, 1941.

7. MEYER-AHRENS, 1841, collected early reports on the first appearance of syphilis in its severe form in Switzerland. He came to the conclusion that the disease had been introduced by Swiss soldiers who had served with the French troops in Italy on their return to Switzerland.

8. The experimental results of JAUREGUI and LANCELOTTI (1924) could not be confirmed by other workers. Syphilis is not a disease of the lamas. According to an old tradition, still existing in Peru, the Incas already had made laws against sexual acts of humans with lamas. This tradition may have stimulated the work of JAUREGUI and LANCELOTTI.

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² See C. H. FUCHS, 1953.

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