

Observations Made During The Epidemic Of Measles On The Faroe Islands In The Year 1846

By
Peter Ludwig Panum
Candidate in Medicine and Surgery

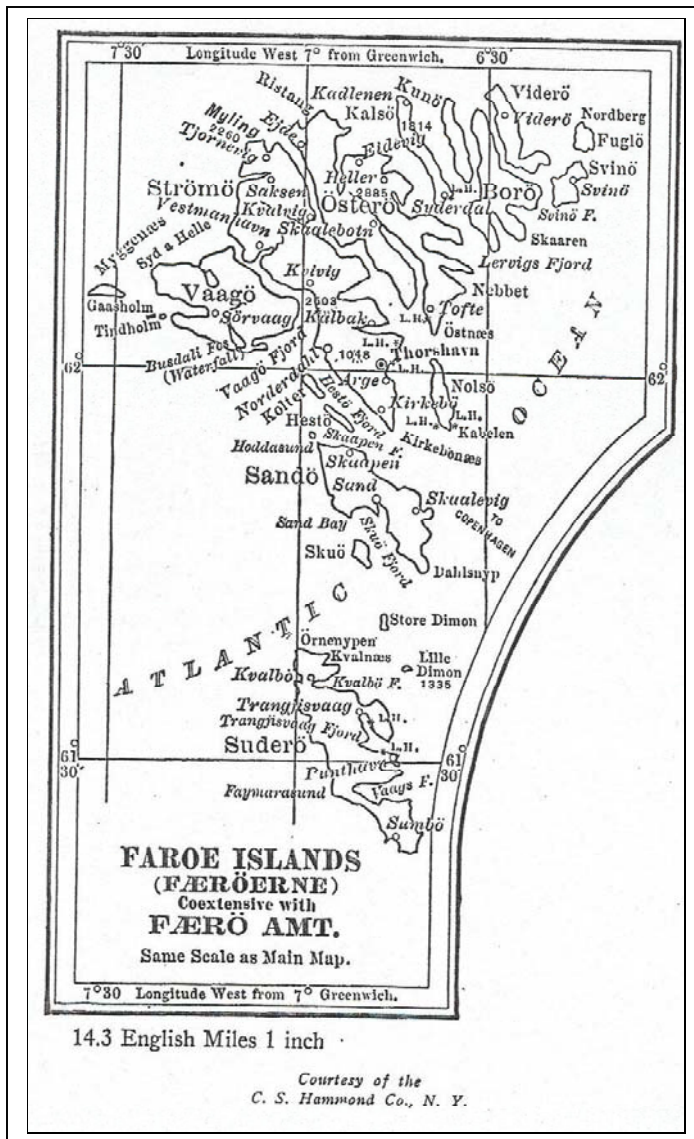
Observations Made During the Epidemic of Measles on the Faroe Islands in the Year 1846¹

When a physician is called to work in a place where climatic and dietary conditions are different from those to which he has been accustomed, his first problem is to study the hygienic factors which affect the state of health of the inhabitants. It is, in fact, these hygienic conditions which contribute towards the development and frequency of some diseases and the exclusion or rarity of others, and which more or less modify the symptoms of every disease; it is, indeed, these conditions that constitute the basis of the geography of disease, the special study of which subject will soon, perhaps, elevate it to the status of an independent science.

Since the outbreak of measles provided the occasion for my journey to the Faroe Islands (*See Appendix [1]*), it was natural that I should direct my attention at once to the influence which the extremely peculiar hygienic conditions of the islands exerted upon this disease, and vice versa. Moreover, because during my sojourn of almost five months (*See Appendix [2]*), on the Faroes, I repeatedly traveled over the greater part of the islands, I was therefore in a position to make a great many observations in regard to the influence of their special hygienic conditions upon the state of health in general, as well as upon the frequency and development of the prevailing diseases. To be able to give a complete nosography of the Faroes, a stay of several years would be necessary; what I here communicate consists only of some nosographic points and fragments, which may,

perhaps, be interesting merely because so little is known about conditions on the Faroes in this respect. I shall, then, try to set forth here the hygienic forces proceeding from the conditions on the islands, and as far as the observations I have been able to make permit me to do so, I shall attempt to show the influence which each of these forces in particular exerts on the state of health in general of the inhabitants, on the origin, development, frequency, and method of propagation of the different diseases, together with the mortality rates of the country, which I shall also seek to illustrate further by statistical data collected during my sojourn on the islands.

In another section I shall then present some observations in regard to measles, inasmuch as they may be of general interest to the medical public. If we first take tender consideration the physical conditions of the Faroe Islands, we find them, as might be expected, unique. The seventeen inhabited islands, the largest of which is about eight square miles (*See Appendix [3]*), in size, the smallest about one sixteenth of a square mile, are separated by fjords, in which the east fall and west fall of the Atlantic Ocean (*See Appendix [4]*), which are connected with the ebb and flood tides, produce in many places very powerful and dangerous currents. The islands consist of masses of volcanic mountains which belong to the trap formation, and which rise to a height of one, two, or three thousand feet above the sea. Inward, towards the fjords, the land ascends in terraces with grass-grown slopes; outward, towards the open sea, it usually ascends perpendicularly upwards.



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The situation of the islands in the midst of the Atlantic Ocean, about six or seven degrees farther north and nineteen or twenty farther west than Copenhagen, in great part determines their climate. In this summer (See *Appendix [5]*) the average temperature was about 80R, and it is usually between 70 and 80R; often, however, the stoves are kept heated in midsummer, the customs in this respect being governed entirely by the weather, which is very changeable. On two days during my stay we had 160 to 170 R.; and at this temperature both the native-born people and the government officials nearly perished with heat. While it is not so warm in summer on the Faroes as with us, in winter the cold is also less rigid: but during the latter season, the humidity of the atmosphere often causes the accumulation of considerable masses of snow, the rolling down of which in the form of avalanches does damage in many places.

The winds are exceedingly uncertain and violent; by turns, calms, and storms which may overturn the houses and indeed which are able to move blocks of stone, making it necessary for the traveler to throw himself on the ground in order not to be carried away, occur now and again. Although I was not able to make hygrometric investigations, I may state with assurance that the humidity of the air on the Faroes is extremely high. Almost always the high, frequently cone-shaped, mountain tops and very often the lower regions, valleys, seacoasts, and fjords, are shrouded in masses of mist, pleasing in their changing shapes; and clear air is rare. Because of the great humidity the standing of the barometer is usually low; indeed, not rarely points to earthquake without the occurrence of remarkable natural phenomena; for the same reason, the grass is nearly always wet and innumerable springs and rivulets leap down the sides of the mountains. The sea mists of the Faroe Islands seem to contain salt particles in pretty considerable quantities, as is clearly indicated by the salt crusts which cover the face after a rather lengthy trip in a boat, especially in foggy weather, even if the sea has been so quiet that not a splash has entered the boat; in unruly weather, moreover, the sea-water that is churned up is conveyed in the form of rain over the surface of the sea, and its salty content then reddens the skin and often covers it with a quite thick deposit of salt. Thunder storms are rare, but the aurora borealis often illumines the usually pitch-dark winter nights.

The vegetation of the country is limited to grass, small herbs, barley, and potatoes. Neither trees nor bushes thrive and, frankly speaking, even the efforts which certain government officials have made to promote, by the use of high enclosures, the fostering of currant and gooseberry bushes and of willow and service'berry trees, have not given any very cheering results. It seems to be less the temperature than the mists, blended with salt and other particles of seawater, in conjunction with the powerful winds, which hinder their growth. The ocean washes ashore numerous species of seaweeds, of which the hand-shaped weed, washed up in great quantities, deserves to be specially mentioned, because in times of need it is used for food.

The character of the Faroese landscape is about as different as possible from that of the pleasant Danish prospects. The inhabited places, without exception, lie close to the sea and are usually situated in valleys, which are enclosed on three sides by high mountains, terrace-shaped or rising in even slopes, and open on the fourth side towards the ocean. The flatter and lower parts of these valleys are tilled as fields, composed of small patches of ground, separated by furrows. These cultivated areas, called "böe" (See *Appendix [6]*), bear partly excellent grass, partly barley or potatoes. Outside the enclosure which surrounds the böe upon and between the mountains, lie the hill-pastures, which include by far the greater part of the country, where sheep and cattle go about at liberty. These pastures are covered everywhere with short but beautifully green mountain-grass, with the exception of the places (called "hamre") where the naked cliffs drop down perpendicularly, giving the mountains their terrace-shaped aspect, and of the mountain fissures and bare furrows formed by water courses and springs.

Since, moreover, the houses are low, being constructed partly of wood, partly of earth and hard stone, always thatched with green turf, and widely scattered over the home fields, it may be inferred that the landscape, the chief beauty of which is its green color, is as a rule neither very imposing nor pleasant looking. Only few of the inhabited places present with the shapes of the mountains, or with views of other islands and of colossal blocks of stone jutting out over the sea, or with waterfalls and lake-strewn plains, really attractive prospects, without, however, losing their stern, melancholy character. In the heart of the country, upon and among the mountains, the landscape bears everywhere, however diversified it may be, an extremely melancholy stamp. Above on the high plains the eye often reaches, within the limits of the horizon, only a level expanse, almost bare of vegetation, strewn over with boulders of greatly varying sizes; and here and there, where the mists part

for a moment, a distant, naked mountain peak. At other places in the interior of the country may be seen valleys, surrounded by mountains, partly bare, partly grass-grown, which sometimes conduct little rivers, sometimes enclose small lakes, and the soil of which is usually a morass of peaty earth.

Everywhere in these regions the deepest silence reigns, broken only by the murmuring tune of the streams and the calls of birds, whose lugubrious, monotonous tones are in harmony with the sombre aspect of the entire landscape. The most pleasing and, with their imposing, solemn character, most attractive landscapes are to be found on those coasts that face the open Atlantic. For there appear perpendicular, wall-like cliffs, attaining a height of perhaps 2000 feet, washed by powerful breakers, which have worn in them caverns as impressive by their size and solemn half-darkness as they are attractive by reason of their beautiful coloring. Outside these rocky walls, there are innumerable cuts and isolated cliffs, usually called "drenge," (See *Appendix [7]*) which often have the most wonderful shapes, now resembling triumphal arches, now colossal statues, and which often reach a height of many hundred feet. Both the "drenge," which are grass-grown on top, and the rocky walls, even, serve in many places, particularly in the bird-mountains, as they are called, as dwelling-places for innumerable sea-birds; these birds, particularly sea-parrots, auks, loons, and in certain spots gulls, sit on shelves, as it were, which are formed by the strata of the mountain-masses, all the way up the cliffs, and their squalling and shrieking enliven the scene.

The reader will excuse me if I have been more detailed in this description than might, perhaps, appear suitable here; but I believe that all the circumstances cited and especially those in regard to the character of the landscape have a not inconsiderable influence, as will be easily perceptible later, on the health of the dwellers on the what detailed description of conditions that exist there. First, as concerns the raw and cold climate that has been described, it will have been concluded already that it might cause many cases of rheumatism, which are, in fact, quite common.

During my stay I saw a great many cases of constant as well as of transient rheumatic pains, many rheumatic hydrarthroses, with consequent tumores albi, many cases of heart disease, and certain cases of paralysis, which appeared to be of rheumatic origin, and some cases of rheumatic fever. Following measles, diarrhea and violent colic pains were frequent, as well as vomiting and considerable prostration, just as in the so-called Danish cholera. These symptoms appeared, in different degrees, to be sure, in almost all measles patients who had been exposed to the cold too soon, and often disappeared quite as quickly as they had come if a suitable regimen, along with the medicines which each symptom indicated, had been prescribed and used; whereas, on the contrary, with an unsuitable diet, they became chronic, especially the diarrhea; and there is no doubt at all that they were in most instances, in the beginning, of rheumatic origin.

It is, moreover, only natural that all sort of rheumatic infections should be especially frequent on the Faroe Islands in that the occupations of the inhabitants, particularly in the summer, require them to spend the greater part of the day in the open air; and their attire, which is the same for summer and winter, is not in all respects adequate for its purpose. Thus their footgear consists of long stockings and a kind of shoe or sandal sewn with strips of lambskin, so thin that the soles are often worn through in one day. As soon, therefore, as they emerge from their houses and go into the wet grass, or upon the swampy ground, or wade the rivers, they get their feet wet; and in regard to this matter they are so indifferent that they neglect to change their footwear even if they have opportunity to do so.

In many, particularly the older men who often do not use suspenders, the center of the abdomen is covered only by the woolen shirt, which, by the way, nearly all wear next to the body, because the vest or jacket above and the knee-breeches beneath do not meet each other. From this description of the climatic conditions, it will have been anticipated that chronic infections of the bronchial mucous membrane are of frequent occurrence. Chronic bronchitis is, without doubt, one of the commonest diseases on the Faroe Islands; to which fact not only the raw, cold air, but the salt particles suspended in the mists, which may cause even erythema of the skin in those not accustomed to them, appear to contribute much. This disease often persists so long that the patients die of it with hectic symptoms, and, according to information which I have obtained, appears to be one of the most frequent, if not the most frequent, causes of death among the older people on the Faroes.

Scrofulosis in its various forms no doubt occurs on the Faroes, and the related tuberculosis is not unknown on them; but both are rather rare diseases in any case, a conclusion which I feel justified in drawing, as far as tuberculosis is concerned, from the fact that though during my stay I examined certainly many hundreds of patients, I discovered only two in which the stethoscopic signs enabled me to diagnose phthisis with assurance. On the other hand, I saw a considerable number of patients who were hectic evidently as a consequence of chronic bronchitis; at least, auscultation and the progress of the disease argued in favor of this diagnosis, of which, very unfortunately; I was not able to get the clearest proof by undertaking necropsies, as the Faroe folk would by no means permit them.

Since malaria is a disease entirely foreign to the Faroe Islands, as we shall hear later, Boudin's (*See Appendix [8]*) assertion as to the antagonistic relation between malaria and phthisis might be used as an argument against us, in that the idea might be conceived from it that phthisis is very common on the islands; and at first glance, such might actually seem to be the case, if, for instance, distinction were not made between really tuberculous patients and patients who are hectic as the result of very prolonged bronchitis. But the great humidity of the atmosphere, which on these islands is not to be attributed to the soil but to the surrounding sea, and the fogs of which, therefore, cannot contain the constituents that characterize swamp air, but on the contrary particles of chlorine and salt and the like, might well be supposed to oppose at the same time the development of malaria, which flourishes best in an atmosphere moistened by swampy soil, and of phthisis, which is most destructive in torrid and dusty regions—even if we do not take into consideration the contradictions which Boudin's assertion, though justly supported in great part, has encountered. It is, however, very difficult to decide whether the fact that scrofulosis and phthisis appear to be so rare on the Faroes is due to the influence of the climate or to that of the food, which is very largely animal.

That chest infections, particularly chronic bronchitis, were far more frequent than usual during my stay on the Faroes, when measles was prevailing, is natural. In making the above assertion regarding the frequency of bronchitis as a disease and cause of death, I have not, therefore, taken account of those cases in which measles was the starting-point of chest infections; and I support my assertion Only on the many cases which I have observed in which the disease had no connection with measles, and in which there was found no sign of tuberculosis of the lungs; together with the fact that among the causes of death given on the church registers scarcely any other is found as often as "chest complaints." Pneumonia was far rarer, at least during the epidemic of measles; I saw only eight cases of it, which, however, offered no plain stethoscopic sign, but in which the glutinous expectoration, from which I washed out Remak's (*See Appendix [9]*) fibrinous, ramified bronchial coagula, did not permit me to doubt the accuracy of my diagnosis.

Whether the menstrual disorders so extremely frequent on the Faroes, bringing the whole host of hysterical infections in their train, are due to colds from the raw and cold climate, from getting the feet wet, which even many of the women cannot well avoid, and especially from going out into the mountains to milk the cows, or whether these disorders are due to the very sedentary life which is the lot of most Faroese women, I cannot decide with certainty; but the former appears to me to be probably the most frequent cause of these troubles.

As another occasion of colds, the fact that the Faroese women never wear drawers should not be passed over in silence. If it were desired to write something about the skin diseases that are rather frequent on the Faroes from the effect of the climate, urticaria and psoriasis would be named. The latter infection is not rare on the Northern Islands, though I saw it only among the men and, in particular, on the lower extremities. This fact might lead to the assumption that the effect of the salt water on the skin is responsible, the more plausibly in that the Northerners are occupied mainly with the sea. That the effect of salt water, whether encountered in the sea-water itself or in the mists, is not without influence upon the origin of skin diseases was exemplified by my own experience; for every time I went on a trip that lasted a few weeks, a combination of urticaria and eczema appeared on my hands, which, especially in warm weather, caused an unbearable itching, but disappeared if I remained for some days in one place, and ended with desquamation. Whether the remarkable abnormalities of desquamation after measles, especially its extraordinarily long duration among men² in particular, should be

² In the case of a man, I saw even in the eleventh week following the measles a considerable desquamation on the hands, elbows, and over the spina tibiae; in many cases desquamation was still present in pretty marked degree seven weeks after the exanthem had disappeared.

ascribed to the same influence, I cannot tell. Since it has been proved that the frequency of mental diseases is generally in direct proportion to civilization and its accompanying social collisions, it might be surmised that these diseases are extremely rare on the Faroes, inasmuch as civilization has certainly not attained a high degree there, and the social collisions so agitating to the mind, under the patriarchal conditions which prevail, are proportionately very few. But on the contrary, there is hardly any other country, or indeed any metropolis, in which mental diseases are so frequent in proportion to the number of people as on the Faroes.

Unfortunately I am not able for the moment to present positive statistical data in regard to this proportion³; but I have been in most of the towns of the islands, and can assert that in nearly all places that are inhabited by 100 or 200 persons, one or more weak-minded persons are found; and I do not believe that I am exaggerating in assuming that at least one per cent of the Faroese are mentally weak. This fact is the more striking because the Faroese in general are endowed with excellent mental powers. A remarkable consistency in the form of the diseases is observable. Many exhibit a quiet religious belief that they live in direct communication with the spirit world, with Christ, the Holy Spirit, the Virgin Mary, and so on; perhaps still more believe themselves beset by evil spirits, which compel them against their will to act in a manner contrary to their better knowledge and desires, so that, when they are unruly, they knock about and destroy the things around them, and later subside into melancholy, angry grumbling. Both forms seem to pass rather rapidly into feeble-mindedness, which appears in others at birth or at puberty. If I have described the Faroese landscape in unusual detail, it is because I feel almost certain that the impress made upon the mind by the character of the landscape, supplemented by the frequent fogs, is the most potent predisposing cause of the frequency of mental diseases on the Faroe Islands. Without attempting to draw a parallel with the Alpine cretins, I shall permit myself to call attention here to a few circumstances which strengthen my views. To an unbiased observer it is unmistakable that the character of the landscape is reflected, so to speak, among the Faroe folk in the kindness of the national character. Probably the physical and psychical exercise which the nature of mountains always requires of their inhabitants, and which is rendered necessary, moreover, on the Faroe Islands by the struggle against the boisterous ocean, produces in the Faroese the same liveliness, thoughtfulness, and vigilance, which characterize the inhabitants of most mountain regions; but yet there is always a certain seriousness in the Faroese; left to himself, he is introspective, and even his cheerfulness, though sometimes combined with a noise like the roaring of the sea, is also extremely monotonous and often almost melancholy. In expressing his opinion, he is usually reticent and not sincere; he is often as hollow as the cliffs of his islands.

The isolated social life and the common dangers occasioned by natural conditions certainly tend to strengthen greatly the feeling that all men are brothers, and it is to the praise of the Faroe folk that they show forth this feeling by their actions. Sympathy is very easily aroused in the mind of a Faroese, and "with Christ—like compassion," he is ever ready to extend to the needy prompt assistance, whether I be with work, provision, clothing, or money, however high a value lie is accustomed to set on these things. The grandiose stamp which the Faroese landscape so often bears, and the mystical effect which mists, clouds, breakers, waterfalls, cliff-caves, and so forth, inevitably exert upon every open mind, must awaken in every thinking and feeling person's thoughts of God's omnipotence and man's insignificance, which tend to stir and foster a religious inclination.

This is found in high degree among nearly all the Faroese; but, sad to say, it must be stated that, very probably in great part because of the influence of the earlier priests, it often borders on bigotry and appears like hypocrisy; thus, the names of God and of Christ are forever on their lips; to perform any work whatsoever on Sunday is regarded as a great sin; to attend the services of God and diligently to observe the sacraments of the altar are, on the other hand, works especially pleasing to God; and the priest is looked upon as a superior being, very nearly akin to the deity, however envious the people are wont to be of his income. Moreover, their sense of freedom and pride, which protests vigorously against any condition of dependence, and which makes it necessary for persons in office to beg, yes; even importune, to pay, and to express thanks every time he wants a service of a Faroese, appears to stand in at least partial connection with the physical character of the country, since the same trait is found among most mountain and seacoast people. Still more indicative of a mental impress unconsciously received from the character of the natural surroundings are the differences in

³Dr. Hübertz's (See Appendix [10]) estimate that on the Faroes only one insane person is found among 277 individuals is manifestly too low; and yet, according to the survey reported by him, even this proportion is almost twice as unfavorable for the Faroes as for Copenhagen

this respect among the inhabitants of the various regions—in fact, even of the individual villages—which are in harmony with the character of each region or village.

Of this I might offer many very remarkable examples: for instance, the difference of the Northern people from those of Sandø and Suderø, the special stamp of the Tjørnevig people, and soon; but it would take too long to enter into further discussion of this subject, and, moreover, it would scarcely be possible to make it understood by those not familiar with the localities. Concerning the agreement which exists as to the ways in which mental diseases are manifested among the Faroese and the harmony between the aspect of mental diseases and the imprint which the mind unconsciously receives from the Faroese landscape, I believe all will agree with me in thinking that the peculiar natural conditions are probably the most important predisposing cause of the mental diseases of the Faroese, in regard to which the usually very low level of the barometer is perhaps also of significance.

As factors which seem partly to develop this disposition, partly to furnish an occasional cause for an outbreak of these diseases, I think the following circumstances, evoked by social conditions, should receive special consideration. Lucas Debes, (*See Appendix [11]*) in his *Faeroea resetala*, expressed the view that devilish vexation and Satanic delusion by fairies, hobgoblins and mermaids, had become less frequent than in olden times, through the power of Christianity, but were still (1650) far from having ceased to haunt the people. He cited many examples, derived from his own experience, which also show what power the prayers of a God-fearing priest have frustrate the spell of the evil one. These superstitions continue among the people with the exception that the more enlightened believe that Christianity has become so mighty in our time that such super-natural beings do not dare to show themselves on the surface of the earth, and that the priests are no longer so well instructed in the “black art” (*See Appendix [12]*) in Copenhagen.

Not very many years ago it seems that Faroese priests were still trying, probably because they felt flattered at enjoying a more than human dignity, to dupe the people by trickery and to make it believed, by soothsaying and sorcery, that they themselves were in immediate communication with the higher powers, and could heal the sick by witchcraft. At this day the country folk come frequently to the priests and offer to pay them to bring back people, especially children, who are lost in the mountains, or to make their influence with the higher powers bring forth the best results for a dear sick one. But to tell the truth, no Faroese priest of our day encourages the common people in superstition or bigotry, but, as would be expected of enlightened men, all combat these errors by word and deed to the best of their ability.

The reserve and lack of sincerity of the Faroese towards the Danish have doubtless been increased and fostered by the fact that in recent times so much has been written, by persons not well acquainted with the circumstances, about the grievances of the Faroese in regard to their language, school conditions, and so forth; but it is equally certain that the characteristics mentioned were not produced by such an influence.

The drinking of distilled liquors has not become really general on the Faroes, only a few persons, who are confirmed drunkards, using them habitually; but on holiday occasions or on journeys great quantities of distilled liquor, which, thanks to the market, is certainly pretty thin, are drunk. If, however, consideration is taken only of confirmed drunkards, who, as we have said, are rare on the Faroes, I believe that a closer investigation than I was able to make in regard to the matter would show that, among the Faroese inebriates, relatively more become delirious than with us, a fact that would indicate a predisposition of the Faroese folk to mental infirmity, and this again must be ascribed to the probable influence of the natural surroundings. According to the statement of an official intimately acquainted with conditions, onanism is probably not rare on the Faroe Islands. Among other examples, I can cite the instance of a mother who, when her son desired to marry, forbade him to do so, and taught him to practice onanism as a substitute. The unfortunate fellow carried this habit to such excess that his mind became weakened; and in his more lucid moments he cursed his mother with the most horrible oaths, because “she had wasted away his oil of life.”

Although the fact that circumstances frequently do not permit marriages that are wished for, and that debauchery with the other sex often appears dangerous to the prudent Faroese, might in part explain this perversion of the sexual instinct, yet it seems to me not unlikely that the disposition which the unconscious impress of nature produces in the inhabitants may develop a sort of predisposition to this vice, which, too,

again both develops an attending disposition to mental disease and becomes a powerful occasional factor in its evolution. Yet it is impossible, of course, to decide whether this vice is more general on the Farces than in Denmark. If after this little digression we turn to a consideration of hygienic conditions associated with the mode of life of the Faroese, we find them not less different from ours than the physical conditions described above.

First, as concerns their food, the Faroese have three principal meals: breakfast, from eight to nine, dövre (See *Appendix [13]*), from twelve to two, and nötttere, or evening meal, from nine to ten in the evening. In the morning they have milk, oftener sour than sweet, and with it "drujl" and "skjaerpekjød." (See *Appendix [14]*) "Drujl" is unleavened barley bread, generally baked the evening before it is to be used, but by some preferred hot, and in that case prepared in the morning shortly before it is eaten. It is made of flour and water, and is formed into rounded sticks, about a foot long and from one and a half to three inches thick, which are usually baked only by being laid on hot embers or coals; only a few bake them on grates. In consequence of this method the crust is burned but the dough inside often remains quite raw.

At butchering time boiled lamb's blood is used instead of "drujl" especially by the poor. "Skjaerpekød" is wind-dried lamb's meat. In the autumn the sheep and lambs designated for slaughtering are shut up in readiness, and in one process, or at least as rapidly as possible, every man butchers his own lot. The bodies are flayed, eviscerated, and, without any kind of preparation, hung up to dry in an outhouse. Although probably some influence⁴ towards preserving the meat may be ascribed to the salt particles suspended in the mists, yet it must undergo a considerable degree of putrefaction, which differs, however, according to the weather that prevails during the winter while the meat is drying. By Shrovetide the skjaerpekød is generally ready for use; it is carved into small pieces for consumption, and is eaten raw with the drujl. Later on in the summer the Skjaerpekød gets full of maggots which still further increase its rank odor and taste.⁵ Dövre, or midday meal, consists of two dishes.

One dish is usually soup, that is, barley meal or barley groats boiled in water, with a goodly addition of "baut," which means all sorts of fat things especially rancid tallow and other rancid fats. More rarely porridge is used, with which also they always cook a good deal of baut; this is eaten mostly with sour milk. The other dish, which, by the way, is eaten first, consists of "rast," that is, half-spoiled meat or fish. The same method of preserving meat which is used for lamb is used also for grind meat,⁶ fish, or bird meat; all are hung up to dry without any preparation by salting, smoking, or the like. In the course of several months, when the meat (or fish) is neither fresh nor wind-dried, it is called "rast," a word that can be translated by no other term than "half-rotten," an epithet fully merited by this meat, considering the abominable odor it spreads, its unpleasiug, mouldy appearance, and its not infrequent occupation by maggots.

This "rast" meat is usually cooked before it is eaten, although some people prefer to eat it raw, especially when it is becoming some- what wind-dried, I have seen a whole boat's crew (eightmen) eating raw grind meat with great appetite, although it was so badly putrefied that its stench nauseated me in the open boat; while the bottom of the boat was white in places with insect larvae, which had partly crawled out, partly been picked out of the meat. In case there is no "rast" meat or fish, skjaerpekød or "grind twist," that is, wind-dried grind meat, or dried fish is eaten, and always in the raw state.

The evening meal (nötttere), which the Paroese are accustomed to take just before they go to bed, is essentially the principal meal and consists always of a dish of hot meat, chiefly fresh meat or fist, the fatter the better, and usually accompanied by potatoes. If there is lack of fresh meat or fresh fish, which are to be had only in the butchering season or when there has just teen a bird-catching, hunting or fishing excursion, "rast" meat or "rast" fish is used, with salted grind lard. As a drink during or after meals boiled milk, which is generally

⁴ This influence cannot be great, since experience shows that Skjaerpekød becomes more rank the foggier the weather is while it is hanging out, even after it has dried.

⁵ Even the officials, as a rule, grow accustomed to Skjaerpekød pretty quickly and often consider it quite dainty. I could not, however, by any means find any pleasure in this food, which was so disgusting that it nauseated me.

⁶ Grind are a species of dolphin, which swim around the shores in great schools of 100 to 1000, and which, when a school strays into a fjord, are driven upon the shore and killed; such a grind drive is the greatest delight of the Faroese

separated by rennet or vinegar, is used, or else a mixture of sweet and sour milk, or the soup mentioned above. It is remarkable that chicken meat is disliked by most Faroese.

Festival dishes, such as knyttlinger, or boiled fish rissoles; skjaerpekød, or lamb's meat, first cooked and then salted and dried; roast meat of all kinds; cooked or salted beef, and pork or bacon; separated milk, cooked with raisins and currants; toiled or roasted mussels (*mutilus*) and limpets (*patella*); peas, boiled rice, boiled eggs, pancakes, cakes, rye biscuits, rye drujl, and fine wheat bread are not seen so often, because not even the richest indulge in such rarities for daily use. Special among the Faroese delicacies is the much-liked kvanner, the peeled stalks of *Angelica archangelica*. These are usually eaten by themselves, but sometimes the well-to-do have sugar and cream with them, as we eat strawberries. Children like to eat sorrel also, which grows wild.

Tobacco is used even by the women, who smoke chalk pipes of the size of thimbles. Coffee is used in general only by the more wealthy people, but at trading-places many poor people are addicted, so to speak, to its use. We have previously touched upon the use of spirits. Wine is employed for daily use by none of the Faroese, but it is not seldom used as a universal remedy, as also are "heart-strengthening drops," or Hoffmann's anodyne, and the like, which are used almost habitually by an exceedingly large number of women. If on no other ground than that people are disposed to consider the food to which they are accustomed as the wholesomest and best, every Danish person will certainly regard such food as very unwholesome.

The Faroese likewise find it as disgusting, however, that we eat old Norwegian cheese as we that they eat half-decayed grind meat, and so forth. They usually think it as absurd that we ruin our good lamb's flesh by salting it, as we do that they make skjaerpekød of it. Again we are strengthened in our idea that the Faroese food is unwholesome by investigating the physiological effects of the different Faroese foodstuffs; these effects we shall now briefly review.

The fresh and still warm unleavened bread (*drujl*), almost raw, is even less digestible than freshly baked rye bread. It is certainly not without effect upon the dyspepsia which is so frequent, associated with cardialgia ("heart-evil") and pyrosis, among both men and women but particularly the latter, who lead more sedentary lives. The "rast" meat of all kinds produces cardialgia and pyrosis, but a more constant effect, when it is eaten in quantities, is diarrhea. Since the bird-catching is done in the summer time, by autumn the bird meat has of course become "rast"; this explains the fact that, as a trustworthy Faroese, well acquainted with conditions, assured me. The inhabitants of Viciør and all the places where there is much bird-catching, suffer in the autumn and winter almost constantly, more than other villagers, from extremely tedious and exhausting diarrhea. Likewise, according to the statement of a certain man, when there has been a catch of grind whales in a village, the residents who get the most grind meat usually suffer from diarrhea as long as they have any fresh or "rast" grind meat.

The flesh of the grind-whale, which is quite lean, tastes, by the way, like coarse beef and, prepared as we are accustomed to handle it, may afford good food; but the Faroese eat with this lean meat a quantity of fat, and only a relatively inconsiderable proportion of the meat is eaten while it is somewhat fresh. "Rast" fish also causes diarrhea. It is, moreover, natural that since the degree of putrefaction at which the meat arrives while it is hanging tip to dry depends upon the weather, this diarrhea, which usually prevails in the autumn, is more violent and makes its appearance earlier if the summer and autumn have been unusually humid and yet quite warm, as was the case in the summer of 1846, which was the most humid that the oldest people of the Faroe Islands could remember.

The fatter the fresh meat, the more it is preferred by the Faroese. Halibut are caught rather frequently, and the livers of coal fish (*See Appendix [15]*) and of haddock, which are well-known to be very fat, are prized as most delicious morsels. Such quantities of fat likewise cannot have other than a purging effect and, in persons who have weak stomachs and who sit still a great deal, cause disturbances of digestion. The wind-dried meat, with its rank taste and smell, quite clearly cannot be classed among easily digestible articles of food.

Taking sour milk the first thing in the morning and when out on arduous mountain trips, and drinking ice-cold river-water in considerable quantities, which few refrain from doing, must often give the inhabitants occasion for colds in the intestinal canal. "Kvanner," when eaten in large quantities, always cause a burning sensation in

the back of the throat, almost like that of senega root, and cardialgia, pyrosis, nausea, vomiting, diarrhea, sores on the lips and in the mouth, and general derangement of health. The outer rind of these stalks, which are peeled before they are eaten, but not always with proper care, is such a powerful rubefacient that it is very common to see sores, psoriasis-like places, and erythema on the children's arms and legs, which appear when they go out in foggy weather to gather kvanner. If these foodstuffs have such an effect on the healthy organism, it is the more obvious that they would be injurious during and after any febrile illness.

There was special opportunity to observe, this during the epidemic of measles, I or in spite of all admonitions, many continued to use their ordinary food both during and after the measles. This was partly because of the power of habit, which is so strong- that the inhabitants prefer their usual food to any other and are wont to consider it the most wholesome under all circumstances, and partly because of inability to obtain more suitable victuals. As a rule, the poor Faroese earns, for instance, only as much as he will consume on the following day; only of "rast" or dried fish and grind meat has he usually a little ahead, but of grain, especially in summer, rarely more than a half-bushel or one or two bushels; and the greater number of the inhabitants may be called poor.

However considerable the offering which the almsboxes may receive in the summer, the number of the needy is so great, and the dwellings are so remote, that it is impossible for all to receive timely assistance. And so, if the small reserve of grain which was to be found in a house at the outbreak of the disease was used up for barley soup and the like, while, perhaps, all the family had measles at once, during convalescence they had to return to their usual food. Not many at one time could have barley or oat soup during measles, but some had to be content with milk, usually sour; some, who had the disease in mild form, used the ordinary Faroese food the whole time.

After measles they generally found the more reason for eating "rast" meat and fish, and fat and very rancid "haut" in the soup, in that they felt weak and seemed to need something strengthening, and they regard the strongest tasting and most indigestible food as the most strengthening. It was no wonder that after measles the majority came to stiffer from very prolonged diarrhea (frequently persisting for many months), often dangerously exhausting to the strength. It occurs to me as very probable that the inflammation which during the exanthematic fever is found in Peyer's glands, has proceeded into ulceration, in many instances, because of the irritating effect of the food; although, for the reason stated above, I was not able to prove this by making necropsies.

The slimy, often light yellow, and odorless character of the excrements, together with the long continuance of the diarrhea and the associated loss of strength, pointed strongly to this conclusion. Generally speaking, I may assert that gastric infections, and especially diarrhea, which occurred after measles, were most prevalent in the poorer districts, where the people live chiefly by fishing, and in those where grind-whales are caught; whereas the wealthier and more enlightened in each village, who could and would restrict themselves faithfully to the prescribed diet, were quite exempt from this unpleasant sequel, or else, as the result of committing some indiscretion, suffered from it for only a short while; on the other hand, the poorer and more ignorant the occupants of the house were, the more common and severe it was.

Besides the harmful effect which the Faroese aliments exert directly upon the intestinal canal, it should be mentioned that hemorrhoids, plethora, and lithiasis are quite frequent diseases on the Faroe Islands, facts which are easily explained by the preponderance of animal food. The Faroe folk, however, are remarkable for excellent and durable teeth. Canons teeth are seen very seldom among the Faroese proper, and often persons of seventy years of age are observed to have complete sets of teeth, of which, though, to be sure, the crowns are usually worn off, as they are observed to be in the skulls of Greenlanders. This condition of the teeth must probably, then, be attributed partly to the firmness and toughness of the food afforded by the dried meat, and partly to the cleansing which is quite involuntarily given the teeth every time a mouthful of "drujl" is taken.

When a Dane would utterly condemn the Faroese food, after what we have stated here regarding it and its effects, and would boast that his food is better, we should at the same time call his attention to the fact that there is some uncertainty as to whether the Faroese or the Danish food is, on the whole, the more nutritious. When we later come to compare the rate of mortality on the Faroe Islands with that of Denmark, we shall see

that, while the greatest mortality among us is found between the sixtieth and seventieth years of life, on the Faroes it is between the eightieth and ninetieth years; and the average length of life, which with us is 36 years, is 44^{2/3} years on the Faroes, though in this estimate the stillborn are counted.

Hereby it appears that the Faroese food is not quite so unwholesome as might be supposed on first consideration, Nevertheless I am convinced that it might and should be very much improved, so that the longevity of the Faroese would become still greater; since the specially favorable rate of mortality on the Faroes, as I shall later seek to show by statistical data, may also certainly be regarded as due to the freedom of these distant isles from many of the diseases which prevail among us. The Faroese houses are constructed in part of boards; the best are lined partially or entirely with tarred planks, and are covered outside with tarred planks; but others are only lined with planks and are enclosed by walls consisting of stone, earth, and grass. Almost without exception the roofs are thatched with green turf.

The dwelling houses proper are of different sizes and arrangements according to the means of their owners. The houses of the poorest folk consist of only one room, which serves at the same time as kitchen, living-room, sleeping apartment, place for keeping chickens, and so on. The only door of this room, which is not lined with boards, is about four feet high; the floor is of earth; there are no windows at all, but a quadrangular hole in the roof, which may be closed by a shutter, serves at once for entrance of light and exit of smoke. The beds are arranged like berths, lengthwise around the walls, and beside them there is commonly a bench. An apartment thus arranged is justly called a "røgstue" (See Appendix [16]) for it is usually so full of peat-smoke that it is often difficult to understand how human beings can breathe in such an atmosphere. The Faroese, however, really seem to take pleasure in air laden with peat-smoke, for I have frequently seen people sitting by the fireplace drawing into their nostrils with true delight the peat-smoke from the burning pile; and ancient traditions show that the Faroe folk even in olden days could well tolerate smoke and sometimes used it to smoke Danish people out. As for me, I was not seldom obliged to rush outside repeatedly to draw breath, before I could finish seeing and examining measles patients, who lay inside untroubled by the atmosphere to which they were accustomed. In our time, however, very many even poor Faroese are accustomed to have besides the smoke-room, which is always arranged in essentially the same way (except that among the wealthy it is larger and furnished with a sort of chimney) and is an indispensable part of every Faroese dwelling, another room, rather small to be sure, called a "glasstue," an apartment with glass windows, plank ceiling, and plank floor.

Only the wealthiest al-c wont to have, in addition to a capacious smoke-room, which is often used as a living room but always as a common eating room and a place for the servants to sleep, a pantry, and several glasstuer. One of the latter is kept unoccupied so that officials and other important visitors may be received in it; this room is usually very tidy, and it always contains, along with other furniture, a well made-up canopied bed. A second glasstue, where the weaver's stool stands, has generally a pair of beds; and sometimes there is a third glasstue, which most of the family use as a living and sleeping room; these last two apartments are not usually remarkable for the cleanliness which is observable in the state parlor.

The features of the Faroese dwelling which may be supposed to be injurious to health are the following: 1. The peat-smoke with which the atmosphere is impregnated. 2. The dampness and bad air, which are attributable partly to the dirt floors of the smoke-rooms and to the damp earth of the walls and roofs that, even in glasstuer with wood floors, is just beneath the boards; and partly to the contracted dimensions of the houses, as well as to the meagerness of the amount of air to the individual, which is diminished still further in the glasstuer by the use of auxiliary stoves. 3. The drafts, which are encountered particularly in the smoke-rooms. It is obvious that these factors must have had an especially injurious influence during the epidemic of measles but their effect is perceptible at other times also. Chronic blepharoadenitis and conjunctivitis are very prevalent among the older folk and in time are liable to pass over into lippitude.

Though the climate has certainly no happy effect on these eye infections, it seems probable, nevertheless, that the most important cause of their frequency is the peat-smoke of the smoke-rooms. This assumption is strengthened by the frequent occurrence of these infections among old women, who make their abode in the smoke rooms and go out very little into the fresh air. It is evident that chronic bronchitis, also, and all sorts of colds, the prevalence of which must be attributed mainly, however, to the climate, are promoted rather than counteracted by the arrangement of the houses. That leukemia (See Appendix [17]) and chlorosis, by reason

of conditions depicted above, are not more frequent than they actually are must surely be due mainly to the strong animal food. In only the most wretched of all the huts did I see leucemic and chlorotic women; I do not recall seeing any leucemic men on the Faroes.

It might be thought that Bright's disease would probably take hold in such houses but, as far as I could perceive from my investigations, such is not the case. I was consulted not rarely by old people with oedema of the legs, and I always examined their urine by boiling it in a test-glass but never found albumen in it. On the other hand, a very close examination almost always proved the presence of heart disease. We have already referred to the clothing, which does not adequately protect the body from the rigors of the climate, We need therefore make no further mention of it here except as regards its uncleanliness.

That, as a rule, it is of woolen stuff outside and inside is certainly in conformity with its purpose, as far as the climate is concerned; but it is clear also that vermin, for instance lice, and itch mites, thrive in the woolen shirts which are seldom changed. The odor which the clothes of the Faroese acquire from the fact that they wash their garments in urine, whereof the production of the whole family is preserved in a great vat, appears to be not unpleasant to these small animals; at any rate itch is an extremely common disease, and very few families are free from lice. As among the most important hygienic factors, the daily occupations of the Faroese should not be passed over in silence.

The employments of the men are, in particular, tending to sheep, fishing, bird-catching, a little agriculture, and peat-cutting. All these occupations keep them out in the open air, especially in summer, and require considerable physical exertion. By this they are hardened and become able to digest their tough food, but as discussed above they suffer very greatly from the effect of the climate.

Occasions which call for surgery, such as fractures, luxations, wounds from falling, and injuries from the knives⁷ which they always wear like poniards, at the side in cases, are also common; and hernia is not rare. In winter the men also stay more in the houses and help with making up the wool and sewing clothes. The activities of the women usually keep them in the houses, where they attend to the cooking and washing and all the other indoor occupations, especially knitting woolen jackets and stockings, weaving, and the like. Milking the cows is the only task that requires the girls to go out on the mountains, and at harvest time they help with housing the hay and with gathering and drying the grain.

Sitting still so much, and staying in the corrupted air within the houses, cannot do otherwise than promote hysteria, digestive disturbances, disordered menstruation, and so on, among the women; and they are likewise more liable, on account of these circumstances, to take cold during the field work in the autumn. The effect of the daily employment of these women on their constitutions may be seen in the striking contrast that is observable between the women who have to go into the mountains to milk the cows, and the others.

The Faroese women are finely built, often graceful indeed, and, when they have passed the fortieth year, they are spare; but the girls who milk the cows are robust, like our peasant girls. It is singular, however, that even with hard work they do not spoil their remarkably pretty little hands and feet; and, again, it is strange that menstrual disorders are as frequent among the milkmaids as among the other women, which would indicate, as suggested above, that colds may be considered one of the most important causes of these disturbances. In order to obtain next a clear perspective of the effect of the epidemic of measles on mortality on the Faroes, I have collected various statistical data, which, on being compared with those for mortality in Denmark, appear to be interesting in many respects.

Since the Faroese seldom emigrate and foreigners have seldom settled on the islands, and since, moreover, the number of individuals who compose the families of Government officials cannot differ so much as to cause any considerable variation in the population, the censuses on the Faroes yield more accurate results with respect to the increase of population by the excess of births over deaths than, for instance, in Denmark. But according to the censuses for 1782, 1834, 1840, and 1845, the population of the Faroes was as follows:

⁷ These injuries are attributable only to carelessness, as it is unheard of that a Faroese should draw his knife against another

	1782	1834	1840	1845
On the Norderøer	585	862	913	953
On the Østerø	1,040	1,648	1,777	1,910
On Strömø, with Hestø, Kolter and Nolsø	1,375	2,169	2,255	2,405
On Vaagø, with Myggenaes	384	642	694	748
On Sandø, with Skuø and Store Dimon	388	552	569	610
On Suderø	637	1,055	1,100 (?)	1,156
Total	4,409	6,928	7,308	7,782

If it is desired to find an average number for the population between the years 1834 and 1845, by adding 6928 and 7782 and dividing by two, then computing a yearly average for the increase of population in these years, and finally computing the percentage of the yearly increase, the latter is found to be 1.05 per cent (See *Appendix [18]*) in the time concerned. For Denmark, on the other hand, it is only 0,83 per cent for the years 1801-1834. Thus, the comparison is considerably in favor of the Faroes. Since, according to Dr. Casper's (See *Appendix [19]*) computation of more than sixty million people, it seems to hold good that the measure of mortality in a colony is in direct relation to its general fruitfulness, it might consequently be expected to find a high mortality on the Faroes; but such is far from being the case. Uldall's (See *Appendix [20]*) Health Officers' Handbook, which is nearest my hand for comparison, presents the following review of the increase of longevity in Denmark, computed for 1000 men, according to an average of five years, for 1784, 1828, and 1833, and observes, besides, that conditions were about the same with respect to females, and that the five-year period ending with 1833, inclusive, gives an unfavorable scale because of the severe epidemics prevailing within it. On the Faroes, for the years 1835-1845, inclusive, I have counted 1059 deaths, which were taken from the carefully compiled church books, for all the parishes except that of Suderø, for which I possess no statistical data. Since sixty stillbirths are included among these 1059 deaths, the numbers below may of course be used for comparison only if it is borne in mind that the number of deaths for those under ten years of age is correspondingly greater than it should be.

	Of 1000 males in Denmark died, according to an average of 5 years			Of 1059 persons died on the Faroes in the years 1835- 1845 inclusive
	1784	1828	1833	
Under 10 years	458	385	366	279*
Between 10 and 20	40	39	43	60
Between 20 and 30	57	55	56	72
Between 30 and 40	62	54	60	68
Between 40 and 50	73	74	77	81
Between 50 and 60	85	91	105	60
Between 60 and 70	104	115	123	90
Between 70 and 80	81	118	113	164
Between 80 and 90	34	60	51	169
Over 90	7	9	6	16

*Under one year, 199. Between one and ten years, 80.

In whatever manner comparison is made, it is obvious that the mortality conditions are far more favorable for the Faroe Islands than for Denmark.

Whereas in Denmark the mortality among children under ten years of age is 366 to 1000, on the Faroes it is only 279 to 1059, though sixty stillbirths are included among the 279. Although in Denmark the greatest mortality (except that of children under ten years) is found between the sixtieth and seventieth years of life, on

the Faroes (likewise excepting children under ten years) it is found between the eightieth and ninetieth years of life; and whereas in Denmark, of 1000 who died, only 122 to 187 were over seventy years old, on the Faroes, among the same number of people, 349 lived beyond that age.

As is known, the average length of life (*See Appendix [21]*) has been computed for the different European countries, For Russia, it is stated as 21.3 years; for Prussia, 29.6; for Switzerland, 34.6; for France, 35.8; for Denmark, 36; for Belgium, 36.5, and for England, 38.5. I attempted to find the average age for each parish on the Faroes, except Suderø, by adding the ages of those who died from 1835-1845, inclusive, and afterwards dividing by the number of individuals, which included the stillborn; wherefore the number representing the average length of life is quite a good deal less than it would be otherwise. In this way I found the average length of life for Nordstrømø to be 41.5; for Sydstrømø parish, 43.9; for Østerø 39.7; for Vaagø, 48.8; for Sandø, 49.8; for the Norderøer, 43.7; and for the whole of the Faroe Islands, with the exception of Suderø 44.6 years. It is thus still clearer how favorable the rates of mortality are on the Faroes; for such a high average age is not known, as far as I am aware, for any other country in the world.

A closer observation of the table set up for comparison will show that the difference between the mortality of Denmark and that of the Faroe Islands consists essentially in the fact that in Denmark more children under ten years of age die than on the Faroes, and that, on the other hand, a far greater number reach the age of seventy years on the islands than in Denmark. For the most vigorous age, between ten and fifty years, it is found, however, that the mortality is higher on the Faroes than in Denmark.

The natural explanation of the latter fact is that a disproportionately greater number of people meet violent death on the Faroes, by drowning in the dangerous fjords and by plunging down from the cliffs, than in level Denmark surrounded by a calm sea. Thus, of the 172 who died on the Norderøer from 1835-1845, inclusive, twenty men, at their best age, perished by accident. Having set forth these facts, we shall attempt to discover the reasons for these differences between the statistics of Denmark and the Faroes, as regards both increase of population and status of mortality.

It would be absolutely at variance with accepted views, established by experience, as to the beneficial or injurious effects of hygienic factors on the health, to seek in the physical character of the country or in conditions dependent on the mode of life of the inhabitants, the principal causes of the favorable rate of mortality and of the considerable increase of population on the Faroe Islands. A raw cold climate, with almost constant fogs and violent, unsteady winds; a group of islands, separated by dangerous fjords, and consisting of high mountains, the roads and bypaths of which often deserve to be called neck breaking, and where the occupations of the inhabitants continually expose them to the effect of the climate and to the dangers which are involved in faring on the uproarious ocean and the perilous mountains; food which we are inclined to consider as indigestible, as injurious by reason of tainting the humors, as too preponderantly animal, and as unpleasing, in fact, as disgusting; apparel in which the feet are almost constantly wet, which, because the men do not wear suspenders and the women do not wear drawers, exposes the abdomen to cold, and which, moreover, harbors vermin and uncleanness; dwellings which are filled with smoke and are surrounded entirely by damp earth—all these features can by no means be supposed to tend to promote the increase of population or to prolong the lives of the inhabitants.

Nevertheless, to avoid partiality, we must mention also those points in the physical and dietary conditions which might be regarded as beneficial to health, which thus might perhaps tend somewhat to make the factors described less harmful. In praise of the climate it may be said that the temperature is fairly uniform, compared with that of other countries, reaching neither a very high nor a very low degree; that, on the whole, the air is free from animal and vegetable impurities, and that even if the former sometimes threaten to pollute it, as after a slaughter of grind whales, for instance, it is constantly purified and renovated by the frequent winds; and finally, that an atmosphere foggy with only water vapor does not appear to be unhealthful, especially when one considers the average length of life ($38\frac{1}{2}$ years) in foggy England, which is greater than that of the rest of Europe, and that of the Faroes ($44\frac{2}{3}$ years) which is still greater. The mountainous nature of the country hardens the body by exercise, which is equally beneficial to digestion, blood, and nerve activity.

The food can be praised probably only in that it is free from spices and palate-tickling ingredients, which tempt people to fill the stomach with more than it can digest; and of the houses nothing at all good can be said except that the drafts in them combat an altogether too overpowering accumulation of (lust and smoke. The clothing is suitable for its purpose in that it consists principally of wool and, taken as a whole, is warm. The occupations of the men and the milkmaids may be regarded as healthful, in that the body is strengthened and hardened by continuance in the open air and by the struggle against nature.

Nevertheless, that this apparently significant circumstance does not exert any essential influence on mortality, or else is completely outweighed by other injurious factors, which are conditioned by the occupations of the men, is evident from the fact that of the 1059 dead from 1835 to 1845, inclusive, 538 were males and 521 females (*See Appendix [22]*). Of greater influence are probably the social conditions, which, from the simplicity of their customs, permit the people to keep calmer than in the places where civilization has attained a higher grade, and which prevent extensive debauchery between the sexes, and foster the general inclination to helpfulness and kind deeds; whence it results, at least in the more generally prosperous villages, that the extremes of hunger and poverty are in some measure avoided.

It must not be supposed, on the other hand, that the circumstances cited as being favorable to health outweigh the injurious influences previously mentioned, and far less can we ascribe to them the very favorable mortality conditions. Only with respect to the increase of population would it appear that the most essential influence should be attributed to the frugal and physically hardening mode of living, and its generally greater serenity, associated with the usually early marriages and the powerful constitutions with which the race which peoples the Fames originally from Norway, is endowed by nature. At any rate, the credit is not due to the Faroese midwives that the increase of population (or the excess of births over deaths) is 1.05 per cent on the Faroes, whereas it is only 0.83 per cent in Denmark; and that of 1059 dead on the Fames only 279 were under ten years of age (counting sixty stillborn or children (lead within twenty-four hours), although in Denmark, in the most favorable of the years cited, there were 366 under ten years old (probably not counting stillbirths) among 1000 dead. The relation between the stillborn and the living-born children is clearly not more unfavorable on the Faroes than in Denmark, but rather more favorable, and this in spite of the fact that the status of midwifery on the islands is almost inexcusable.

For since the life of a Faroese midwife is attended with difficulties and dangers which are unknown in this country, and since withal she receives neither from the public nor from the respective individuals a compensation commensurate in any sense with her exertions, it is rare that a suitable person is found willing to journey to Copenhagen to study midwifery. But even when a suitable woman has signified her willingness to do this, the directors of the Royal Institute of Nativity have frequently refused her admission into the establishment.

As a result, there are on the Faroes very few trained midwives (if I remember rightly, only four or five), a condition which seems so much the more unfortunate because now no women are trained by the authorized physicians of the country, as was formerly the case. It is, therefore, certainly to be desired that these conditions should be ordered better than they have been hitherto, notwithstanding the repeated presentation of them by administrative officials and provincial surgeons to the authorities concerned. Nothing could be more unjust than to draw, from the favorable conditions named above, the conclusion that in the mechanics of birth totally ignorant women can render the same service as well-trained mid-wives, for such an idea is quite sufficiently disproved by statistical investigations; and it is not to be doubted that the rate regarded as favorable for the Fames with respect to the increase of population and the proportion of stillborn to living-born must be attributed to other circumstances, which are so favorable that they outweigh the injurious influences exerted by a badly arranged system of midwifery.

Little as the existing conditions of midwifery can be supposed to promote the increase of population, no more can the favorable rate of mortality on the Fames be credited materially to the physicians; for it is a familiar fact that there are on the Faroes only one royally appointed physician and, at present, one practicing physician, who both live in Thorshavn, and whose activities, in consequence of the physical character of the country, must be still more ineffectual and imperfect than in the Danish country districts. According to an average

computation for nine years, from 1837-18-45, inclusive, there died yearly of the inhabitants of the respective parishes, as follows:

	Per cent
In Sydströmø (with Thorshavn)	1.856
In Nordströmø	1.263
On Østerø	1.593
On the Norderøer	1.691
On Vaagø	1.376
On Sandø	1.634
On Suderø*	1.555

*According to the kind information of Candidate Manicus

Now, since the people who live in Sydströmø, and especially in Thorshavn, have ample opportunities to get medical assistance, whereas Suderø, for example, sometimes is not visited by a physician in a year and a day, it is evident that the physicians on the Faroes do not have such a great influence on the rates of mortality as do other factors, especially financial circumstances and physical characteristics of the islands. It would be just as unreasonable, however, to assume that the appointment of more physicians would be superfluous, as to declare from the results cited above that midwifery is superfluous. As an example which might appear to count for the opposite, I shall take the liberty of presenting the following: In the years 1780-1790, when there was no scientifically trained physician on the Fame Islands, 223 persons died on Østerø, which in 1782 had 1040 inhabitants. Since, according to average computation, the people of Østerø increased yearly by $11^{36/52}$ individuals during the ensuing fifty-two years, the population for 1785, or the average number of inhabitants in the period named, is plotted at 1075 individuals; accordingly, there died on Qsterg from 1780 to 1790 one out of $4^{183/223}$ individuals. From 1835 to 1845, inclusive, 299 persons died on Østerø; but the population of the island had increased so much, that in 1840 it had 1,777 inhabitants. If this is supposed to be the average number of inhabitants, only one of $5^{282/299}$ died in this latter period. It might perhaps be said in reply to this statement that measles prevailed in 1781 but this fact increased the mortality so little, as far as Østerø was concerned, that while the mortality on Østerø from 1771 to 1780, inclusive, according to an average computation, was $24^{1/5}$ yearly, from 1781 to 1790, inclusive, it was found to be only $19^{9/10}$ notwithstanding the increase in the number of people on the other hand, there died in the year 1833, during the terrible epidemic of influenza, 47 individuals on Østerø, whereas, according to an average computation for 1835 to 1845, inclusive, only $27^{2/11}$ individuals died yearly on this island.

Since, then, the physical character of Østerø, as well as the mode of life of the inhabitants, seems to have been almost entirely unchanged during the periods concerned and, besides those cited, no unusual causes seem to have influenced the mortality, there might be all inclination to ascribe the not inconsiderable difference to the service of the physicians. I think, however, that the efficacy of the physicians cannot generally be estimated, because it is impossible to make allowance at the same time for other factors; and the contrary evidence found in the numerical results above, which were obtained by various methods seems, furthermore, to substantiate this view.

Only this much is certain, that although it seems the activity of the physicians cannot be regarded as an essential factor in the favorable rate of mortality on the Faroes, and does not become conspicuous from a statistical survey of the mortality of the different islands, the employment of a physician on Suderø, an island of 1,156 inhabitants, which is now completely cut off, so to speak, from medical assistance, appears from a humanitarian viewpoint to be not only desirable but also necessary, if the influence of physicians in rendering the rates of mortality more favorable is not to be altogether discredited. After having thus reviewed the causes which at first glance would possibly exert some effect on the favorable rates of mortality on the Faroes, without so far having found any factor to which, on closer scrutiny, might be ascribed any essential importance in this respect, we are led to accept the assumption that the entire or partial exemption of the Faroe Islands from a number of diseases, especially those which are infectious, which decimate (*See Appendix [23]*) the populations

of other countries, is the most important of all reasons for the favorable rates on these islands, and the high limit of life of the inhabitants.

This assumption becomes the more obvious when we run over in brief the diseases which are rare or unknown on the Faroes. Scrofulosis and tuberculosis, the vast influence of which on mortality in general in other countries, and in particular on the mortality of children under ten years of age, while not unknown, are, however, rare on the Faroes, in comparison with other countries. Perhaps the specially favorable rate of mortality cited for children under ten years might be explained by this fact. Perhaps the food of the inhabitants, which is in general so largely of the animal variety, exerts an influence hereupon; but possibly the fact that until a few years ago syphilis was a completely unknown disease on the Faroes (of this more later) has contributed its part towards the relative rarity of the two families of diseases named. Whether skirrhus, or cancer, occurs on the Faroes, I cannot say; I did not see any cases of it, and it is not probable that the disease should have entirely avoided my observation, unless it belonged at least among the rarities. Morbus Bighti, which is a very rare disease, at least among the patients in the General Hospital, I did not see on the Faroes; although I always boiled the urine of patients who suffered with oedema of the limbs or from other suspicious symptoms, I never found albumen in the urine; on the contrary, as stated above usually heart disease was detected as the cause of the oedema.

Malaria (*See Appendix [24]*) and the accompanying infarcts of the liver and the spleen, etc., do not, as I have said, occur on the Faroes. Among the infectious diseases, the Faroes are visited only by scabies, influenza, typhus, and, in recent years, syphilis. Since we have not so far discussed these diseases, we shall here present briefly the effect on mortality which may be attributed to them. Scabies, as is well known, hardly ever shortens life, and so will receive no further mention here. Epidemics of influenza (krujm) are frequent, however, and as it appears, sometimes quite severe. The minor epidemic which I had a chance to observe was very mild and, as far as is known, did not cost any lives; but year 1838, there raged an epidemic increased the mortality very markedly (*See Appendix [25]*). clearly from the following table:

	Died in 1838	Died yearly, according to an average calculation of the years 1835-1845, inclusive.
On Nordströmø	15 persons	10 ^{9/11} persons
On Sydströmø	41 persons	23 ^{9/11} persons
On Østerø	47 persons	27 ^{2/11} persons
On Vaagø	12 persons	9 ^{9/11} persons
On Sandø	13 persons	9 persons
On the Norderøer	32 persons	15 ^{7/11} persons
Total	160 persons	96 ^{3/11} persons

This considerable increase of deaths in the year 1838, as far as may be judged from the data found in the church books and from verbal information, according to which the year 1838 otherwise presents nothing disadvantageous to which this increased mortality can be ascribed, can obviously be due only to the frightful epidemic of krujm, or influenza. It is remarkable that the outbreak of these epidemics stands in close relationship to the arrival of the trade—ships, especially in the spring. This cannot well be accidental, since the arrival of the first trade-ship may occur at very different times sometimes in March sometimes in April, sometimes, again, in May; and since, according to the statement of Mr. Pløyen, Chief Civil Officer, among others, in the seventeen years he has resided on the islands it has happened invariably that such an epidemic has broken out two or three days after the arrival of the first ship; and in this wise the commercial managers and clerks were first attacked, then all Thorshavn, and later the remaining places of the country.

The epidemic also occurs rarely at other times of the year, as in August, 1846, during my sojourn on the islands. This epidemic, too, began a few days after the arrival of the ship, and got abroad in the manner just

described. The disease manifested itself in the form of a catarrhal fever, with cold in the head and cough, in greater or less degree; and also, in the severer cases, with catarrhal injection of the conjunctiva and watering of the eyes. It ran its course in eight, or at the most fourteen (days). As analogous herewith, I take the liberty of mentioning the curious, familiar fact that on the Island of Saint Kilda a similar epidemic breaks out, which likewise makes its appearance with sniffing, cough, and catarrhal fever, every time a ship arrives.

Typhoid fever (*See Appendix [26]*) called on the Faroes “landfarsot” (*See Appendix [27]*) prevails there off and on, to be sure, but certainly not as frequently as with us. The isolated situation of the districts makes it plainly observable that the disease is primarily of spontaneous origin, but is afterwards spread contagiously. In the latter part of September, 1846, an epidemic of “landfarsot” broke out in Vestmannhavn and another, but lesser one, about the same time in Thorshavn. Since, on account of the cessation of the measles at that time, I had only to await the arrival of the ship to return to Denmark, I was requested by the chief civil officer to take up my residence in Vestmannhavn, in order to treat the sick there, and to devise measures which might possibly prevent the spread of the infection.

During my stay there, which lasted fifteen days, I treated fourteen patients who were suffering from a pronounced typhoid fever. Since it has been supposed that there is something distinctive about the Faroese “landfarsot,” as though it were a nervous fever *sui generis*, I shall here set forth in brief the symptoms which the patients who came under my treatment presented, and which, in my opinion, proved that the disease is nothing else than a typhoid fever in the course of which the patients symptoms sometimes appear to be more conspicuously pronounced than they usually are with us. In all the cases there was headache, sometimes setting in at once, sometimes later, with giddiness, a stuporous appearance, tinnitus and photopsia, muscular soreness (*See Appendix [28]*) in all the limbs, general indisposition, with great lassitude, nausea and anorexia, as the first indications of illness. The cerebral symptoms increased rapidly, and among about half of the sick, violent delirium was present incessantly while the disease was at its height.

During the first days the patients complained of sleeplessness later they slept nearly all the time. With all there were a considerable wasting away of the flesh and loss of strength during the progress of the disease; while it was at its worst, most of the patients were affected with trembling of the hands, and convulsive movements (*See Appendix [29]*) were observed to pass over their faces. Rubor fugax genarum was observable in nearly all. Deep pressure upon the abdomen, especially in the caecal region, caused a good deal of pain in eleven of the fourteen patients. In all the sick, without exception, the tongue was heavily coated, particularly in the center, where it was also dry; in several, the coating of the tongue was brown or black and was crusty and seamed with fissures, the bottoms of which were bloody. When the coating was loosened, sometimes diphtheritic or aphthous places were observable on the tongue; but it soon regained its natural appearance, and when fissures were present, these healed rapidly.

All patients had a bitter or putrid taste in the mouth; appetite was entirely absent at first, but in convalescence returned with renewed force; all suffered from thirst, which was usually very severe. In about half the patients, diarrhea, which in some was quite profuse, alternated with constipation; some suffered with constipation only, others with diarrhea only, and in but few were the dejections natural all the time. Nosebleed occurred at the onset of the disease in several of the patients, though not in the majority; bloody diarrhea was noticed in only one elderly woman, but distinct petechiae, some isolated, some blended into large dark purple spots, were found in three patients.

The pale, faint typhus exanthem, resembling morbilli, was present in more than half the sick, being especially apparent on the arms, breast and legs. Several of the patients had, besides, a catarrhal cough, usually inconsequential, and dry noses; and the conjunctiva was quite conspicuously injected, particularly in older persons. After the illness extreme weakness followed in all, but was worst and most persistent among old persons. In addition, taciturnity, despondency, and morosity were marked, being particularly great in the first stage of convalescence. In all, desquamation of the lips was noticed, and in some also a branny scaling-off of the whole body. Older persons were usually more severely attacked than the young.

This little epidemic, which did not carry off anybody during my stay, evidently originated spontaneously; but it was afterwards quite apparent that it was spread by contagion, inasmuch as, after isolation was effected, the

disease was confined not only to the districts*⁸ which had already been affected when I arrived but, during my stay, even to the invaded houses; and because even in these the persons who slept in a room apart from the sick either escaped entirely, or did not fall ill until later on; while those who had to sleep in the room with the patients were attacked immediately, one after the other. The same method as that used in Vestmannhavn is usually successful on the Faroes in hindering the spread of a typhus epidemic, and to this end the inhabitants' extreme dread of infectious diseases helps greatly.

Since the disease seldom succeeds in spreading beyond the place where it spontaneously originates, and since such spontaneous occurrence is fortunately not very frequent, typhus seems not to contribute much towards increasing mortality on the Faroes, at least not so much as in other countries, where the inhabitants have more intercourse with each other and are less willing to undergo isolation. Syphilis was unknown on the Throes until about two years ago; since that time about twenty cases have come under treatment. According to what I saw of the disease there, I may pronounce it simple syphilis, in that I saw nothing but superficial chancre, mucous tubercles, shallow white ulcers on the neck, and syphilis which belong especially to the exanthematic types.

The only feature in which it seems to differ from syphilis as observed en masse here in the hospital is the predominant frequency of the mucous the primary type which was transplanted to the Faroes. While the Provincial Surgeon, Mr. Regenburt called the disease a leprosy—syphilitic infection, I can explain this to myself by the fact that he perhaps regarded the mucous tubercles as leprosy nodules. In his latest report to the Royal College of Health I see, however, that he has changed his views about the disease, since in this report he speaks of it only as syphilis. 'To what extent the former freedom of the Faroes from syphilis has helped to make the rates of mortality more favorable cannot be determined for the present, particularly when consideration is given to the connection in which this disease probably stands with scrofula and tuberculosis.

Of still greater influence on the favorable rates of mortality on the Faroe Islands seems to be the fact that the islands have been free, at least in the years 1835-1845, inclusive, from smallpox, scarlet fever, and measles. Smallpox last prevailed on the Throes, as far as I know, in 1705, and at that time caused great devastation, in regard to which accounts are still current among the people; for instance, it is narrated that the whole population of Skuø died out from it.

At present it might be hoped that such a calamity could be at least partially prevented by vaccination. It is obvious, however, that the physical character of the country renders it peculiarly difficult to carry this out satisfactorily. It could scarcely be done in any other way than for the physician to divide the islands into perhaps five districts, and to look after the vaccination in one of these each year, by turns, by making a double tour, so that he would manage to reach each village twice, with eight days' interim, the first time to perform the vaccination, the second to learn the results. But it would be unreasonable to require such an inconvenience of the appointed physician without a corresponding remuneration, since, apart from other hardships, by such a long absence from Thorshavn as would be involved, he would lose a part of the income from practice to which the medical practitioner would be entitled.

This much, at least, is clear; that vaccination such as is now performed on the Faroe Islands is entirely unreliable and futile. The fact is that a rustic is delegated to travel around the country to vaccinate the children; for this purpose, he is provided with vaccine and a needle or lancet, and is instructed how to go about the operation. This rustic then engages in each village a man, who can write, to inspect the children eight days after vaccination and to write to the provincial surgeon as to whether or not the vaccine has taken. However, since on the one hand, it is quite doubtful, in fact in many cases even improbable, that the man who is to inspect the children has ever seen a characteristic vaccine pustule, and, on the other hand, since there is a question as to whether to serve his neighbor or countryman he is not capable of telling a slight falsehood, seeing that the inhabitants are often loath to have their children vaccinated, because they fear the grafting in of foreign diseases, and so on, it may easily be perceived what is to be expected of such control.

⁸ The Faroese villages, or "böjgder," lie spread out over the entire homefield; and the lesser groups of houses, of which the "böjgd" is composed, are called "bylinger."

If, then, a complete reform is to be effected on the Faroe Islands in regard to vaccination, as is certainly most desirable, especially if freer conditions of trade are to be expected, it will not only have to be undertaken by the physician himself, in double trips, as suggested above, but it must also be carried out for all persons without exception, so that certificates of vaccination hitherto issued should excuse none from this slight operation. Scarlatina (*See Appendix [30]*) has never, as far as I know, visited the Faroes, nor, probably, whooping cough, though the latter is recorded in 1838 in some of the church registers as a cause of death; For this information seems to have originated only from the fact that during the prevailing influenza epidemic, one or another priest mistook a violent catarrhal chest infection for whooping cough. Measles had not prevailed on the Faroes since 1781 then it broke out early in April 1846.

As I intend to offer in another section some observations about this disease, I shall limit myself here to mentioning the effect of this epidemic on the mortality. Of the 7782 inhabitants, about 6000 were taken with measles in the course of about half a year, in that the first case appeared, in Thorshavn, on the 4th or 5th of April, and after the 17th of September only a few cases were still occurring on Sandø. From the beginning of the year to the middle of September, a total of 255 persons died, of whom at least 102 died of measles or its sequelae. But as I have no very accurate statistical data for Suderø, which Mr. Manicus has taken care of, I shall here give account only of the other islands, comprising six parishes, with 6626 inhabitants, of whom about 5000 had measles last year. From the beginning of the year 1846 until the epidemic had ended, 215 persons died in these parishes, of whom 164 died during the epidemic, the duration of the latter having been calculated separately for each village, and, of these, seventy-eight were victims of measles or its results.

It must, however, be observed withal that the number of those who died of measles seems to be set too low as far as Sydstrømø is concerned. The fact is that for this parish I was able to refer only to the records which I found in the church registers, where measles is given as the cause of death in but twelve instances. But since the church registers also show that of sixty-eight individuals who died on Sydstrømø from the first of the year to July 30th, sixty-four died between April 21st and July 21st, just in the space of time during which measles prevailed there, whereas, according to the average count for the years 1235-1845, only 23^{9/11} persons usually die yearly in Sydstrømø, it is unlikely that only twelve should have been carried off by measles.

This is the more extraordinary, because, of the sixty-four dead, forty-five had lived in Thorshavn (with about 800 inhabitants), where both physicians of the country live, and, in accordance with instructions, report the causes of death to the priests, who record them in the church registers, In all the other parishes where I had been able by personal presence to obtain more reliable information, it was found that between a third and a half of those who died in the course of the year were carried off by measles or its sequelae, except in Sandø, however, where measles demanded no sacrifices.

Therefore, even if we ascribe to an influenza epidemic beginning with the arrival of the ship some effect upon the mortality, it appears to me as probable that the actual number of deaths from measles was between 78 and 164 214 the first case, there would have been one death among 64 measles patients, and in the other one among 30^{1/2}. Whereas the ratio of deaths to the total number of people, which in Denmark, according to the average calculation for 1801 to 1834, is 1:41.22, and on the Faroes, according to the average computation for 1835 to 1845, is usually 1:64.66, it is here found to be 1:31,07 in only the first two-thirds of the year 1846. It is a remarkable fact, indicative of the serious character of measles among grown people, that the yearly average age of death, namely, 44^{1/8} years (usually 44^{2/3} years), was practically unaltered.

The following table serves to show the mortality in the respective ages during the measles epidemic of 1846, and a comparison of these rates with those usual on the Faroes:

I Aarene 1835—45 incl. døde efter gennemsnitlig Beregning aarlig i de respektive Aldere:	I de første 3 af Aaret 1846 døde	Hvormange pCt. der aarlig pleje at døde af de resp. Alderes Folke-mængde, beregnet efter Folketællingen i 1845 for Aarene 1835—45 incl.	Hvormange pCt. af de resp. Alderes Folke-mængde der døde i de første 3 af Aaret 1846, beregnet efter Folke-tællingen for 1845 og egne Optegnelser.	Hvormange Gange Dødeligheden i de første 3 af Aaret 1846 var større end den plejer at være i et sædvanligt helt Aar.
Under 1 Aar . . . 18 $\frac{1}{11}$	50	10 $\frac{9}{11}$ pCt.	30 pCt.	c. 2 $\frac{9}{11}$
imellem 1 og 10 Aar 7 $\frac{3}{11}$	6	$\frac{6}{11}$ —	$\frac{6}{11}$ —	0
— 10 - 20 — 5 $\frac{5}{11}$	5	$\frac{5}{11}$ —	$\frac{4}{11}$ —	÷
— 20 - 30 — 6 $\frac{6}{11}$	8	$\frac{11}{22}$ —	$\frac{15}{22}$ —	c. 1 $\frac{4}{11}$
— 30 - 40 — 6 $\frac{2}{11}$	13	$\frac{17}{22}$ —	2 $\frac{1}{11}$ —	c. 2 $\frac{1}{2}$
— 40 - 50 — 7 $\frac{4}{11}$	18	1 $\frac{1}{11}$ —	2 $\frac{8}{11}$ —	c. 2 $\frac{1}{2}$
— 50 - 60 — 5 $\frac{5}{11}$	28	$\frac{10}{11}$ —	4 $\frac{4}{9}$ —	c. 5
— 60 - 70 — 8 $\frac{2}{11}$	31	2 —	7 $\frac{8}{11}$ —	c. 3 $\frac{3}{4}$
— 70 - 80 — 14 $\frac{10}{11}$	30	6 $\frac{5}{10}$ —	13 $\frac{1}{11}$ —	c. 2
— 80 - 100 — 16 $\frac{9}{11}$	26	16 $\frac{9}{11}$ —	26 —	c. 1 $\frac{1}{2}$
Summa: 96 $\frac{3}{11}$	215			

Fødtægelsler fra Færoerne.

	From 1835-1845 inclusive, died yearly, by average computation at the respective ages	In the first two-thirds of the year 1846 died	Per cent of persons of the resp. ages taken by death yearly, for 1835-1845, reckoned from the census of 1845	Per cent of persons of the resp. ages died in first two-thirds of 1846, counted from census of 1845 and my own notes	Number of times mortality in first two-thirds of 1846 was greater than that usual in an ordinary whole year.
Under 1 year	18 1/11	50	10 9/11	30	About 2 9/11
Between 1 and 10 years	7 3/11	6	6/11	6/11	0
Between 10 and 20 years	5 5/11	5	5/11	4/11	÷
Between 20 and 30 years	6 6/11	8	11/22	15/22	About 1 4/11
Between 30 and 40 years	6 2/11	13	17/22	2 1/11	About 2 1/2
Between 40 and 50 years	7 4/11	18	1 1/11	2 8/11	About 2 1/2
Between 50 and 60 years	5 5/11	28	10/11	4 4/9	About 5
Between 60 and 70 years	8 2/11	31	2	7 8/11	About 3 3/4
Between 70 and 80 years	14 10/11	30	6 5/10	13 1/11	About 2
Between 80 and 100 years	16 9/11	26	16 9/11	26	About 1 1/2
Total	96 3/11	215			

This review shows that measles, perhaps associated with the epidemic of influenza which prevailed with it in the spring, was destructive to the young children under one year of age (*See Appendix [31]*) but, on the other hand, did not remarkably increase the mortality between the first and twentieth years of life, because the disease was less dangerous in this period; and that the mortality rose from the thirtieth year, until it became greatest for the ages between the fiftieth and sixtieth years, that is, five times as great as usual; it then descended again after the sixtieth year, not because the disease was less dangerous for those still older, which was by no means the case, but because it was precisely sixty-five years ago that measles had last prevailed on the Faroes, and those who had recovered from the disease at that time were now spared (*See Appendix [32]*) The following table shows how the measles epidemic on the Faroes—irrespective of the difference which might arise from the fact that no age was exempt, whereas in Denmark measles ordinarily attacks only children—contributed to make the mortality in 18445 more like that of Denmark than usual.

Accordingly, it might appear as if the singular way in which measles affected the mortality rate on the Faroe Islands had something in common with the way in which a number of simultaneously occurring epidemics affects the mortality of Denmark and other countries.

	Mortality on the Faroes (except Suderø) in the first two-thirds of the year 1846, reckoned on 1000 individuals, instead of on the actual mortality of 215	Mortality in Denmark in the years 1829-1833 incl. reckoned for 1000 males	Mortality on the Faroes (except Suderø) in the years 1835-1845 incl., reckoned for 1059 individuals of whom 60 were stillborn or died within 24 hours
Under 1 year	233		199
Between 1 and 10 years	28	366	80
Between 10 and 20 years	23	43	60
Between 20 and 30 years	37	56	72
Between 30 and 40 years	60	60	68
Between 40 and 50 years	84	77	81
Between 50 and 60 years	130	105	60
Between 60 and 70 years	144	123	90
Between 70 and 80 years	140	113	164
Between 80 and 100 years	121	57	185

The influence which the epidemic of measles of 1846 exerted on the mortality rates of the Faroes may serve as an example to illustrate the tendency of epidemics as a whole to decimate (*See Appendix [23]*) the population of a country. Of course, measles is not wont under ordinary conditions to menace any but children, but on the Faroes it evidently attacked almost the entire population without respect to age; and the epidemics in the aggregate, which prevail in other countries but partially spare the Throes, also threaten the entire population, without respect to age. I believe that I have established that the most essential cause of the favorable rates of mortality on the Faroes may be looked for in the freedom of these islands, because of their situation as well as their isolated condition as regards commerce from many diseases which in other places, in Denmark, for instance, very considerably increase the mortality.

It is obvious, then, that prophylactic measures against the introduction and spread of foreign diseases are of very great importance in such places, where they can be put into execution, as, for example, on the Faroes; whereas they are of no importance where they are rendered impracticable by a great conflux of people and by other conditions, as in Copenhagen. Here, therefore, an edict of quarantine against measles would seem ludicrous, but the Faroe Islands would probably not have lost nearly 100 inhabitants if an edict directed against the introduction of measles had not been removed some years ago. Measles is a disease so generally familiar and so almost trivial as to warrant the supposition that observations in regard to it could offer nothing new, except in special cases with more or less rare complications. It is not, however, my intention here to go into details which are of only more or less partial interest, but to present some observations with regard to the nature of the contagiousness of measles, which peculiarly favorable circumstances rendered it possible for me to make, and which I believe merit some attention.

As to the length of the incubation period, accurate and satisfactory observations have hitherto been lacking, as far as I know, since some authors regard it as eight days, others as from ten to fourteen days, and others again assume no definite stadium contagii latentis. This is not strange, however, inasmuch as observations in regard to the subject could not well be made where a very lively intercourse goes on among the people, and where each individual comes into contact with a large number of other individuals, each of whom may be carrying the material of infection (*See Appendix [33]*) with him. Here in Copenhagen, for instance, it can very rarely be said of a measles patient that he was exposed to infection only once, on this or that day; for it can hardly ever be proved that he was not in anywise exposed earlier or later, without knowing it, to the influence of the contagion of measles.

To be able to arrive at some definite result in reference to this question would call for special circumstances which might render it possible to make accurate observations, and these circumstances were offered on the Faroe Islands, The isolated situation of the villages, and their limited intercourse with each other, made it possible in many, in fact in most cases, to ascertain where and when the person who first fell ill had been exposed to the infection, and to prove that the contagion could not have affected him either before or after the day stated. The first person on the Faroes who took measles was a cabinetmaker, now living in Thorshavn. He left Copenhagen on the 20th of March and reached Thorshavn on the 28th; on the journey he felt quite well, but was attacked by measles early in April, on what day he did not know. Shortly before his departure he had visited some measles patients in Copenhagen.

About fourteen days later his two nearest associates were attacked. These facts, although inaccurately observed⁹ to be sure, which were related to me before my departure from Thorshavn, induced me to give attention in my travels about the islands to the length of the stage of incubation. The first village to which I came (on July 2nd) on my rounds was Tjørnevig, on Nordstrømø, where eighty of the 100 inhabitants were down with measles. On the 4th of June a boat with ten men from Tjørnevig had taken part in a catch of grind at Vestmannhavn; and on the 18th of June, precisely the fourteenth day following, the measles exanthem had broken out on all ten men, after they had been feeling ill from two to four days, and had been suffering with cough and smarting of the eyes.

The ten men mentioned had not been together at all except at the grind-catch referred to, and none of them had been at any place where they could have happened to be exposed in the remotest way to the infection, which they dreaded and shunned. In Vestmannhavn, on the other hand, they had not only been in contact with many men who had recently got up after measles (perhaps some of them still florid with the exanthem), but had also been staying for sometime in houses where persons had to go to bed on the next day with an eruption of the measles exanthem. From twelve to sixteen days after these ten men had taken measles (counting from the appearance of the rash), the exanthem broke out on nearly all the other inhabitants, except some few individuals, who were not attacked until twelve to sixteen days after the first general outbreak.

These facts might suggest that the contagion of measles produces no visible effect for quite a long time, usually ten to twelve days, after its reception into the organism, since the catarrhal prodromal stage began just after this lapse of time, and the exanthem first appeared on the fourteenth day after the reception of the infective matter. If this supposition were confirmed, then the observation that the second and third general outbreaks ensued each after about fourteen days' interim would make it probable that measles is most infectious during the stage of eruption and efflorescence, and not, as generally supposed, during that of desquamation. In order to investigate as to whether or not these suppositions were well-founded, I decided to undertake in each village, to which I came, a brief inquiry, as exact as possible, in regard to the origin, mode of introduction and of spread of the disease.

In this manner I obtained, for fifty-two villages, the names of the persons who first took measles, the circumstances and dates of their exposure to infection, the dates on which the exanthem appeared on them, and the time that elapsed thereafter before other residents broke out with the exanthem. It would become too tedious to review this for every single village, especially since I found the suppositions set forth above confirmed everywhere, and I did not encounter any instances to prove that there were exceptions to the rule. I shall, therefore, present here only some cases by which these conclusions were substantiated in most remarkable fashion.

In Velbertstad on Sydstrømø I obtained statements which contradicted my assumption of a stage of incubation of a definite length, inasmuch as there appeared to have been, in the case of a certain patient, only ten days between the time on which the patient was exposed to the infection and the day on which the exanthem appeared. Since it was a very reliable man who stated this to me, and the patient concerned was his own wife, I thought I had found here an exception to the rule. But on Olai (July 29th) (*See Appendix [34]*) the same man

⁹ Mr. Regenburt, Provincial Surgeon, who was the cabinetmaker's physician, was ill himself at the same time at which the former's illness was at its height, which, as well as the surgeon could remember, was on April 4th.

sent me a message by his nephew, Pastor Djurhuus, to the effect that his statement had not been correct, but that it was exactly fourteen days, instead of ten, that had intervened between the time that his wife had been exposed to the infection and the day on which she broke out with the exanthem.

Shortly before my arrival the man had lost at the same time his beloved wife and a sister, and his grief had distracted him. The other case in which I thought I had found an exception to the rule was in Hattervig, on Fuglø. A young man, the first person who had developed measles there, declared to me that he had not been outside Hattervig except on Whitmonday (June 1st) when, together with another man, he was in Arnefjord, on Bordø where at that time measles had not broken out, but where, as he had learned later, a man had developed the exanthem on the 3rd of June, and two others on the 8th.¹⁰

The first young man asserted that in his case the exanthem had appeared on the 11th of June, but in his companion's not until the 14th. Although I explained to him that it was of great importance to other people that he should tell me the truth, and that there was no question of any responsibility for him, he would not admit that he had been exposed any earlier to the infection. But in the evening, when I was sitting in the smoke—room, attired in Faroese clothes, he came to me and begged my pardon because he had not recollected correctly; the fact was that he had been also in Klaksvig, on the 30th of May, and being in an intoxicated condition, had been in several houses where there was measles.

The procedure that I had followed, somewhat resembling an examination, had made the young man from that isolated Fuglø uneasy, and had induced him to conceal the truth. In Selletraed, on Østerø I was told that a young man had been infected on June 4th at the grind haul in Vestmannhavn, and that on June 9th he had broken out with the exanthem, and that his younger brother and other folk in the village had been infected by him, and had broken out with the exanthem on June 17th. I asked for the almanac, and inquired where the older brother had been on the 26th of May (fourteen days before the exanthem broke out on him).

They told me that on that very day he had been in Nord-Øre, where measles was prevailing, and that on the way home he had spent the night of the same day in Sydre-Göthe, and had slept in the bed with the servantman of P. Johnson's widow; but that in Nord-Øre he had not been in any house, and there was no measles in Sydre-Göthe at that time. fly looking at my notes afterwards, I found that the servant-man mentioned was the first person who took measles in Sydre-Göthe, and that the exanthem had spread over his whole body a few days later. Then I learned that only those folk in the village who had broken out with the measles exanthem at the same time as the younger brother had been along with the brothers at the grind catch at Vestmannhavn.

It was now clear to me that the elder brother had been infected in Göthe (or possibly in Nord-Øre), and the younger, together with the others, in Vestmannhavn. In Fuglefjord, on Østerø, on account of my observations, I acquired the reputation of being able to prophesy. On my first arrival there, the daughter of Farmer J. Hansen, churchwarden, had recently had measles, but had then got up, and, except for a slight cough, was almost entirely well. All the other nine persons in the house were feeling well in every respect and expressed the hope that they would escape the disease. I inquired as to what day the exanthem had appeared on the daughter, asked for the almanac, and pointed to the fourteenth day after that on which the exanthem had been noticed on the daughter, with the remark that they should make a black line under that date, for I feared that on it measles would show itself on others in the house; if this did not happen on that day, they might perhaps have some hope of being exempt.

As it turned out I was summoned to Fuglefjord again ten days later and was met with the outcry: "What he said was correct! On the day he pointed out the measles broke out, with its red spots, on all nine." Having on my first round found my suppositions verified in the thirteen villages which I inspected, I felt it my duty to impart my findings to my colleagues, Mr. Regenburt, Provincial Surgeon in Thorshavn, and Candidate Manicus, who was staying on Suderø. Both have since told me that they, too, have found these observations confirmed in their practice, without feeling assured, however, that there were no exceptions to the rule.

¹⁰ This was related correctly. On the 20th of May, one man had been at the trading-place, Klaksvig, where the measles was prevailing, and he broke out with the exanthem on June 3rd; on the 25th of May the two others had been at the same place and the exanthem appeared on them on June 8th

The young medical practitioner, Candidate Nolsøe, likewise assured me that he had everywhere found the observations cited confirmed in his practice, except at Skaalevig, on Sandø, where the general rule did not hold good at all, and where it was impossible to detect any definite incubation stage or any rule for the spread of the disease. On the 24th of September, however, I came to Skaalevig myself, and so was in a position to acquire accurate information about these things and I learned the following facts Candidate Nolsøe had been at Skaalevig three times before Whitsuntidee, because a severe epidemic of influenza was prevailing in the village, the first time on the 5th, the second on the 12th, and the third on the 18th of May. On the 19th of May one of the men who had been to fetch the physician the first time broke out with the measles exanthem, and, on the 25th, one of the men who had fetched him the second time.

The first man who took measles had a sister, who was a servant of the wealthy farmer J. Dahlsgaard. In spite of her master's interdiction, she had gone to see her brother, and she broke out with the exanthem on the 2nd of June (fourteen days after the brother); another maid-servant of the same farmer had visited the other man, who had developed the measles exanthem on the 25th of May, and she broke out on the 7th of June.

Then the mistress of the house developed the exanthem on the 16th of June (fourteen days after the first girl); three children and two servant-men on the 20th of June (thirteen days after the second girl) the master, on the 30th of June (fourteen days after his wife); the eldest daughter, on the 4th of July (fourteen days after the younger children), and the eldest son on the 7th of July. In several houses where I sought for information about the origin of the measles, I learned that first a servant-girl or a servant-man, whose family had measles, had been infected, and fourteen days afterward, one individual, or usually several, in the house had broken out. Closer investigation showed, then, that Skaalevig, far from offering any exception to the rule, provided, on the contrary, a very complete example of the constant length of the stage of incubation, and of the fact that measles is most infectious during the period of efflorescence.

The only deviation from the rule generally observed was the slower spread of the disease in Skaalevig than in the other villages, and this might seem strange in view of the fact that the residents of Skaalevig were generally said not to shun the infection of measles at all. The natural explanation of this difference is apparent on closer examination of the conditions. Skaalevig is one of the most widely scattered of the Faroese villages; either the houses stand isolated out in the midst of the fields, or two or three are grouped together; in the largest byling, with six houses, measles had made its complete round when I arrived.

The dwelling of Farmer J. Dahlsgaard, in which the very slow spread of measles was most extraordinary, is distinguished for its size and roominess, together with the fact that the bedrooms in it are separated farther from each other than in any of the rest of the Faroese houses. Another important circumstance I found in the fact that, as I was assured everywhere, the people in Skaalevig had been careful, especially in the beginning, to the extent that residents of houses which were still free from the disease had not gone into houses where there were sick persons, and that the heads of families had instructed their children and domestics to avoid association with those from infected houses.

But at work and when meeting in the open air, the people from the exempt and the infected households had not avoided association with each other; and so it came to be said that the inhabitants of Skaalevig did not shun the infection of measles, which, strictly speaking, was not correct. A third circumstance, apparent especially towards the end, was the plainly decreasing intensity of the infection as the cessation of the epidemic drew near. Similarly, towards the end of the epidemic, the disease attacked very slowly in Kunø Midtvaag, and Sandevaag. At the height of the epidemic, in Tjørnevig, for example, about fourteen days after one or several persons had caught measles, the majority of the residents, of the village were attacked, and only a relatively small number were spared until fourteen days after the great onset; but the people in the last-named villages fell ill gradually, so that only a few were attacked fourteen days after those who took the disease first; fourteen days later, others about fourteen days after these, still others, and so on; thus the disease lingered longer in the villages last attacked than in those that were infected earlier.

Nevertheless, measles preserved withal, at least as far as my experience went, its definite period of development (from the reception of the infection to the appearance of the exanthem); and in fact, I know of no

case where, after a pause of more than fourteen days, measles had appeared afresh in a village without reinfection from some other place. Nevertheless, we cannot deny the possibility that the infective material may be retained for quite a while after the cessation of measles, in wool or clothing, for instance, or in other things that are capable of harboring it.

The rule that the contagion of measles does not produce any symptoms of illness at all, for a considerable time after it has been received into the organism, and then, according to my observations, after an indefinite prodromal period, brings forth the well-known exanthem always on the thirteenth or fourteenth day, has thus proved constant for me in a significant series of accurate observations. It cannot be denied of course that, in addition, the constitutions of patients, their diet, etc., may be contributing factors towards hastening or retarding the eruption of the exanthem; but these differences are not nearly so great as might be expected a priori; for it appears that these external conditions are never able to hasten nor to retard the eruption of the exanthem more than about twenty-four hours on either side of its normal time, which may be considered to be between the thirteenth and fourteenth day.

At any rate, I think that, after my inquiries concerning the outbreak of measles in fifty-two different villages, where I always found the above-cited rule steadfast, though often with many dates for a single village, I am justified in asking that exceptions to the rule (the occurrence of which I can by no means deny, though I have not seen them) which might be advanced in opposition to my assertions, be accurately observed, and that they should be of such a nature as to be significant. The examples given show clearly enough that, on more accurate investigation, apparent contradictions of the rule often serve to establish it more firmly than ever. In most of the alleged cases, I myself felt shaken in my faith as to a constant period of incubation, but in every instance my doubt vanished with a more precise inquiry.

The analogy here with the information which has been acquired concerning the stage of incubation of smallpox, of fourteen days between the reception of the contagion and the appearance of the eruption, imparts to these observations, it seems to me, still greater significance. A circumstance which may easily create confusion in these investigations is the indefinite length of the catarrhal prodromal stage. Some patients suffered for six to eight days before the eruption of the exanthem, from cough, pain in the eyes, and slight fever; others, for only from four to six days; the majority for only from two to four days; and in light cases the precursory period was either entirely lacking or lasted only one to two days. It is better not to ask the patients, therefore, when they became ill, but rather when they broke out with the exanthem, if one expects to be enlightened as to the time which the contagion requires to develop the exanthem.

If it is now regarded as a rule that the contagion of measles requires between thirteen and fourteen days after its reception into the organism to develop the exanthem, and, as numerous experiences like those which established this rule show, that there are usually thirteen or fourteen days between the time at which the exanthem appears on the patient and that at which it breaks out on his infected associates, it is then clear that the persons who are infected by him receive the contagion into their organisms at precisely the time when the exanthem is breaking out or has just appeared on him.

Hence at least it is plain that measles does not infect as long as the contagion is still lying latent without producing any symptoms of illness. Whether it may be regarded as infections in the catarrhal prodromal stage, shortly before the eruption of the exanthem, is hard to decide. I saw not a few cases in which it was to be supposed from the patients' statements that they had been in contact only with persons who had prodromal symptoms but not yet the exanthem. The example cited of the young man from Fuglø who was infected in Arnefjord and the man from Selletraed who was infected in Göthe might, for instance, go to prove this. But since I so often saw persons have a good deal of exanthem on their faces without even knowing anything at all about it until I showed it to them, many first becoming aware of its presence when, after several days' preliminary course, it had broken out over their whole bodies, I do not believe that it can be accepted as certain that measles sometimes infects before the eruption of the exanthem.

At least, the cases observed by me which might seem to corroborate such an opinion were of such a nature that it could not be positively asserted that there was no exanthem present on the infected persons; for in every case the rash had developed over the entire body a day or a few days later. It has generally been maintained that measles is most infectious during the period of desquamation. I do not know whereupon this assertion is

based; but I am inclined to assume that it was inferred from observing that infected associates of a measles patient first exhibited the exanthem while the patient was in the stage of desquamation. Now if the observer be not familiar with the relatively long period of latency of the contagion, it is natural that he should assume that the infection was transmitted by the first patient at a later period than was actually the case. I could not find any instance which could prove that the contagion may really be given off during the stage of desquamation, but just as little can I prove that infection may not occur in this stage.

In some villages certain young persons who had not taken measles earlier and were constantly exposed to the infection remained quite exempt, being infected neither by the patients who had the exanthem nor by those who were scaling. I believe, however, in regard to the rule laid down that thirteen to fourteen days intervene between the reception of the contagion and the eruption of the exanthem, that I may assert that in the majority, if not in all the cases, the infection proceeded from the measles patients while the exanthem was breaking out or had just appeared; and no case was known to me in which a person took measles more than fourteen days after the exanthem had disappeared from the persons who might be supposed to have transmitted the infection to him.

It is not impossible that the reason for this consists partly in the fact that the associates, so to speak, of the measles patients who were susceptible to infection had already been infected by him while he had the exanthem, and so could not be infected while he was desquamating; but it is certain that measles is extremely infectious during the eruption and the period of efflorescence; whereas its infectiousness in either the prodromal stage or in that of desquamation is doubtful. Whether this may be seen whether the slight fever which is produced by the development of the cowpox stands in any inimical relation to the measles; but I came to the conclusion that there is no relationship at all between cowpox and measles, and that the two may be developed simultaneously. I made no experiments with inoculation of measles, because I could expect no results with persons who had evidently been exposed to the contagion of measles; and with those who had not been exposed to infection, I feared that I might do more harm than good. It is known to me generally supposed that measles sometimes attacks one and the same individual twice.

In this connection it is quite remarkable, however, that of the many aged people still living on the Faroes who had had measles in 1781, not one, as far as I could find out by careful inquiry, was attacked the second time. I myself saw ninety-eight such old people, who were exempt because they had had the disease in their youth. This was the more noteworthy in that a high age by no means lessened the susceptibility to measles, since, as far as I know, all the old people who had not gone through with measles in earlier life were attacked when they were exposed to infection; whereas certain young persons, although constantly exposed, were exempt. If recovery from measles sixty-five years before could insure people against taking the disease a second time, it might be supposed that still greater protection would be afforded by having recovered from it a shorter time before; and I am, therefore, inclined to assume that the cases in which measles was observed to occur the second time in the same person are attributable to erroneous diagnosis, or at least are extremely rare. Opinion has been divided as to the degree of intensity which should be credited to the infectiousness of measles. As a contribution towards the solution of this question, the following cases would seem to be not without interest. On the 2nd of June a boat set off from Funding for the trading place, Klaksvig, to fetch wares. These traders were not permitted to obtain goods, however, unless they would help to unload grain from the transport-ship which had just arrived from Thorshavn.

On board ship there were men who had just recovered from measles, and the business clerics in Klaksvig were just coming down with it. Upon arriving home, the men from Funding, who had been in the hold and in the warehouses, but had not been among those who were ill with measles, threw away all the paper that was around their goods, undressed completely in a *kjaeld* (an outhouse for drying fish), washed themselves all over with water, put on clean clothes and threw into water all the clothes they had been wearing. None of these men took measles until July 3rd, when the whole village already had been attacked.

On June 3rd, another boat set out from Funding, in company with a boat from Nordre-Gjov, for the trading-place. In order to obtain goods, the men from these boats were required to load the ship with dried fish. A man from Funding became ill and had to go into a house, into a room, in fact, where several persons lay sick with measles; the other attributed to the exhalations from the patient, which are strongest during the eruption and

on the first day of the efflorescence, when also the peculiarly acrid odor is most characteristic, I cannot say positively, but the supposition seems to be very reasonable.

At the suggestion of the Provincial Surgeon, Mr. Regenburt, I vaccinated sixty children on one of my rounds, to men from Funding and the men from Nordre-Gjov were only in the ship's hold and in warehouses, where they stood close against other people, among whom there was a man from Nord-Øre, which had been invaded by measles. After their return home, the men from Funding did as those who had been in Klaksvig with the first boat and not one of them was taken sick until the whole village was attacked. The five men from Nordre-Gjov, who had not gone through with the same careful cleansing after arriving at home, all broke out with the rash about fourteen days afterwards.

On June 8th, a third boat from Funding was in Klaksvig; there the commercial employees had just recovered from measles, and some people were there from Leervig, who were out for the first time since their recovery from measles. The men from Funding were in close contact with both the shop people and the Leervig folk. Although on returning home, they took the same precautions as those who had previously been there on business from Funding, they all, except a woman (not pregnant), were attacked by measles, breaking out with the exanthem about fourteen days later. Kvatvig, (See Appendix [36]) on Nordstrbmyl, was one of the villages where the people most dreaded the measles. Willing as the Faroese ordinarily were to convey me farther on my itineraries, and to be obliging to me in general, in Kvalvig they were so afraid of measles that they almost refused me conveyance to Vestinnahavn; and when I got their consent to take me, the man who carried my things kept at a long distance from me, and the man who drove the horse had wrapped his head up in a large handkerchief, and kept always at least three feet away from me.

This was strange, for the Faroese are usually convinced that the physician never carries any infection with him; the explanation of their fear was to be found in the way in which measles had been brought to Kvalvig. The fact was that three weeks before Whitsuntide the provincial surgeon was summoned to Kvalvig, where a severe epidemic of *krujm* was prevailing, and he had to spend the night in the village. In the house in which the surgeon had slept, measles broke out exactly fourteen days after his arrival. No other occasion than his visit could be assigned for the outbreak of the disease, since no resident of Kvalvig had been in any suspected place, and particularly none of those who lived in the house that was first attacked, and no other stranger from any of the affected or suspected places had been in the village. From Fuglefjord, where I had visited many patients with measles, I was summoned to Mygledahl, which was still exempt. As eight men had ventured, notwithstanding their fear of the disease, to come to fetch me for a woman, who must have been very ill, it was my duty to do what was in my power to avoid carrying the measles to Mygledahl.

On my arrival, in the middle of the night, therefore, I undressed in an outhouse in which fish were dried, and put on a suit of clothes which I had not had on among the measles patients. Mygledahl was not attacked by measles afterwards. To Midtvaag, on Vaagø, measles was carried, so people said, by the midwife, who had passed several days with the measles patients at Steegaard. The woman had had the disease herself in Denmark. In all the houses in which the midwife had been, they said, measles appeared fourteen days later; and a girl who washed the midwife's clothes immediately after her arrival was the first who took measles in Midtvaag. These examples, which seem to prove that the contagion of measles may be carried about in clothing worn by persons who are not themselves susceptible to infection, apparently give evidence of an intensity of contagiousness which hardly otherwise would have been attributed to measles. It might have been supposed, for example, that the contagion with which the physician's clothes were impregnated would be blown away on a trip of four miles in an open boat, especially when the weather through which I traveled was inclement with wind and rain.

Moreover, the cases cited in regard to the residents of Funding on their business trips appear to prove that prophylactic cleansing after exposure to infection may sometimes protect. It is beyond doubt that the surest means of hindering the spread of the disease is to maintain quarantine. In this way, by house-isolation, success was attained in many villages in preventing general dissemination of the disease. Thus, in Saxen, two houses were saved from measles; in Midtvaag, ten; in Sandevaag, ten; in Gaasedahl, two; in Glibre, two; in Funding, one; in Fundingbotn, one; in Nordskaale, one; in Selletraed (at least at my arrival), four; likewise the half of Thorsvig and Lanibavig, the greater part of Kvalvig; Skaapen, and part of Skaalevig.

By cutting off communication with infected localities, the residents of the following places succeeded in keeping measles entirely away: Haldersvig, with 102 inhabitants; Eldevig, with 85; Andafjord, with 121; Viderçø, with 101; Mygledahl, with 66; Trollenaes, with 29; Husum, with 54; Elankeskaale, with 51; Share, with 26; Skaaltofte, with 19; Myggenaes, with 99; Skup, with 61; Sand, with 240; Husevig, with .52; and Skarvenaes, with 26. And so, by maintaining quarantine, about 1,500 of the inhabitants of the Faroe Islands were saved from measles. If, among 6,000 cases, of which I myself observed and treated about 1,000, not one was found in which it would be justifiable, on any grounds whatever, to suppose a miasmatic origin of measles, because it was absolutely clear that the disease was transmitted from man to man and from village to village by contagion, whether the latter was received by immediate contact with a patient or was conveyed to the infected person by clothes, or the like, it is certainly reasonable at east to entertain a considerable degree of doubt as to the miasmatic nature of the disease.

Since the doors could be locked everywhere, so to speak, against the disease, in my opinion it is not only theoretically justifiable but also practically even necessary to regard it everywhere as a contagious disease. For if people believe that the causes of the disease are generally dispersed in the atmosphere, they can have no hope of protecting themselves against it, and will not be disposed to take precautions in this respect, since such measures must be regarded as vain; but if it is considered as settled that measles is transmitted only to such individuals as are susceptible to the infectious material which every measles patient carries, whether the infectious matter is suspended in the air most nearly surrounding the patient, or is entangled in clothes and the like, there may be hope of setting limits to the spread of the disease, and the necessary provisions in this direction will be instituted with reasonable hope of a successful result.

There are probably many physicians who have the same views in regard to the miasmatic-contagious character of measles which the two physicians of the Faroe Islands had when measles arrived in the country. Since the people were convinced that the cause of the disease could be carried through the air from house to house, from village to village, and from island to island, they did not at that time, think the trouble worth while to undertake an isolation, whereby the disease would probably have been limited to only a few houses.

Experience, however, had taught a part of the inhabitants in 1781 that the spread of measles could be hindered by isolating places or even houses; and the aged people, who had preserved the recollection of this from their youth, effected in many places, on their own responsibility, a sort of quarantine, as mentioned above whereby the places concerned were entirely or partially spared. Not until later on, when experience had taught the physicians of the country also that the infection is quite obviously carried from place to place by persons and does not jump about, did they, too, begin to discourage communication with infected houses and places; but the disease had already been spread over the entire country, and from the public viewpoint it was too late to institute earnest measures towards isolation.

Experience in regard to the fact that measles is not miasmatic but purely contagious in character has been so dearly bought on the Faroe Islands that the people there will probably agree with us hereafter that it is correct, at least in practice, to consider measles as a contagious and not as a miasmatic nor miasmatic-contagious disease. It is another question whether measles can arise spontaneously. This did not happen on the Faroes, and although from a theoretical point of view, in analogy with typhus and the like, the possibility cannot be denied, yet with respect to regulations that might be instituted against the spread of the disease, especially under conditions such as those on the Fame Islands, Iceland, and other isolated places, if spontaneous origin ever occurs, the occasions are so rare that they cannot be taken into consideration.

Appendix

Notes by the Editor and Translators

1. The name "Faroe Islands" is commonly used today and is adopted in the translation. The Danish word, "Ø" (Øer) means "Island." The stroke is equivalent to an umlaut. Hence: Färö; Färø; Faroe; Faerø; Faerø and Faeroe. Faerøerne, etc. = The Sheep Islands. Fuglø Bird Island; Østerø Eastern Island;

Sandø = Sand Island; Strömø = Stream (or River) Island; Suderø Southern Island; Viderø = Wide (or Large) Island, etc. A.S.H.

2. The dates of Panum's arrival and departure are not given, he planned to depart early in October. He must have arrived, therefore, sometime in the latter half of May. This is supported by the statement of his "traveling companion," Manicus, who, writing shortly after September 1st, stated that he had been three months on Suderø. Two physicians resided at Thorshavn: Landkirurg Regenbting, the government physician, who apparently was engaged also in private practice, and Mr. Nolsøe (or Nolsø), a private physician. Manicus was sent to Suderø almost immediately after arrival at Thorshavn. Panum stayed in Thorshavn until about July 1st. J.A.D.
3. The Danish mile equals 4.68 English Statute miles. J. Di.
4. Panum used the words Østfa1d and Vestfald. Dr. Henry F. Donner, of the Department of Geology and Geography, Western Reserve University, has kindly contributed the following interpretation: "I have never heard the terms 'east fall' and 'west fall' of the Atlantic Ocean used before; with reference to the tides, but assume that the author meant the eastern and western slopes of the tidal bulge as it crosses, the Atlantic. As the west slope approaches the islands the water rushes into the fjords and raises the water level; as the crest passes, and the east slope or fall arrives, the water level drops back to its lower level in the fjords." J.A.D.
5. That is the summer of 1846. J.Di.
6. Denne dyrkede Indmark, "Boe" kaldet, etc. Lit., this cultivated infield, called "Boe." The "Boe" thus includes all cultivated areas, in the aggregate. J.Di.
7. Dreng: Lit., Boys. ASH.
8. Boudin, Jean Christian Marc François (1806-1867), "Boudin's Law" claimed antagonism between malaria and tuberculosis. It was given its coup de grâce by Hirsch (Geog. and Histor. Path.; Eng. Trans.by Creighton: III, 235-236. New Sydenham Soc. Lond.1886.) J.A.D.
9. Remak, Rohert (1815-1865). German physician and histologist assistant of Schönlein (see Garrison's History of Medicine, 2nd Ed., Saunders and Co., Phila.,1917). J.A.D.
10. Hübertz, Jens-Rasmussen (1794-1855). Danish alienist, sometime Director of the Institute for Insane and Epileptic Children, Copenhagen. (See La Grande Encyclopedia, XX. Paris.) J.A.D.
11. Debes, Lucas Jacobsen (Lukas Jakobsön), 1623-1675. Priest in Thorshavn for many years; naturalist, topographist and noted scholar. The full title of the publication is: Faeroae et Faeroa reserata (1673); an English translation was published in London in 1675. (See Dansk Biografisk Leksikon, 1934, V. Copenhagen.) J.A.D.
12. Den sorte Skole: Lit., In the black school. J.Di.
13. Dövre: Colloquial Faroese term for midday meal. J.Di.
14. Skjaerpekjød: Lit., Sharp meat. ASH.
15. Sei: Coalfish: Pollaclus virens (Green pollack), related to the cod. J.Di.
16. Røgstue: Lit. Smoke-room. ASH.

17. Leuchhaomier: This term was used probably to indicate all anemias other than those then included tinder chlorosis. Leucemia was described by Bennett in 1845. J.A.D
18. Actually, this method gives a figure closer to 1.06 per cent and very close to that obtained by geometric progression: $6928 (1.0106)^{46} = 7780$. It is of interest that the same rate of increase continued at least to 1880, when the census population is given as 11,220 or very close to $6928 (1.0106)^{46} = 11,253$. For 1900, the census figure is 15,230 and the geometric expectancy only 13,894. During the present century the population has increased at a much higher rate, probably through immigration, the population in 1930 being 24,200. The following average annual rates for the period 1835-1845 may be derived for the islands, including Suderø, all, except infant mortality, being per 1000 total population. Birth rate (including stillborn and those dying within 24 hours): 26.3; birth rate (excluding stillborn, etc.): 25.3; death rate (including stillborn): 15.6; death rate (excluding stillborn): 14.7, and infant mortality rate (for those born alive and surviving 24 hours): 75.1 per 1000. J.A.D.
19. Casper (Caspar), Johann Ludwig (1796-1864). German medical statistician, and authority on forensic medicine. (See Garrison, Ic.) J.A.D.
20. Uldall, Frederick Adolf (1806-1873), Danish physician, noted for his contributions to social and forensic medicine. The publication referred to by Panum is probably the following: *Handbog i Medicinallovgiving i Danmark* (1835) (See Dansk Biografisk Haandleksikon, Copenhagen, 1926, III, 629.) J.Di.
21. Only in a stationary (life table) population is the mean age at death equivalent to the expectation of life at birth, and the former may be very much lower than the latter in a population increasing rapidly by excess of births over deaths. The figures for countries other than the Faroes are probably life expectancies. At least, that for England (38.5 years) is only slightly below the figure given by Parr (Vital Statistics, p. 473) for life expectancy in 1841 (41 years), and it is considerably higher than the average age of death for that year (29 years). (See also Newsholme, Vital Statistics, 3rd Ed., Macmillan Co., N. Y., 1899. 293.) J.A.D.
22. Mandfold og Fruentimmer: Lit., Men and Women. Obviously Panum meant Males and Females. J.Di.
23. Although there is some objection to the use of the word "decimates," it is a literal translation. Panum uses *decimere* twice. J.Di.
24. Intermittens: Malaria. J.Di.
25. The excess deaths in 1838, presumably attributable to influenza, numbered 64. The duration of the epidemic is not stated; if taken as three months, the death rate during the epidemic period was about three and one half times normal. J.A.D.
26. Panum uses, synonymously, the terms Typhoid Peter and Typhus, in describing this outbreak. It is improbable that he knew of the distinction, as this was not generally appreciated in Europe until after the publications of Jenner. There can be no certainty regarding the nature of the disease which he encountered but it was probably typhus. The character and distribution of the eruption, particularly "tydelige Petechier, dels isolerede, dels konfluerende til store mørk-violette Pletter," pronounced nervous symptoms early in the course, the injection of the conjunctiva and the catarrhal cough all point to typhus rather than typhoid. In Denmark, at this period, typhus appears to have been rare, but Hirsch mentions an epidemic in Fredericia in 1839 and one in an over crowded prison in Odensee in 1843. Incidentally, Hirsch apparently accepted the landfarsot of Iceland, the Shetlands and the Faroes as typhoid, but he does not refer specifically to the outbreak here described. J.A.D.
27. Landfarsot: Lit., Epidemic of the country. A.S.H
28. Dedolationer i alle Lemmer: "Soreness or tenderness in the limbs." The context limits the meaning but does not make it obvious. Although the word "dedolation" has been used usually with a surgical implication, particularly with reference to wounds of the head with loss of tissue, it has been applied

also to indicate the sensation of having been bruised. The word is derived from *dǣdōlo* (-*âvi-âtuni*), of which the usual meaning is “to hew away,” or “to hew smooth.” Harper’s Latin Dictionary gives, as an alternate, “to cudgel soundly,” in which sense the word was used by various Roman writers, and to which the second medical application is traceable. J.A.D.

29. *Mimiske Spasmer*: Lit., Mimic spasms. Convulsive movements. ASH.

30. Scarlet fever was introduced to *Suderø* February 1873. There is no record of its previous occurrence. In the succeeding 27 months, it spread generally over the islands. In *Thorshavn* 38.3 percent of the inhabitants were attacked. (See von Jürgensen: Vol. on Diphtheria, Scarlet Fever, and Measles; *Nothnagel’s Ericyl. Prac. Med.; Amer. Ed., Saunders and Co., Phila., 1902. 384.*) J.A.D.

31. The statement by *Fredericia* (*Prominent Danish Scientists Through the Ages: Levin and Munksgaard, Copenhagen 1932. 134*) that *Panum* “pointed out that children under 5 months of age are not attacked,” is erroneous. *Panum* did not give figures for the months of the first year of life, nor did he make any general statement of this kind, here or elsewhere, as far as I have discovered. The mortality under one year of age was extremely high; and on *Suderø*, of 24 deaths officially charged to measles, 7 were in children under this age: 1 at two weeks of age, 2 at four months, and 4 at six months. J.A.D.

32. The estimated population, cases, etc., by ages, are shown in the following table:

Age	Population	Number Attacked	Deaths*	Case-Fatality (per cent)
Under 1 year	198	154	44	28.6
1-9 years	1440	1117	3	0.3
10-19 years	1525	1183	2	0.2
20-29 years	1470	1140	4	0.3
30-39 years	842	653	10	1.5
40-49 years	791	613	19	3.1
50-59 years	728	565	27	4.8
60-69 years	480	372	27	7.3
70-79 years	272	211	19	9
80 years and over	118	92	15	16.3
Total	7864	6100	170	2.8

*For *Suderø* only 24 deaths are included, specified by *Manieus* as caused by measles, rather than the estimated excess of 34, for which ages are not given. For the remainder of the islands 146 excess deaths are included, a slightly lower figure than that obtainable directly from *Panum’s* table, as population was increased by 1.06 per cent over that of 1845, as a base for calculating normal mortality in the first two-thirds of 1846. J.A.D.

33. In the translation, all words derived from *Smitte*: Lit., to infect, have been translated in this usage; e.g. *Smitte* = infection ; *Smittestof* = infectious material; *Smitsom* = infectious. The word *kontagium* (*kontagiet*) has been translated as contagion. That *Panum* did not distinguish in his usage is evident from the following passage: “Med Inokulation of *Maeslinger* anstillede jeg ingen Forsøg, da jeg hos de Personer, som bevisling vare udsatte for *Maeslingekontagiet*, ikke kunde vente noget Resultat og hos Personer, som ikke havde vaeret udsatte for *Smitte*, maatte befrgte at gjöre Skade istedetfor Gavn. ” (I made no experiments with inoculation of measles, because I could expect no results with persons

who had evidently been exposed to the contagion of measles; and with those who had not been exposed to infection, I feared that I might do more harm than good.) J.Di.

34. Olai: St. Olave's Day, which commemorates the death in battle of King Olaf (Olave, Olaus), who lost his life in 1030 A.D. in his campaign to establish the Christian religion in Norway. Norway held the Faroes from the 11th century to 1386, when they were acquired by Denmark
35. Bordø: This is the correct spelling, although on the map it is given as Barö. (See Encycl. Brit, 11th Ed., Article on Faeroe Islands.) J.A.D.
36. Concerning the Kvalvig incident, Hoff states that he was informed that at least one of the boatmen who brought the surgeon over had measles at the time. He was told also that the midwife, supposed to have carried the disease to Midtvaag, had never been in Copenhagen and that she had measles while at Midtvaag. Hoff rightly doubts, however, the accuracy of statements obtained 30 years after the event. (See von Jürgensen, lc.247). J.A.D.

Om Maeslinge-Epidemien paa Faerøerne i 1846¹¹

(Efter Landchirurg Regenburgs Beretuing til det kglige Sundhedskollegium dat. d. Pde Juli, 1846)

On the epidemic of measles on the Faeroe Islands in 1846 (From Provincial Surgeon Regenburg's report to the Royal College of Health, dated July 9th, 1846) Translated from the Danish by Joseph Dimont.

"On March 28th, a Faroese returned here from Copenhagen on the schooner Havfruen after a voyage of nine days. It was not until the 7th of April, after this Faroese had been ill for several days, that he permitted me to be called. He was suffering at that time with slight fever, slight headache, and severe pains and tenderness in the joints and extremities, slight cough, and very profuse sweating, but without any infection of the eyes, without the peculiar oppression of the chest or the characteristic measles exanthem. I did not neglect to inquire how he felt in Denmark and on the ship, and whether any illness had existed on board during his return journey. I wanted especially to see if he had any eruption and in this respect I found a few pale spots on the chest. About eight days before his departure he had visited, according to his later story, a fellow countryman in Copenhagen, who shortly thereafter was admitted to Frederiks Hospital with measles.

He had not mentioned this earlier inasmuch as it did not occur to him that his illness could possibly have been due to the short visit twenty-six or twenty-seven days before. I treated the illness according to the symptoms and the character of the fever, considering it to be rheumatic fever, a diagnosis in which I believe any physician would have concurred at the time. After the course of hardly a week the patient felt almost completely recovered and on the ninth or tenth day he went out, without my permission. In the course of a week, two persons became ill, who had attended and nursed the above-mentioned Faroese during his illness. One was an old, rheumatic man who came under my care the other was a boy, 18 years old, living with his parents, who came under the care of the practicing physician Nolsø.

Although the skin eruption on the old man had great difficulty in breaking out, and did not become very distinctly red, I nevertheless declared his illness to be measles, especially since I learned that the above-mentioned boy also had developed measles. I then went to Mr. Nolsø's house and, not finding him at home, I visited the patient, whom I found lying in bed with an intensely red, very profuse, and characteristic measles exanthem, a more typical example of which I have not seen during the entire epidemic. I might mention that, at a chance meeting, Mr. Nolsø and I had discussed these patients and we were both of the opinion that they would develop on exanthematic disease.

The presence of measles having thus been recognized in two houses, I immediately reported the fact to the chief civil officer. As the regulations for the control of measles, according to the statutes of May 18th, 1787, and

¹¹ Published in the Bibliothek for Laeger R., 14, 444-448. 1846.

May 27th, 1803, had been repealed on June 20th, 1838, he did not consider it legal to institute any isolation of the houses or to cut off communication with the rest of the country. I concurred in his opinion, completely, so far as the isolation of the houses was concerned, since I could not then, as now, see that it would be of any value. It became known immediately throughout the village that an infectious disease, measles, had broken out in two widely separated houses; otherwise no change nor any kind of isolation was instituted, except that all persons were discouraged from visiting the patients and their families, many of whom shortly thereafter took ill, unless they planned to remain there.

The school, which had been ordered closed on account of the prevailing "kruim," remained closed as did also the dance halls on Sundays. I also prepared a general proclamation giving the symptoms of the disease, its nature, the necessary precautions, care, etc, which was posted at the court house and also distributed to the business men, school teachers and others who desired it. Later these same instructions were sent to all priests and business men with the request that they be distributed in the various villages. In addition, I wrote more exact details of the disease to several of the priests and especially to the priest on Suderø, and forwarded the requisite medicine. As soon as it was learned that the disease had appeared on Suderø, and after a conference with the chief civil officer, Candidate Nolsø, the practicing physician, was requested to take up temporary residence on Suderø.

During the time that the epidemic was progressing, he was asked for suggestions, whenever he was willing to discuss the matter. Since Mr. Nolsø declined to accept—but offered to take over my public duties for a suitable compensation—I meanwhile had decided to undertake a tour of inspection to the infected villages on Suderø, when, very fortunately, as regards Suderø, the ship brought the two physicians, I might also mention here that in the year 1839, when Mr. Bithusen, then provincial surgeon, declared the exanthematic disease, which had broken out in Thorshavn, to be measles, no isolation of the houses or the like was undertaken, and, as far as I have learned, this met with no public or private criticism. "So far measles has been, in general; violent and inflammatory, especially here in Thorshavn, but beyond that not particularly malignant. Inflammations of the chest, with involvement of the heart, have perhaps caused malignancy at times but were frequent only as a result of neglect after the illness.

This will not be surprising to one who is familiar with Faroese conditions and housing; and who realizes that the Faroese are both imprudent and self-opinionated in times of illness, after pain has disappeared; and that a high degree of anxiety before and after illness prevents them from giving their neighbors necessary care and assistance. Since the disease broke out so violently that, after it had prevailed for two or three weeks, almost two-thirds of the inhabitants of the village were attacked at once, it cannot be denied that some were actually compelled to set aside caution and the admonitions of the physician.

There have been much wretchedness and poverty in Thorshavn and the public has tried in many ways to assist the needy; for example, oat soup was cooked in two places in the village and carried frequently to the sick. With respect to the mortality, in Thorshavn parish, where the epidemic to the present has been most violent and the wretchedness greatest, there were reported 46 deaths from April 21st to July 7th. Of these, one occurred in Hvidenaes, one in Dal, four in the hospital (three of old age, including one insane person who had suffered from chronic bronchitis for many years, and the fourth of lung abscess following an attack of measles on a fishing boat), and the remainder (40) in Thorshavn village.

The causes of death were as follows: measles, 8; inflammation of the chest, 8; consumption, 7; lung and chest diseases, 8; infirmities of age, 3; internal weakness, 1; nervous fever, 1, and stillborn, 2. The causes are not indicated for the others, including one aged man who died suddenly out in the country. If it be now observed that the deaths listed under measles occurred for the most part among very old people, and in two children under one year of age, it becomes apparent that the disease had a fatal outcome only in the old and weak, and in a few others who were imprudent. The large number of cases at one time have resulted in deplorable conditions, but nowhere has the disease, in itself, had any menacing aspect or exhibited a generally fatal trend.

There is no reason that all commerce should cease here. In many instances convalescence has been very slow, because of lack of caution and care, and on account of violent diarrheas, which have been very common

and severe among those weakened by krum and measles during the last month. The situation, however, is now quite satisfactory and already, on June 20th, I have written to the county authorities that the measles epidemic here in Thorshavn may be considered to be ended. "At the present time, measles prevails most violently on Suderø, where Mr. Manicus is attending the sick, in the above-mentioned villages on Nordstrømø where Mr. Panum is, and now, according to reports, in the northern villages on the eastern side of Østerø, whither I am about to journey today."

Maeslingerne paa Faerøerne i Sommeren 1846¹² (Meddelt af A. Manicus)

Measles on the Faroe Islands in the summer of 1846 (Communicated by A. Manicus)

Translated from the Danish by Joseph Dimont.

The literature on measles is insignificant and incomplete in comparison with that of other acute exanthemata, as, for example, scarlet fever and smallpox. Aside from scattered reports in the journals relating to single outbreaks, there are only a few monographs, several of which date back to the preceding century. That of the Dutchman, Thuessink, should be mentioned as one that is more complete and critical. This limited material is rendered even less suitable for comparative analysis by the uncertainties of diagnosis and description so characteristically prevalent in all the older accounts of measles.

This exanthematic fever, certainly unknown to Greek and Arabian physicians, was so insufficiently differentiated even in the last century that de Haën maintained the identity of measles with smallpox, on the basis of symptoms, and writers prior to the end of the seventeenth century described both diseases as belonging to the same family. It is not known definitely when measles was introduced into Denmark and, as far as I have been able to determine, there is not a single serious epidemic of measles on record in Denmark. The disease has been carried many times by ships from Denmark to Greenland, Iceland and the Faroe Islands.

After a discussion of the manner in which the infectious material acts, inasmuch as this epidemic has yielded pertinent information on this point, I wish to describe the disease as I saw it on Suderø Island during a stay of three months, and as it was demonstrated to me by observation of about 900 patients, most of whom I saw during the exanthem, while the remainder were treated for complications of measles and its sequelae. I shall conclude with a review of the mortality in appropriate places, I shall indicate wherein this epidemic deviates from, or conforms with, reports of other epidemics which I have been able to use for comparison, since the description of an epidemic gains value insofar as it corrects and further elucidates the concept of the disease formed by observation of previous epidemics.

As is well known, the Faroe Islands are completely exempt from our exanthematic fevers, and every time an epidemic spreads over the islands it can be demonstrated that the infection was introduced from the outside, a fact which argues against the view that the exanthematic fevers may arise spontaneously by a sort of generatio aequivoca. It is difficult to be reassured by attempts to render the spontaneous appearance of the infectious diseases more plausible by regarding a certain disease as but a transition to a more complete form accompanied by an exanthem. Such a deduction is, perhaps, not so hazardous with respect to such epidemic infectious diseases as, for example, typhoid fever and dysentery, but, as regards diseases which act so specifically that they confer immunity for the rest of life, it is quite another matter. Thus, according to Schönlein, measles is the most highly developed catarrhal form; but peculiarly enough, on these islands where the catarrhs seem to have their proper home, it is found only as a guest.

One might, therefore, perhaps conceal his ignorance as to the origin of the exanthematic fevers behind the words "under favorable external conditions," an explanation which becomes peculiarly unsatisfactory upon consideration of the fact that measles, for example, in various epidemics, has occurred at all times of the year and under the most varied atmospheric and epidemiological conditions. The reports of these epidemics indicate only that the number of attacked individuals increases with cold weather and with winds from north to east, and that the catarrhal cases exhibit a tendency to become inflammatory, a fact which was also substantiated by this epidemic.

¹² originally published in the Ugeskrift for Laeger: R 2, Bd VI. No. 3-14. March 6th, 1847. Paragraphing, quotation marks and parentheses are as in the original; where the author utilized larger type for emphasis, italics have been used in the translation.

This much, however, seems certain, that whereas the physicians in larger towns tend to assume a new miasmatic source of the exanthematic fevers when, from time to time, they become epidemic, other physicians, who make their observations generally are inclined to assume a contagious transmission which they can easily trace, not being faced with insuperable difficulties which such an investigation entails in larger towns. Measles had last prevailed on the islands in 1781. In April, 1846, it was introduced from Denmark by a Faroese, who had visited an individual with measles in Copenhagen shortly before his departure. His voyage had lasted nine days, during which he was apparently well, and he spent about a week in Thorshavn before measles broke out on him.

Thus we have here an example of a latent stage that lasted somewhat longer than fourteen days. Cazenave and Schedel give the duration of the latent stage as from ten to fourteen days, without further comment. Thuessink observed a stage of over three weeks in his wife, who was exposed to the contagion in Groeningen, and then was stricken with the disease on a trip through Holland, at a time when there was no measles there, three weeks after, her departure from Groeningen.

The contagion spread very rapidly in the thickly populated Thorshavn, and thence it was carried by boats to the other islands. Journeys to and from the trading-places, church and school attendance and grind drives spread the infection to the other villages. The contagion was introduced into Suderø from Thorshavn by an identified individual, and upon investigation it was possible to demonstrate almost everywhere how and by whom the infection had been brought to each village. Whether the infection can be transmitted by such things as clothing, laundry and letters seems rather doubtful, and I did not see or hear of any examples of such transmission during the epidemic.

Thuessink reports the following instance as evidence: A letter from an infected person in the Hague to a relative in Cassel gave the latter the infection at a time when there was no measles in Cassel. This case, however, is open to considerable doubt when one considers the inoculation experiments with measles that I shall briefly present. Home, in Edinburgh, carried out the idea suggested by Monro in the following manner: In several patients with pronounced measles, he scratched the skin between the spots of the eruption, collected the blood on cotton, and placed it upon a small cut in the arm, allowing it to remain for three days. In most of twelve children, so inoculated, there appeared on the sixth day a light fever, copious running of the eyes and sneezing, but almost no cough; this was succeeded by a characteristic but not abundant exanthem.

There are no further successful experiments in this direction reported from England. Home did not succeed in producing any symptoms by inoculating the nasal discharges of measles patients. Willan mentions that he attempted inoculation of serum which is occasionally found in the most prominent papules of the exanthem, without success. On January 6th, 1810, he inoculated a young individual simultaneously in two places, with vaccine and the above-mentioned serum, respectively. On the 10th, some redness and swelling were found at both sites, which however, had disappeared by the 15th from that area where the measles had been inoculated, whereas vaccinia had developed well and had continued until the 18th. On the 22nd, the prodromal symptoms of measles began, and, on the 28th, that is, twenty-two days after the inoculation, the exanthem broke out. Fever and cough were marked. Thuessink, quite justifiably, objects to this experiment, since, in the first place, the results do not agree with those of Home; secondly, because in the long interim nothing was done to insure against later infection; and, thirdly, because it may be supposed that the subject was exposed to infection while the inoculation was being performed directly from the skin of a measles patient.

The experiment demonstrates, however, that vaccinia does not weaken susceptibility to the infectious material, a fact that has been shown also by my traveling companion, Candidate Panum. According to his report, in some cases vaccinia progressed absolutely simultaneously with measles. The same has been observed in variola. Most of the reports, however, indicate that, when vaccinia occurs at the same time as measles, its evolution is stopped by the latter which progresses first. In 1816, Thuessink performed the following experiments: The blood from a small incision between measles macules was inoculated in the same manner as the vaccine; then other individuals were treated according to the method of Home; in others, lacrymal fluid was applied to healthy skin and to skin stripped of its epidermis; and, finally, a piece of cloth, which had been in contact with the breast of a child with a well-marked exanthem, was bound to the arm of a healthy child. All

these experiments failed completely. It is perhaps worth mentioning that, in Thuessink's opinion, based upon personal acquaintance, Home was neither qualified to experiment nor was he trustworthy.

Furthermore, Home's contemporaries in Edinburgh do not recall that these experiments, which at one time attracted much attention, had been performed by him. Nevertheless, the various experiments mentioned, especially those performed by Thuessink, have been carried out on so few individuals and with such little variation of method, that one cannot altogether deny the transmission of the contagion by wearing apparel and bedclothes. Henle's fear that the contagion may be hidden under special conditions, as, for example, neglect of cleaning, for some time, and then develop anew its infective power under favorable circumstances is therefore, perhaps, not so unfounded. I regret that circumstances made it impossible for me to experiment on this important matter.

The latent stage of measles of about fourteen days was so conspicuously constant, that many laymen had already made this observation. Whenever a village had, become infected, about ten days elapsed after the appearance of the exanthem on the first victim before others in the house began to show symptoms of illness, and about fourteen days before the exanthem broke out on them. I shall discuss later several exceptions to this general rule. Thus one could distinguish between many generations of the disease in a house or village, each generation being separated from the preceding by an interim of about fourteen days. I can cite the following illustration from Copenhagen.

The above-mentioned measles patient, who was probably the source of the Faroese epidemic, and who lived in Teglgardstraede, was visited by an individual from Christianshavn on the 18th of March, when the exanthem had begun to develop. On April 2nd, this individual developed the eruption and on the 18th the exanthem broke out on another member of his family. The others in the house had previously had the disease. In another family known to me one of the children was infected at school, and, fourteen days after the appearance of the exanthem, nine others in the same family took to bed with measles. Whereas, at the beginning of the epidemic on Suderø all members of a household were infected at the same time after introduction of the disease, later in the epidemic, a long time often elapsed before runny of them were attacked, but with the usual interval of fourteen days. It might be assumed that the incubation period was shorter and that the infection developed essentially during convalescence and desquamation, especially since no other definite facts speak against this view.

As an example, I may mention the island of Store Dimon, which is surrounded on all sides by nearly perpendicular cliffs and dangerous breakers. The only peasant family living on the island had not had any contact whatsoever with an infected place for many months. A crew rowed from this island to the infected trading-place, Tveraa, on Suderø, and returned on the same day, and had no later communication with any of the other islands. For ten days the men felt well; then they began to fall ill and in the course of fourteen days they came down with the exanthem, whereas another fourteen days elapsed before measles broke out in the rest of the peasant family.

It cannot be denied that the desquamation stage may be infectious, but one should be cautious in accepting this view inasmuch as on general grounds one would suspect the opposite. It almost appears that because such a long latent period could not be conceived, a later stage of the illness was chosen as the infecting one. In the villages of Hove and Lobre, on Suderø, towards the end of the epidemic, there occurred an interval of longer than fourteen days between generations of the exanthem in the same household, without my being able to demonstrate a new infection from without; yet these two cases can be explained by an infection which was transmitted during the stage of convalescence. From the data here presented, I believe that the incubation period of measles can be estimated with great assurance to be about fourteen days, without, however, insisting that this interval is one which cannot be modified by particular circumstances, as, for example, a journey; many factors speak a priori against such an absolute dictum, as well as analogy with the uncertainty of the latent periods of other diseases.

Decrease in the intensity of the infection towards the end of the epidemic is also proven by the observation that later on many houses, which were not isolated and which were close to others that were infected, were exempt. In a few instances, at a time when measles had almost ceased in the surrounding villages, several

individuals actually in the same house, remained free for six to ten weeks after-wards. The old people who had had the disease in 1781, were exempt without exception; there were, however, several houses and small villages that had not been invaded in 1781 and in these the older folk were attacked just as the others. Willan, Rosenstein, and Thuessink, in their long experience with many great epidemics, have also observed the same protective power, without exception. Almost all reports agree also on two apparent exceptions, which I shall discuss immediately. In certain reviews on measles from various countries and authors there are references to the so-called "false measles, morbilli spurii." This occurs most frequently as independent epidemics, without any definite incubation period, is characterized by a very indefinite course, almost complete absence of catarrh, a sharply delineated, bright red exanthem with larger and more discrete spots and papules, which breaks out first and most abundantly on the extremities.

This extremities is not followed by desquamation and there is no protection against measles. This disease may well be rubeola, which, when it occurs in greater epidemics and becomes more confluent, may be quite difficult to distinguish from measles. On the Fames I have not seen any exanthem of the above-described nature; however, several years ago, there prevailed among the children on Strömø an exanthem, accompanied by fever, which was declared to be measles by the local physician; all these children were attacked last year by morbilli hut the previously mentioned illness certainly cannot be regarded as the so-called "false measles" without more definite proof.

However, it is quite different in those instances in which a measles patient has been observed to have had the characteristic exanthem twice within a short period of time. The Dutchman Oudeman has observed among patients, whom he himself treated for measles the first time, the appearance of another equally intense eruption from three to four weeks later. This occurred only among those who had been exposed to the cold too soon and had "forced nature to another battle" when the weather became milder, no cases of this sort were seen. Hufeland observed a similar recurrence in children after an interval of three weeks. We have made similar observations.

Many patients have told me the same thing, hut inasmuch as I had not seen them the first time I could not draw any conclusions, especially since the endemic Faroese influenza, "kruim," had prevailed just previously or at the same time. In one man, however, in the village of Qualbö, I observed the eruption both times; the first time he had not gone to bed until the exanthem broke out. He then got up while it was still present and went about for eight days, when, upon having become thoroughly wet outdoors, he developed a mild fever accompanied by a distinct measles exanthem. The Provincial Surgeon, Mr. Regenburg, reported to me an example in a pregnant woman in Thorshavn, in whom the exanthem disappeared after a difficult labor and then recurred eight days later with fever and profuse sweating.

The duration of the first stage of measles was, on the average, three days; in children it was somewhat shorter and among older people it extended up to eight days. The fever in this and the subsequent stage appeared in two main forms, the catarrhal and the gastric, one succeeding the other. At the beginning of the epidemic the first form, at times somewhat more inflammatory, prevailed, whereas towards the end the gastric form was predominant. Besides these two forms a third form sporadically pervaded the entire epidemic, in which the fever was accompanied by congestive and nervous symptoms and in which the entire disease pursued a much more irregular course. This occurred as a rule among women at the time of menstruation and among older, rheumatic people. Three symptoms which were found constantly in all forms of the fever and which are not emphasized in the current descriptions of the disease were: 1. The profuse sweating which set in very early and persisted even after the exanthem.

The patients were bathed in perspiration, and, when the bedding was raised or the shin exposed, vapors literally rose from them like clouds. One might be tempted to ascribe this to the warm and thick bed coverings and to the prevailing enjoyment of warm drinks, but even in those cases, where opposite procedures were followed or where poverty and a poor dwelling place made a warm regimen impossible, and in the majority of those patients whose diet I had changed, having found it injurious, sweating was a constant symptom. 2. The sensation of a severe compression occasionally over the sternum, more frequently in the cardia and across the hypochondria as if something were constricting them.

Frequently when the catarrhal fever and cough were insignificant this latter was the only alarming symptom. It occurred usually among women, and simulated a violent cardialgia, entirely different from the dyspnea and orthopnea which were present when an intense bronchitis had developed. There was as a rule considerable mitigation of these symptoms at the time of the appearance of the exanthem. 3. The abundant presence of miliaria. These have frequently been seen to accompany measles of various types, the gastric as well as the catarrhal. Only Hildebrand associates them with the nervous form. They could not be considered peculiar to any part of the epidemic, but only as symptomatic, inasmuch as they appeared on the skin after the measles had broken out, without association with any particular symptoms and without complicating the disease or changing the prognosis. In none of the patients on Suderø were they associated with nervous symptoms. It is difficult to say whether they constituted an independent phenomenon related to the feeling of constriction in the chest. Not infrequently, the catarrhal form began with chills and fever, and most of the patients were sensitive to cold and subject to horripilation.

Exacerbations and remissions were mild in most cases; frequently they were practically absent. Usually the disease was ushered in by an oppressive headache over the eyes and in the forehead, dry paroxysmal cough, slight conjunctivitis, usually restricted to the eyelids, running of the nose without excoriation, hoarseness and the sensation of compression in the chest. Occasionally earache, angina, and severe nose bleed attributable to the cough, were observed. The tongue was moist, whitish and heavily coated; movement of the bowels was normal; and thirst was intense. Among adults the pulse was not below 100; on the third or fourth day, it was frequently from 100 to 120. On the second day, the skin, already congested on the first day, began to perspire. It is this catarrhal form of the fever that was accompanied by inflammation, by pneumonia among the younger subjects, observed in five cases, and by intense bronchitis among the older. During the second half of the epidemic the symptoms of the gastric form prevailed over the catarrhal nausea, vomiting, colicky pains, diarrhea, cholera, and in several cases dysentery.

Those with the last mentioned involvement had, almost without exception, been exposed to severe cold, or, impatiently waiting for the breaking out of the exanthem, had arisen from bed in spite of the fever, and even gone outside. Only after the dysentery had subsided did the skin become moist and warm and the exanthem appear. The patients with this form of the disease suffered, in general, longer from the fever, loss of strength and insomnia. Among children below three years of age, during the latter half of the epidemic, the disease was complicated most frequently by enteritis, occasionally associated with a diphtheritic inflammation of the throat and mouth, which claimed many sacrifices. It was characterized by a high fever, tense rigid abdomen tender to pressure, diarrhea and vomiting, unquenchable thirst, difficulty in swallowing, hiccough and a weak, squeaking voice. In more than half of the patients there were observed large confluent membranes in the mouth and throat; when these were detached there was exposed a bleeding, ragged surface with sharp, uneven edges. One child, who passed through the disease, could not regain her health, and upon my departure was hectic with symptoms of mesenteric phthisis.

The congestive nervous form of the disease occurred mainly among girls and young women. At the onset the disease usually provoked premature menstruation, which, as the fever and the congestion of the skin increased, ceased altogether this was also true when the disease coincided with a menstrual period. A similar condition is also observed in the Faroese typhoid fever, "landfarsot." As soon as menstruation ceased, fever and congestion of the head increased, in several cases associated with delirium, palpitation of the heart, ringing in the ears, great anxiety, repeated fainting, cramps and, occasionally ischuria. One woman died, as the table indicates, with signs of inflammation of the brain, which lasted three days during the first stage of the disease; the symptoms became manifest the day after the cessation of menstruation. Insomnia, vertigo, mental confusion, cardialgia, vomiting and vague rheumatic pains in all limbs, were frequently seen in old, decrepit, gouty people, and lasted up to eight days before the exanthem appeared. During the second stage, the exanthem broke out on the red, swollen skin. As a rule the constriction in the chest was relieved considerably, whereas the other symptoms—fever, cough, perspiration—remained unchanged, at least during the first day. This has been observed in most epidemics.

Only among children and plethoric individuals was the face considerably swollen so that the nose appeared retracted and the eyes could be opened with difficulty. The exanthem appeared in the following sequence: First in the region between the ears and the corners of the mouth, and almost simultaneously with it on the forehead

and chin, neck, wrists, forearms, upper part of the chest, shoulders, stomach and thighs. The lower extremities were much less affected than the upper; the upper arm, as well as the back and chest had a very slight eruption. The exanthem was most concentrated around the articulations of the hand and knee and on the forearm; on the extremities it was more abundant on the flexor surfaces. In several individuals the exanthem extended to the hairy parts of the head. I did observe injection of the palate and pharynx, but I cannot say to have discerned anything resembling measles spots.

During the whole epidemic the spots on the skin were so evident that one could be convinced by feeling them. The papules in the middle of the spots were well developed on the face and, as far as I could determine, they developed earlier and more rapidly than the red spots around them. Observing such a group of almost acuminated, and occasionally somewhat transparent papules, surrounded by a red halo on the chin and forehead, one might be tempted on first glance to assume the disease to be smallpox. This marked development of papules was found almost exclusively on the face, less distinctly on the wrists and forearms, whereas the exanthem on the other parts of the body was more or less macular. Fridsch (in his dissertation on measles, 1772, Copenhagen) also cites the distinct difference between the papular exanthem on the face and the macular eruption on the rest of the body. Lientaud also calls attention to the same thing, and proposes that this distinction should be employed as a diagnostic test between the beginning of smallpox and measles; this should also be true, perhaps to a greater extent, for scarlet fever and measles.

The papules may, as Willan, Cazenave, and Schedel point out, occasionally develop into small vesicles; there were actually traces of this in the faces of children. Until the third day after the eruption of the exanthem there appeared in more than a third of the cases miliaria, irregularly grouped, as a rule on the red surface of the measles spots, most abundant on the face, neck and breast. Usually they disappeared in the course of one day. Whereas the exanthem in older persons was sparse, discrete and pale, and broke out in crops on several successive days, in plethoric individuals, and especially in children, it was confluent, forming, over the cheeks and nose, elevated, irregular plates of skin; in most places the spots were aggregated in clusters with intervening spaces of natural skin. Febris morbillosa sine exanthemate has been frequently observed, by F. L. Bang among others; I, however, did not see any that I could definitely classify as such; on the other hand, I found single, scattered spots as a rule on younger people who maintained that they did not have measles either because they wanted to consider themselves healthy or because they mistook the prodromal symptoms of measles for influenza.

An intense, bluish form of the eruption occurred on the swollen face of a child who died during this stage from hydrocephalus. As a rule it required twenty-four hours for the exanthem to break out; it remained another twenty-four hours at its height and then began to regress. On the sixth or seventh day of the disease it had disappeared completely. The order of disappearance was not the same as that of appearance; thus it persisted longest on the face and arms. Neither the exanthem nor measles as a whole exhibited any tendency to recur, at least not suddenly. If this however does occur, it seems hardly rational to treat the former with emetics and purges and the latter with random venesection, as was frequently done in the past. F. L. Bang cites an example of a man who was bled five times in succession at short intervals, and yet a luxurious eruption remained.

This was also the case with a woman in Trangisvaag, who in a delirium during the second stage got out of bed in the evening and ran about naked in the village. The epidemic claimed most victims in the village of Sumbö. This was probably due to the poverty of the inhabitants, the bad housing, the fact that the measles attacked the majority of the population at once, and the lack of proper diet and medical instruction. Here it frequently happened that people with the exanthem were compelled to get up to attend to the household necessities. Under these tragic circumstances some contracted cerebral conditions which were fatal. I cannot state anything definite as to the nature of the exanthem in these cases as I did not chance to see the patients; however, it was said that it was of bluish color; In women in the seventh or eighth month of pregnancy measles usually provoked premature birth, which in four cases observed during this epidemic, occurred six to eight weeks too early. One of the women died, undelivered, before my arrival at the island.

One of the premature children, very weak after a difficult delivery, died 24 hours later, without anything to be found on the skin. A second child was born four days after the measles broke out on the mother, and

presented an entirely desquamated skin, simulating pityriasis. It did not contract measles later on. A third child was born eight days after the appearance of the exanthem on the mother. When I visited the place fourteen days later I found the child to be suffering from measles and enteritis; it died. Several days after the greatest intensity of the exanthem there appeared here and there pale yellow then grayish-white spots. Desquamation was very incomplete and in many instances there was hardly any to be observed. It was limited to several small, white, wrinkled patches of skin on the face and arms.

The fever subsided, but the cough remained; most of the patients got out of bed on the eighth day of the disease. In occasional cases there occurred, at this stage, diarrhea and colic, and, in one woman in confinement, a very violent dysentery. In older folk the cough continued, with bronchitic expectoration, dyspnea and night sweats; it often persisted for several weeks before they could get out of bed. Occasionally death occurred from suffocation or [Iron] complete exhaustion especially when the diarrhea was particularly marked. Phthisis, like scrofula, is rare on the Faroe Islands.

Some earlier physicians even denied their existence there; however, just as I saw several scrofulous children, I believe definitely to have been able to diagnose tuberculosis in three younger persons on the basis of symptoms and physical signs. None of those attacked that I saw on Suderø died of phthisis. From two to five weeks, sometimes longer, after the patients had gotten tip and resumed their ordinary mode of living, diarrhea used to occur three or four times in twelve hours, usually without pain, in some patients accompanied by colic and rheumatic pains in the extremities, and occasionally by simultaneous vomiting and status gastricus. Fever was generally absent; tenesmus and pain upon deep pressure on the abdomen were exceptional. If the patient restricted himself to a somewhat reasonable diet it was soon relieved; but if he went outside and got his feet wet the diarrhea would recur immediately.

Thus matters alternated for many weeks, and, when grossly neglected for many months, led to loss of strength, great thirst, lack of appetite, a red tongue and a tendency to profuse sweating upon slight exertion. Older folk had to remain in bed. This diarrhea spared most Danish families, and was very mild among the well-to-do natives. However, it was particularly severe and persistent in the poorer villages, where many individuals were obliged to resume their work much too early. The possibility of intestinal ulcers has been suggested as its etiology, but this seems highly problematical. Peyer's glands are indeed swollen in the exanthematic fevers, and even form plaques; but these are of a different nature than those found in diseases which lead to the actual formation of intestinal ulcers.

I am not acquainted with any observations of ulceration following scarlatina or morbilli. Cazenave and Schedel did not find any changes in the intestinal canal in scarlatina, in which diarrhea is a very prominent clinical symptom. In the more persistent and severe cases a dysenteric process and a few ulcerating glands were possibly involved. In several severe epidemics of measles, in which dysentery was a general symptom, this dysenteric process was found in the mucous membrane of the large intestine. Furthermore, it might be emphasized that dysentery and diarrhea are diseases which occur year in and year out, and occur not infrequently in epidemics, to which the damp and raw weather and the mode of living of the inhabitants may be important predisposing factors. In many cases where measles did not prevail people suffered from diarrheas and colics, but not as generally and severely.

Quite a few convalescents suffered from furunculosis, ecthyma and eczema, and it was fairly common that even several months after the measles a large part of the hair fell out. In older persons there remained a light blepharoadenitis, running of the eyes and photophobia; only in three cases did I observe serious consequences, namely, ulcerative keratitis in a child and in an old man, and in a man, who had been particularly negligent, loss of sight in one eye due to the formation of a staphyloma. Catarrhal otitis was one of the not infrequent sequelae. In comparing this description with those which I have read of other epidemics, it is found that they too mention the catarrhal form as the most frequent.

Some authors differentiate between simple and catarrhal measles, without, however, justifying such a distinction in their descriptions. Similarly, perhaps, one ought not to distinguish inflammatory measles from catarrhal, which differs from it only quantitatively: more violent inflammation of the eyes, angina, croup and

pneumonia, later appearance of the exanthem, a daily rising fever causing more pronounced exacerbations, nosebleed, swelling of the skin, and cerebral congestion.

The gastric form, however, is most clearly differentiated, and the bilious symptoms, which some have maintained as a distinct form in itself, are attributable to this type. The third form is composed of the "nervous-putrid" measles, or, as it is frequently called, malignant measles. In the accounts of epidemics of measles with nervous fever, one does not see a typical nervous fever with its peculiar course. Usually only a few symptoms are present which rather suggest inflammation of the lungs, intestines or brain.

Most recent observers agree that "nervous measles" occurs very rarely, and that the symptoms usually attributed to it are generally due to inflammations; Hildebrand also maintains that it occurs only sporadically and not epidemically. In a few instances a typhoid condition preceded the eruption of the exanthem, which pursued a highly irregular course, occasionally accompanied by petechiae and violent dysentery. As a rule those attacked in this fashion were wretched, debilitated people. This form appears most prominently in the account of the great epidemic in London in 1763 to 1768, where gangrene of the neck and extremities, and dysentery were very frequent.

Besides this severe form, ordinary measles was also present during the epidemic, the diagnosis of which is amply confirmed by Watson's description. I did not observe any croup or whooping cough, which were seen during and after the measles in other epidemics. Diarrhea was a fairly constant symptom during and after the disease. It usually began during the stage of desquamation or somewhat earlier, and was thus considered by many as a sign of alleviation. In epidemics that have been regarded as severe, diarrhea was bloody and of longer duration, and appeared early during the eruption. Ranøe, in his report of the Copenhagen epidemic of 1781, mentions bloody diarrhea as a sequela when the patients were exposed to cold. Among the rarer sequelae, anasarca, abscess of the parotid, noma and metastatic abscesses are mentioned by many authors. On Suderø, which had a population of 1156 persons in 1845, the number of individuals attacked was approximately 1100.

When I arrived at the island eleven had already died, out of about one-third of the indicated number of cases, and later thirteen more died, thus comprising a mortality of not quite two per cent of the attacked. Our data are too inadequate and uncertain to determine the usual mortality of measles. Thuessink asserts that 140 died, of about 2000 cases, in the epidemic of 1816 in Groeningen; Guldbrand reports no deaths out of 200 cases in 1781. The average age of those dying on Suderø was, for males, 23.2 years, and, for females, 34.17. On the island of Østerø it was for males, 50.5, and for females, 55.25. This difference is due to the greater mortality among small children on Suderø. Whereas the average mortality or one year on Suderø, calculated for the period 1837 to 1846, was 16.4, the mortality for the present year, on the first of September, already amounts to 41, and it may be assumed on the basis of average monthly calculations that at the end of the year it will exceed the usual mortality three times.

The following table indicates, as far as it was possible to determine, the cause of death, stage of the disease, age and sex:

Complication	First Stage		Second Stage		Third Stage			
	Males	Age	Females	Age	Males	Age	Females	Age
Pneumonia					1	46	2	$\left. \begin{array}{l} 40 \\ 40\frac{1}{2} \end{array} \right\}$
Bronchitis			2	$\left. \begin{array}{l} \frac{1}{2} \\ \frac{1}{2} \end{array} \right\}$	1	$\frac{1}{3}$	1	56
Dysentery Hectic, as result of bronchitis and diarrhea							2	$\left. \begin{array}{l} 86 \\ 63 \end{array} \right\}$
Enteritis			3	$\left. \begin{array}{l} 1 \\ \frac{1}{2} \\ \frac{1}{3} \end{array} \right\}$	2	$\left. \begin{array}{l} 1/24 \\ \frac{1}{2} \end{array} \right\}$		
Hydrocephalus Congestions of the brain with delirium			1	1				
		1	32	1	$22\frac{3}{4}$	1	$41\frac{1}{2}$	
		1		7		5		3
								8

About the Author¹³



It is a privilege to contribute a biographical sketch in honor of the memory of Peter Ludwig Panum. I shall endeavor to present an evaluation of his scientific achievements for the medical reader, in so far as this is possible for a physician who is not a professional physiologist. As a student of Eschricht and later of Panum, I was profoundly impressed by the significance of Panum's arrival at the University of Copenhagen. His predecessor, Eschricht, had adhered essentially to the viewpoint of comparative anatomy; he had remained aloof from pertinent discoveries in physical chemistry, and even from the experimental approach of Magendie. Thus the appointment of Panum was an event of far reaching importance. Panum was indeed the one to reform the study of physiology at our university.

From his youth he had devoted himself to the new developments of science and had worked untiringly in its spirit. As a student, it is said that he had expressed himself at an audience with Christian VIII to the effect that he desired not only to become a scientist, but to attain a professorship in science. That this ambition was not the fantastic dream of an adolescent was demonstrated abundantly by his later career. Many obstacles and handicaps had to be overcome, first of all those which ever face the impoverished student. At the time of Panum's birth (December 19th, 1820), his father was a regimental surgeon at Rønne, on the island of Bornholm.

Later the family moved to Eckernförde, in the war-torn Schleswig-Holstein. While the son was attending school at Flensburg, his father died (1836). A few years later Panum matriculated at Kiel, but transferred to the University of Copenhagen in 1841. Upon arrival here he was entirely without means of subsistence, but, fortunately, obtained a position as a school teacher. Within a short time his abilities became so evident that he was greatly in demand as an instructor in the natural sciences and was able to support not only himself but his immediate relatives. Panum did not teach merely to gain a livelihood. He was greatly interested in his subject, was critical of current pedagogy and was concerned particularly with the position of the natural sciences in the

¹³ By Dr. med Jul. Petersen. Originally published in the Nordiskt Medicinskt Arkiv: Ed XVII; No. 24; 1885. The translation has been somewhat abbreviated.

educational pattern. He wrote an elementary text-book, entitled: "Methodisk Ledetraad til Brug ved Undervisningen i Naturlärens Begyndelsesgrunde,"¹⁴ and, in the introduction, emphasized strongly the importance of these subjects and demanded for them a greater share of the curriculum. In spite of his didactic activities, Panum pursued his own studies with such zeal that, in 1845, he passed his medical examinations with honors. Immediately afterwards he became a "Kandidat" at Almindeligt Hospital in Copenhagen. His hospital training was interrupted in the following year when he was chosen by the government as one of two young physicians to go to the Faroe Islands, where a particularly violent epidemic of measles was raging. There he found an opportunity to give brilliant proof of his talent for investigation.

Taking advantage of the unique conditions prevailing, on these islands, he studied the infectiousness of measles and, in particular, determined its period of incubation. His first medical treatise "Iagttagelser, anstillede under Mäslingeepidemien paa Färøerne I Aaret 1846,"¹⁵ is a master-piece. After its appearance in the Bibliothek for Laeger, an abstract was published in the first volume of Virchows Archiv (1847), entitled: "Beobachtungen über das Maserncontagium." Thus he established an enviable reputation abroad at an early age. Virchow had become acquainted with Panum earlier in the same year, when the latter, thirsting to see and learn something of medical science in other countries, had accumulated his savings carefully and undertaken a journey to Berlin. The two young scientists were immediately attracted to each other and established a friendship which was to last a lifetime.

The following years Panum spent as a practicing physician at the Almindeligt Hospital, as a naval physician during the War of Schleswig-Holstein, and as cholera-physician during a small epidemic in Bandholm on Lolland in 1850, which he described capably in the Hospital Meddelelser (volume 3). This last undertaking ended his activities in actual medical practice. His temperament directed him towards pure scientific research, especially in the field of physiological chemistry. By diligent self-study he had progressed in 1850 to the point where he could publish two reports in the Bibliothek for Laeger, entitled: "En hidtil lidet paagtet, i Blodserum konstant forekommende Proteinforbindelse, der i sine Forhold Stemmer overens med Kasein,"¹⁶ and, "Kunstig Mälk og kunstige Celler."¹⁷

These articles appeared in translation in the third and fourth volumes of Virchows Archiv. In 1851 he presented his doctorate thesis, likewise in the field of physiological chemistry, the subject being: "Om Fibrinen i Almindelighed og dens Koagulation i Särdeleshed."¹⁸ Immediately thereafter he went abroad for two years. The first months he spent at Würzburg where he was intimately associated with his friend Virchow, who had become a professor at the University of Würzburg, following the political reaction in Prussia. He also studied assiduously with another young professor at that institution, Koelliker; but, being prompted by his particular interest at the moment, he devoted himself especially to the study of physiological chemistry, first under Scherer at Würzburg, and later under Lehmann at Leipzig.

The second year was spent in Paris, for a time under Würzburg, but chiefly under Claude Bernard, participating in the investigations of that genial physiologist in his laboratory at the College de France. Panum was now fully equipped to play a significant role in physiological research, which, based on the fundamental natural sciences, was being developed with particular vigor and ability in Germany. Immediately upon his return he was fortunate enough to be appointed Professor Extraordinarius in physiology, medical chemistry and general pathology at the University of Kiel. The young Danish scientist had to begin at the bottom. Violent national and political dissensions were seething in Kiel and he met with many difficulties in his endeavor to prevail against the domination of the German professors at the University.

Soon, however, his calm temperament, charming personality and outstanding ability made a favorable impression and won the respect of his colleagues. Thus established, he embarked upon a fruitful career. Panum's primary concern was the application of the fundamental sciences to experimental studies in medicine.

¹⁴ Guide to Instruction in the Principles of Science.

¹⁵ Observations made during the measles epidemic on the Faroe Islands in the year 1846.

¹⁶ A hitherto little observed protein combination appearing constantly in the blood serum and which in its proportions resembles casein.

¹⁷ Artificial milk and artificial cells

¹⁸ On fibrin in general and its coagulation in particular.

To achieve this end, he pursued a wide variety of activities. Shortly after his arrival at Kiel, he gained the support of the other members of the faculty in the organization of the Physiological Society of Kiel, which carried on a very active program under his able leadership.

By perseverance he obtained a suitable experimental laboratory, from which there emanated during the following years many series of outstanding physiological experiments which established his position in the scientific world. In 1863 he began the publication of one of his most extensive and significant experimental projects: "Experimentelle Untersuchungen zur Physiologie und Pathologie der Embolie, Transfusion und Blutmenge," in the 27th volume of Virchows Archiv, and completed it in the 29th volume. This appeared later in several volumes of the Bibliothek for Laeger, and was published separately by Reimer in Berlin. These investigations, characterized by their thoroughness and brilliance, are an extension of Virchow's earlier work on embolism, and Panum's findings on capillary emboli are of especial significance to pathology. His studies on transfusion aroused particular interest among practicing physicians. He demonstrated clearly the harmlessness of defibrinated blood, thus heralding the method of indirect transfusion which has been used frequently to great therapeutic advantage. He pointed out the danger inherent in transfusions from animals to man.

To this aspect of the problem he returned twenty years later, when Hasse and other German physicians were advocating the use of lamb's blood for phthisis and other debilitating diseases. Panum exposed the fallacies of these physicians so thoroughly and convincingly that this ostentatious procedure rapidly disappeared from ethical medical practice. The experiments on the pathogenesis of embolism had prompted Panum to study septic emboli and pyemia, and his results were published in the Bibliothek for Laeger (1856) under the title: "Experimentelle Bidrag til Læren om den saakaldte putride Infection."¹⁹ This paper did not attract much attention at the time, but in later years together with his work on ptomaines, it was accorded proper evaluation and credit.

This problem was studied later in its bacteriological aspects, the results being published in Virchows Archiv (Vol. LX) and in the Nordiskt Medicinskt Arkiv (1878). Panum's years at Kiel were marked by intense activity in research. One project followed immediately upon another, each being carried out with characteristic caution, thoroughness and sincerity. He was preoccupied for several years with the physiology of vision and in 1858 published his great treatise: "Physiologische Untersuchungen über das Sehen mit zwei Augen." He contributed also several smaller articles on this subject to the Bibliothek for Laeger and to German journals (Reicherts und Du Bois-Reymonds Archiv, Gräfes Archiv 1. Ophthalmologie, etc.)

During the same period, Panum launched an extended study of the genesis of monsters. In a very comprehensive article: "Untersuchungen über die Entstehung der Missbildungen, zunächst in den Eiern der Vögel" (Berlin, 1860), he made the significant observation that definite anomalies may be produced during the development of the egg. Thus he demonstrated that these phenomena, which had been ascribed to an inscrutable "lusus naturae," are dependent upon physiological laws. He continued these studies later in Copenhagen with emphasis on the embryology of mammals, summarizing his findings in the first volume of the Nordiskt Medicinskt Arkiv (1869).

Notwithstanding the great demands of his experimental work, he found time to contribute frequent reviews of the work of contemporary physiologists to the Bibliothek for Laeger, especially in the field of physiological chemistry. Panum spent eleven brilliant years at Kiel, the last six as Professor Ordinarius. His laboratory gained a wide reputation as an institution where research was carried on seriously and energetically. He was proud of his Danish origin and deeply attached to all things Danish; yet he maintained the best personal relationships with his German colleagues. Anti-Danish sentiment in Holstein, however, increased to an extreme and under such tension the position of a Danish professor could not have been a happy one. It had, indeed, always been Panum's ambition to be associated with the university in the Danish capital, and this desire was naturally accentuated by the current feeling.

¹⁹ Experimental contribution to the theory of the so-called putrid infections.

The sudden death of Eschricht early in 1863 presented the opportunity. The two men, however, represented completely divergent schools of scientific thought and much as Panum desired the appointment, he could not compromise. The unhampered pursuit of science in accordance with those principles which formed the basis of his outlook always dominated his course of action. As a condition of acceptance, he stipulated that a modern experimental laboratory be provided for the study of physiology.

This radical departure from the Eschricht tradition met with strenuous opposition. His request was granted only after much debate and negotiation and after the publication of a paper in defense of his cause, entitled: "Til Oplysning Om de fysiologiske Laboratoriers Oprindelse, Formaal, Fornödenheter, Kaar og Indretning" (Ugeskr. f. Laeger, 1863).²⁰ In the spring of 1864, when the Second War of Schleswig-Holstein was at its height, he was appointed to the chair of physiology, physiological chemistry and comparative anatomy at the University of Copenhagen. Even after his appointment Panum met with difficulties which only unbending determination and inexhaustible energy could surmount.

He encountered opposition from influential quarters in the faculty, fostered by the national despondency created by the disappointment of the Second War. Panum was a fervent patriot, as he had demonstrated at Kiel yet his whole intellectual and scientific temperament derived its essential inspiration from Germany and found there its strongest allegiance. Nevertheless he was soon able to demonstrate concretely that he had been completely nationalized, in the highest sense of the word, and that the honor and the prestige of his Fatherland were close to his heart. Here, too, he had to begin at the bottom, perhaps more literally than at the Kiel. From Eschricht he did not inherit as much as a test tube or a spirit lamp. Soon, however, he had installed a temporary laboratory, with essential apparatus and experimental animals, in the cellar of the university, already filled with Eschricht's stuffed whales.

He commenced an extensive study of metabolism, based on the work of Bischoff, Pettenkofer and Voit. In 1866, his first significant achievement in Copenhagen was reported in the Ugeskrift for Laeger, under the title: "Bidrag til Bedømmelsen af Födemedlernes Näringsvärdi."²¹ This was followed, in the same year, by a publication in the Bibliothek for Laeger, of results of his work in the new "mediko—pneumatiske" institute, an a treatise entitled: "Fysiologiske Undersögelser over komprimeret Luft."²² In spite of financial and other difficulties, in the summer of 1867 he succeeded in transferring his laboratory to the old Surgical Academy Building; thus he was able to abandon the dismal cellar of the university and accord to physiological research the prominence which it merited. He attracted numerous students and inspired them with the vigor and enthusiasm which he possessed so abundantly. His laboratory quickly achieved wide renown. It was the only place in Copenhagen that afforded opportunity for experimental medical research. It was open to anyone, young or old, who was devoted to this pursuit; anyone could avail himself of Panum's superior experience and ready assistance.

Panum was intensely interested in medical education. He was dissatisfied with available manuals and textbooks and devoted himself to their improvement with his usual thoroughness. Within his first year at Copenhagen he completed the first volume of a new textbook, which included an introduction to the study of physiology, describing its limits, objectives, basic principles and significance, both practical and theoretical. This introduction acquired unusual importance in view of the fact that the new scientific physiology was a "terra incognita" at the university and in medicine generally.

The first part of the text proper appeared in 1867. In a volume of 215 pages, it encompassed the very difficult and intricate section on nerve physiology, modestly entitled "Erindringsord til Foreläsningar,"²³ but actually yielding infinitely more. Panum followed an original plan, in keeping with his conservative temperament. He attempted to place the entire emphasis on accepted facts and to differentiate sharply between these and purely theoretical speculations, which, according to Lotze, are valid for about four years. "Only simple direct and actual facts persist in our science," he stated in the introduction, "and they remain and retain their full value even though the attempt to correlate them into a particular pattern may prove to be fallacious." In fine print, he

²⁰ Details concerning the Physiological laboratory: Origin, aims, requirements, conditions and arrangements.

²¹ A contribution to a criticism of the nutritive value of certain foods

²² Physiological studies on the effect of compressed air

²³ Notes on lectures

considered all that lies beyond indubitable fact and all hypotheses and theories. The subsequent volumes appeared at short intervals and in 1872 the series was complete. It was a unique work in its field, containing a complete and satisfactory review of the facts of physiology. It soon became obvious, however, that the peculiar method of presentation made the volumes difficult to adapt to the needs of the students.

Realizing this fact, he adopted a more lively presentation in the new edition, begun in 1883, according equal attention to theoretical and factual aspects. Unfortunately only four volumes of the new edition were published, the last one posthumously by his assistant Dr. Bohr. The first introductory volume was completely revised. It included a detailed defense of vivisection in experimental science; this Panum considered necessary in view of the continued agitation of the animal protection leagues.

The enthusiastic interest in the problems of students also found expression in attempts to reform the methods of medical study. Having determined the desirable changes, he devoted himself to them whole-heartedly. In 1870 a committee was appointed to amend the methods of medical study and examinations. Panum, as a member of this committee, exercised outstanding influence, and many innovations were attributable mainly to his initiative. If some of these seemed to be of questionable importance and even in need of modification, it should be said that on the whole they denoted actual progress, particularly the new arrangements for preparatory examinations in medicine and the widening and improvement of clinical instruction. Panum's efforts were not limited to the undergraduate curriculum; he tried also to widen the intellectual horizon and interests of graduate physicians.

Several projects which were undertaken simultaneously with academic reforms—notably the establishment of a medical reading room and the merging of the two medical associations, the Philiatrum and the Royal Medical Society—were largely credited to his endeavors. In Panum's soul there stirred even greater plans for the improvement of medicine. His fine patriotic spirit dwelt with sorrow upon the limitations imposed upon the growth of science by the insignificance of his vanquished country. He realized that only through unity and cooperation of the Scandinavian countries could he hope for greater progress and became an enthusiastic agitator for a practical Scandinavianism. In 1866 he succeeded in organizing a group of Copenhagen physicians to submit reviews from all Scandinavian journals to the Yearbook of Virchow and Hirsch. This group has continued to function regularly. At the general meeting of scientists in 1868 in Christiania, the first gathering of its kind, Panum participated as the representative from Copenhagen.

He heartily supported Professor Key's suggestion to publish a medical journal for the Scandinavian countries and served it with undiminished interest as the Danish co-editor and as a prolific author until his death. At this meeting Panum proposed "to hold more frequent meetings of the Scandinavian physicians independently of the general conventions." A committee on preparations, consisting of Panum, Santesson and E. Winge was selected to act upon this proposal, it was decided to hold the first meeting of Scandinavian physicians in Göteborg in 1870. Panum was very enthusiastic about the possibilities of these meetings, and he suggested reforms that were perhaps too radical for the times. Apparently the clear-thinking, critical scientist also had moments when his enthusiasm carried him away.

His plan for 'reciprocal medical practice' among Scandinavian doctors, which he championed vigorously at every opportunity, was, nevertheless, a daring appeal to the future. Panum's striving, indeed, was not in vain a standing commission was appointed to report on medical education and practice in Scandinavian countries. This zeal to obtain greater recognition for his country was expressed also by his interest in the International Medical Congresses. Panum was one of the outstanding figures in the great London Congress of 1881. He supported eagerly the movement to have the next international meeting in Scandinavia, and since neither Christiania nor Stockholm was inclined to accept the invitation, he succeeded, in spite of opposition and skepticism on the part of his Danish colleagues, in bringing the Eighth International Medical Congress to Copenhagen (1884).

He was elected chairman, and demonstrated that his energy and enthusiasm had not diminished, and that he possessed greater executive talents than many had realized. Gradually Panum had become more intimate with his colleagues from other Scandinavian countries and it gave him great joy to observe the constantly warmer recognition which they accorded him. His reception at the Jubilee of the University of Upsala in 1877,

as rector and delegate of the University of Copenhagen, was an eloquent expression of this closer association. At the same time he was elected to the Swedish Academy of Science, succeeding Ehrenberg.

In 1878 he was made a member of the Royal Scientific Society in Göteborg, and in 1879 of the Norwegian Association of Scientists. At the Copenhagen Congress he had the unprecedented pleasure of being regarded as the representative not only of Danish but of all Scandinavian medicine.

During his later years Panum interested himself greatly in plant physiology, especially in its practical importance to agriculture and industry. He was an active director of the Carlsberg Laboratories and was deeply interested in research carried out there. In 1879 he visited a number of foreign laboratories for plant physiology and on his return he advocated pursuit of this science at the university. His views on the relation of plant physiology to agriculture were the subject of an excellent series of articles in the *Agricultural Lexicon* of that year. These diversified activities still left him time and energy to continue his purely scientific work. He carried out numerous studies on metabolism and on gastric fistulas in dogs—his last experimental study. At the time of his death he was engaged in a large project on bacteriological methods.

During his last years he entered a new field, that of the history of Danish medicine. This interest was aroused when he accepted the task of preparing short historical reviews of the various faculties for the Jubilee celebrating the four hundredth anniversary of the founding of the University of Copenhagen. Temperamentally, Panum was perhaps alien to historical writing. Nevertheless, his article: "Vort medicinske Fakultets Oprindelse Barndom"²⁴ was a creditable and thorough accomplishment. He continued his description, with a moving and fascinating presentation of an interesting period in Danish medicine in an article entitled: "Bidrag til Kundskab om vort medicinske Fakultets Historie med Hensyn til dets Betydning for Naturvidenskabernes og Lægevidenskabens Udvikling i Danmark 1648-1766."²⁵ Much of this detailed half-biographical description of outstanding medical personalities was incorporated into the "Biographisches Lexikon der hervorragenden Aerzte aller Zeiten and Völker" begun by Hirsch and Wernich in 1883, to which Panum had been induced to become the Danish contributor.

He wrote numerous biographies of the old Danish physicians and sacrificed much time to assure proper recognition of his country in this international project. Here again Panum exhibited loyalty, perhaps his most outstanding trait, a loyalty to everything he undertook, which did not recognize fatigue and insisted upon unconditional fulfillment of all obligations. Panum labored with undiminished vigor to the end. After the Congress, he had seemed somewhat fatigued, but this made no visible imprint on his work. In the spring of 1885 he suffered for some weeks from dyspnea, but he took the matter lightly and, even on May 1st, when attacked by severe pain and forced to remain in bed, he talked cheerfully about his "neurosis." On the following day, after dictating some letters, he suddenly expired. Thus was extinguished, at the age of sixty-four years, a life which had been loyally dedicated to the best interests of the Fatherland, the whole of Scandinavia, and the great international world of medicine.

For a bibliography of Panum, with many useful supplementary notes, see: Gafafer, William M.: *Biography of Peter Ludwig Panum (1820-1885), Epidemiologist and Physiologist*. Bull. Inst. Of Med. II. 258-280. June, 1934. (Supplement to the Bull. Johns Hopkins Hosp., LIV, June, 1934.)

²⁴ Origin and development of our medical faculty

²⁵ Contribution to the history of our medical faculty with regard to its significance for the development of natural and medical sciences in Denmark from 1648 to 1766