ask him to expand his upper chest, not necessarily by respiration, but by elevation of the superior ribs by a musculareffort, at the same time slightly drawing in the abdominal wall. We now introduce the smallest mirror and ask our patient to sing "A," pronounced as in law or maw. With this position of the larynx and muscular poise we observe two things: First, the epiglottis does not assume its most vertical aspect, not inclining as near the perpendicular, and the soft palate and uvula do not spring upward and backward to make the partition between the mouth and naso-pharynx. Different in every respect is the tone produced by the chords, which may be assumed to vibrate longitudinally, but never touching each other in the middle portion, even in making the initial attack. The chords appear narrower, tenser, lower anteriorly, equidistant from each other, more homogeneous and whiter in color.

These two pictures should be well considered, as they become the basis of criticism in distinguishing the correct and eliminating incorrect methods, on the one hand, in singers' voices, and of the greatest assistance to the laryngologist in correcting pathological conditions, the result of bad training. The proper appreciation of these opposite conditions and their effect on the quality of tone immediately calls our attention to the subject of respiration. Within the past three years the entire theory of musical education has changed in France, the explanation of this change being that there is at present a better appreciation of the influences bearing upon the production of tone and a better understanding of the physiology of the larynx, by reason of the advances made in laryngoscopy.

Modern teaching tends to cultivate tone harmonies and sympathy in the voice at the expense of brilliancy of execution. The same judgment should be exercised in the training of an individual who proposes to make singing his or her art as should be employed in advising the painter that his special *forte* lies in landscapes rich in color, in which he may give expression to his imaginative genius, rather than to the sterner *fac-simile* of portraiture.

How many singers we hear whose technique and brilliant staccato in the Bell Song of Lakme calls forth our admiration and amazement, but who are absolutely unable to put any sympathy whatsoever into the simplest ballad! We should study color harmonies in music in the same way that they must be studied in painting. There is no rule for the palpitating sunlight effects and prismatic play of colors in the school of Claude Monet; it is certainly a subtle feeling which is given by an ingenious mingling of pure spectrum colors. In the human voice that added coloring of tone which appeals to the heart as well as to the ear of the listener must be brought about by the employment of those harmonies which are added to the original tone by intervibrations within the accessory cavities of the nasal passages. To sing *dans le masque*, as the French say, is to give this added richness to the initial tone; but to sing in this manner requires the soft palate and uvula to be lowered in the production of tone. Likewise to make the purest initial tone from the chords, we must get the utmost possible tension, which may only be arrived at when the thyroid is depressed, for, in proportion as the thyroid is elevated, the chords tend to assume the base of a right angle triangle instead of its hypotenuse. Several elements besides this enter into the question of greatest possible tension, one of the most important of which is that the trachea be drawn down to assume the position that it takes when the apices of the lungs are filled to their greatest extent with air.

One of the greatest singers the world has ever known told me that the reason that he adopted a fixed high chest was that he had found, after the removal of a papilloma from one of his chords, that the only way in which he could be at all sure of his voice while singing was by the maintenance of the so-called high chest respiration. This is easily explained by the fact that in this position, the upper ribs remaining fixed, the apices of the lungs always remain in contact with the thoracic wall, expanded to their fullest extent, the chords being kept in their state of greatest possible tension. In this position the breathing becomes entirely inferior costal and diaphragmatic. The position of the thorax, as indicated above, permits the lungs to expand to their fullest extent, thus adding a secondary resonance to the voice from below—a sort of complementary *timbre*, the fixed upper thorax allowing of the least possible change of color during tone production.

It is this combination of facial and thoracic tone fortification which gives the enormous carrying power to tones produced by this method. For a number of years before I made a special study and estimated the great significance of these factors in singing, I deluged the throats of singers with sedative and astringent sprays when their chords appeared congested and swollen, often presenting nodules in their center which I had never previously recognized as being due entirely to singing with an improperly poised larynx.

I may cite several cases to show you the difference, from a medical standpoint, in the treatment of the singer's throat, where I now substitute respiratory and tone exercise for the amelioration of conditions that I have always been taught were only to be cured by rest and the diligent use of drugs. The cases I cite are typical of a class of singers that I have treated with equally good results since I have made a particular study of the peculiar value of the proper tone production in the human voice.

CASE I.—The first day of January last I was consulted by Miss F., aged twenty-three years, who had had a contralto voice of large power which she had employed constantly for several years, and had finally, after a prolonged concert tour with a well-known orchestra, entirely broken down. Her chords were dark red, with a slight nodule in the middle of either band; she complained of great pain in producing her notes, and her medium register had no power in it whatsoever. She had been told by two of the best authorities on the throat that she must not sing a note for a year, and must have her chords painted with astringent solutions and tone up her general health. Upon testing her voice, I remarked an extremely breathy tone and clavicular respiration.

In accordance with the principles which I have attempted to demonstrate, I forbade her speaking a single word for a week, but placed her at once upon the so-called inferior costal respiration, maintaining a high chest, and giving her directions to take a medium "C,"

with the chin almost resting upon the clavicle, singing the word "ma" for five minutes of each hour of the day, the two first to be focused in the face with the mouth closed, and the attack to break upon the lips as much as possible on opening the mouth. At the end of seven days the chords, instead of presenting an elliptical appearance, were straight, and the nodule was so far rotated upward on either chord that it did not touch the nodule of the opposite side in the emission of tone. At the end of the week this young lady, who considered her voice hopelessly destroyed, having acquired a new method of respiration, sang in a concert. She has since sung regularly in church, in many oratorios during the winter, and is at present singing three times a week in grand opera, learning new *roles* continually, apparently perfectly restored. She tells me her voice is far more powerful than she had ever dreamed of.

CASE II.—Miss P. H. consulted me on March 2 in great distress. She was obliged to sing in a comic opera on that evening or close the theater. Examination showed inflamed and bulged chords, with great hoarseness in the speaking voice; middle register impossible, but the high notes obtained with great effort. I sent her at once to my assistant, who gave her exercises to maintain tension, and at the end of an hour's work with tension exercises and inferior costal breathing the cords responded and she sang with ease.

CASE III.—Miss H. B. consulted me in May, having lost her position as prima donna by reason of loss of voice. Had been constantly treated. Her chords showed the nodules of attrition, the result of the employment of the *coup de glotte* and faulty respiration. In this case a week's work caused the nodules to disappear. She adopted a proper laryngeal poise and again assumed the leading role.

Observation.—In this class of cases rest causes a relaxation of the chords and singing becomes impossible for some time, whereas constant work, with tension of the chords and non-approximation of the same, gives immediate relief.

CASE IV.—Fraulein K. consulted me in the spring. Her chords appeared swollen and the membrane was injured, but not hyperæmic. Had been obliged to cancel her engagements and return to New York for treatment. I recognized the familiar picture and sent her to my assistant, who cured her in a week without other treatment than the establishment of a proper laryngeal poise.

With many cases like these which I might cite, may I not be excused in my assumption in calling attention to what I consider the most important ground principle of the singer's art—namely, the proper employment of the muscles of respiration, the poise given the chords and the proper use of the intrinsic muscles of the larynx, not forgetting the bringing into play of the accessory cavities of the face, which lend so much color to the tone, removing entirely from the chords the deleterious effects of an improper initial attack?

To rehearse briefly the deductions which I have attempted to draw from my argument, I maintain that the best method of respiration is the inferior costal or diaphragmatic, faithfully maintaining the elevation of the upper ribs without raising the shoulders. Next in importance is the depression of the thyroid cartilage, brought about through the agency of the crico-thyroid muscles and the pulling down of the trachea, by increasing the capacity of the upper lobes of the lungs—anatomically speaking, a pose causing the thyroarytenoid muscles to produce tension instead of the crico-arytenoids. Be careful that the initial attack is removed entirely from the chords. Lower the uvula and soft palate, that the sound waves may obtain their intercurrent vibrations or harmonies by partly passing into the nasal cavities from behind. Let us not fall into the error that the roof of the mouth alone is the sounding board of the singing voice, for without that added richness and *timbre* to be given by calling into play nature's resonance pipes, the nose and its accessory cavities, we may sing, but the singing is at the expense of the chords, and the life of the voice is necessarily shortened.

If I have said enough to arouse a new interest in what I consider a most necessary accessory to laryngology, I shall feel amply repaid for my endeavors to set the theme before you in a clear and comprehensive manner.

BOVINE TUBERCULOSIS.

By HENRY G. WOLCOTT, New York State Commissioner of Health.

In a recent letter to the editor of the *Orange County Farmer*, State Commissioner Wolcott gives the most recent information on the above subject, as follows:

I have read with much interest in your issue of March 8 the statements relative to bovine tuberculosis, and the efforts of the State Board of Health to call popular attention to the same.

Since comparatively little is generally known upon the subject, I think it may not be devoid of interest to your readers to learn some of the facts which have induced such efforts, and while in thus addressing you I shall have, necessarily, to indulge in the "scientific," I believe that all information upon this most important subject is worthy of attention.

Bovine tuberculosis is practically the equivalent of the like disease in humans, be it known as pulmonary tuberculosis or consumption, as lupus, as tuberculous fistulas, as scrofulotic affections, or under many other names familiar to the medical profession, varying in name with the symptoms or part affected. In all such cases the cause of the disease is the "bacillus tuberculosis," a microscopic vegetable parasite, in shape like a bit of very fine thread, and when viewed through a microscope of say 1,300 diameters, appears to be about a sixteenth of an inch in length. These germs increase by segmentation, that is, they break up, and each thread-like piece is capable, under favoring circumstances, of lengthening, breaking, and in time producing others. They do not multiply except in living tissue or in animal products, such as blood, serum, beef broth, or the like; and while they may live for years outside the animal or its products and be capable of producing the disease, still sunlight will destroy them in the course of a few hours. Nature has thus put a limit to their destructibility, and has also given to healthy animal tissue, in the great majority of cases,

the power of expelling or annihilating the germ, else tubercular affections would be far more prevalent than at present.

The importance of this germ theory of disease as applied to tuberculosis is thus clearly recognizable, and to Prof. Koch is due all credit, for the discovery is distinctively his. It is now classified by our best sanitarians as a "preventable disease," and in the same category as diphtheria, smallpox, scarlet fever, etc. The importance of this discovery is emphasized by the fact that about thirteen deaths out of every hundred are caused by some form of this disease.

Viewed solely from its sanitary standpoint, this discovery marks an era in the nineteenth century. That the cause of this disease and the disease itself exist in cattle, that cattle can communicate it to members of the human race and to other cattle, is without doubt. That it can be communicated from man to cattle is also acknowledged. That it may be, and in many cases is, hereditary, is also established; or, if not always hereditary, the offspring of tuberculous parents are more susceptible to its influence than are the offspring of non-tuberculous parents.

There are within the State of New York about a million and a half of milch cows, and about two and a half million of animals whose annual dairy product exceeds \$35,000,000. The records of the State Board of Health show that 3½ per cent. of all cattle examined are tuberculous. Hence, looking at the question from a pecuniary point of view solely, how vast the interests affected. Considered from both the sanitary and pecuniary standpoints, how momentous a question this proves itself to be.

The cause of all this trouble, the bacilli tuberculosis of Koch, is readily isolated from other bacilli. A dilute solution of nitric acid has no effect upon them, while destroying other germs. Again, a dye known as "carbolfucine" will stain them a dull red, having little or no effect upon other bacilli. If, then, upon a microscopic examination, we find them in diseased tissue, inoculate healthy tissue with them, again finding the specific germ, and carry this operation on through seventy different series of animal cultures, taking proper antiseptic precautions in every case, and have the seventieth subject die from symptoms tuberculous in their nature, still finding the same specific bacilli, we may reasonably conclude that it is the cause, and not the result of the disease. This has been done by Prof. Koch and other observers, and the results as stated established and acknowledged as facts. The only animals, so far as known, upon which such inoculations have no effect are rats and mice. Guinea pigs and rabbits are particularly susceptible to its influence, and upon them the great majority of experiments have been made.

The contamination from the human to the human or to the bovine is presumably by the sputa, which, when dried, permits the bacilli to be carried by the air, and when a suitable lodgment is found in susceptible tissue, either in the respiratory or alimentary tracts, germination and increase may result, producing a tubercular affection, specifically named in accordance with the organs affected. The communication from the bovine to the adult bovine is by the sputa mainly, the well known habits of cows licking each other, feeding from the same troughs, etc., being familiar examples. Calves frequently take it in their mother's milk. It is mainly communicated from the bovine to the human through the milk.

While it may be communicated through tuberculous meat, the fact that meat is usually cooked and that a temperature of 160° Fah. is maintained will destroy the bacilli and prevent much danger on this score. A tuberculous cow may or may not have tuberculous milk, depending in measure upon the part affected, and the extent to which the disease has developed. When the mammary or milk glands are so diseased, the milk is generally tuberculous. The certainty that a tuberculous cow having non-tuberculous milk at the time of observation will, during her life, limited at the best to a few months or years, prove a source of contagion to all remaining healthy members of the herd, the fact that her milk may at any time become tuberculous, and the further fact of her progeny being probably tuberculous, would warrant her destruction. A tuberculous bull is not a fit animal to breed from, no matter how phenomenal his record as a progenitor of milk-producing cows. It is a curious fact that butter when made by either the separator or ordinary methods seldom contains tubercular germs even when made from milk known to be tuberculous. The reason for this doubtless is that the specific bacilli referred to are heavier than the milk surrounding them, and fail to become entangled in the lighter or butter-producing portion. This fact enables the skilled pathologist to the more readily find the bacilli by using a centrifugal apparatus which concentrates them in a certain portion of the fluid under examination.

About two years ago the State Board of Health, recognizing the important bearing of the facts above mentioned, commenced its crusade of enlightenment. It takes to itself no little credit that among all the States of the Union it was the first to establish a department devoted solely to this work, where the latest and most authentic information upon the subject could be collected and collated, and where the correctness of theoretical deductions, based upon such facts, could be practically proved or disproved. Pennsylvania, Rhode Island, Massachusetts and sister States are now following in our lead, and the Bureau of Animal Industry in Washington, D. C., is exhaustively examining the question.

The use of Koch's tuberculin or lymph as a diagnostic agent in cases of suspected tuberculosis has vastly increased the possibilities of eradicating the disease. Many fallacious notions exist as to this tuberculin and its effects upon the animal inoculated. In the hands of a skilled, conscientious and experienced specialist, it can effect no possible injury. It will not cause the disease, nor will it increase the disease in affected animals. In unskillful hands it is likely to give results that are not borne out by the *post mortem* examinations. In the hands of a skilled, conscientious and experienced specialist the information it gives may almost be said to be infallible.

There are as yet certain attendant facts and circumstances connected with the correct readings of the indications it gives that make the information obtained by physical examinations important in doubtful cases,

and while the State Board of Health uses its best endeavors to obtain inspectors who shall fulfill all the requirements of the ideal inspector, still the limited annual appropriation of ten thousand dollars will not permit of its paying salaries to its inspectors commensurate with the skill and experience demanded. The faulty diagnosis, as evidenced by the *post mortem* examinations amounting thus far to about three percent. of the animals slaughtered, is due not to errors in the principle employed, but to errors in the method, carelessness or ignorance on the part of the user of such principles, and in nowise affects the efficiency of the tuberculin test as a diagnostic agent.

The tuberculin is imported into this country, and although the department in Washington has the formula for its production, still the febrile reaction of the two brands differs. Just what or how the tuberculin is produced is not generally known. It is generally believed to be a ptomaine of the bacilli tuberculosis in pure glycerine.

We will suppose that the owner of a herd of say forty head has, during the past year, unaccountably lost two or three animals. Some of his cows have rough coats, feverish eyes, are thin and low spirited. The milk supply may be normal or even increased. Two or three have a cough, and to sum it up the owner would say his cows are "sick." He hears of consumption among cattle and writes to the State Board of Health at Albany, asking that an examination be made of his cattle at the expense of the State. After waiting several months (we have over fifty applications on file and unattended to), he receives notice that on a certain day the inspector will make an examination. He is asked how long since his cattle first became "sick." Inquiry as to cattle purchased at or before such first sickness will be made, and the chances are more than even that the purchased animal came from a herd known to be tuberculous. The cattle are then numbered, examined physically with much care, and the results entered.

If the facts warrant it, the cattle are thereupon tagged and quarantined. The owner is directed to remove all cows within two weeks of calving, and all cows bulling unless the physical examination clearly shows them to be tuberculous. The reason for this is that the tuberculin test is apt to give undue reactions in such cases and to similarly feed and water his entire remaining herd. One hour after feeding the temperatures of all animals are to be taken by thermometers, the similarity of whose readings under similar changes of temperature the inspector has previously established. He will take temperatures five hours thereafter and again at ten hours. During the interim the cattle are to be neither fed nor watered. Careful entries are to be made of all results so obtained.

He will then order the cattle well fed and watered and will proceed to inoculate the animals with tuberculin, using his judgment as to the amount to be injected, based upon the weight of the animal to be tested. About seven hours thereafter he will again commence taking temperatures and without permitting feeding or watering take eight temperatures at intervals of two hours each, after which the test ceases and the animals may be fed and watered.

Now commences the real work of the inspector and upon which his reputation and the reputation of the board depends. The inspector will remember that temperatures are nearly two degrees lower between twelve and two at night than at midday, that free watering may reduce the temperature one and a half degrees, that a bull has two degrees higher temperature than a cow, and that chewing the cud is certain to run the mercury up at least one degree.

It is trying work, and the tendency is to let the doubtful cases remain under quarantine pending subsequent examination. This, however, is a hardship upon the owner, and should be, so far as possible, discouraged.

Depending upon the results of his study of the chart, he orders some freed from quarantine; some he continues under quarantine, and for some he orders killing cards from the ward in Albany. If the rise is spasmodic, resuming or approximating the normal as the tests continue, other things equal, the animal is non-tuberculous. If there is a gradual and regular rise, reaching its maximum at the seventh or eighth test and showing an increase of upward of three degrees above the normal, the animal is almost certainly tuberculous and should be killed. When received the cattle are killed under his direction and *post mortem* examinations made. The carcass is buried usually in quicklime or removed to a phosphate factory.

It is believed by the board that it as a body cannot alone ever eradicate this disease. The subject is too vast to seriously undertake. It wishes to bring the subject before the people, and let the individual or the local boards in co-operation with the State board attend to the details. It is hopeful that the health departments of cities will appreciate the importance of the subject and issue a quarantine against tuberculous milk. It hopes that in the near future a corps of specialists will be granted from our agricultural and veterinary colleges whose certificate of immunity will be a prerequisite to the possibility of sale, and that the ultimate result will be a material lessening of the death rate and a demand for the animals and dairy products from the State of New York by reason of their known freedom from disease.

ROOSTING BUTTERFLIES.

By JOHN T. CARRINGTON.

CONSIDERING that more than half the span of life allotted by nature to the perfect state of butterflies is spent in sleep, it is of the first consequence that the manner of roosting should be as far as possible protective. Alert and well able to save themselves during the active period of their existence, when the sun is hot and their power of flight is strong, they are perfectly helpless in the dusk of evening, the night time, early morning and on dull days. Then we may pick them up with our fingers and place them on our hands without the slightest show of movement on the part of the insects. When in this condition of torpor or sleep induced by absence of sunlight, butterflies form an easy prey to prowling enemies, which may by chance take them before they have

provided for the continuance of their species. Therefore, we must conclude that the habit of roosting adopted by each kind is most conducive to protection during the long hours of sleep.

When we take the list of the European *Rhopalocera* and scan it deliberately through, it is only possible to come to one conclusion upon the knowledge possessed as to the manner of roosting of the various butterflies. Indeed, we, in this country, need not take the whole European list if we are in search of discovery into the resting habits of these insects. Very little is really known about the roosting positions, from the protective point of view, of the majority of our British species. Most entomologists know how to hunt for several of our "blues," or *Lycenidae*. Various kinds are to be found so soon as

PIERIS RAPÆ, ROOSTING ON PEA BLOSSOM.

the sun has set, resting upon the stems of grass; though not all the species affect the same position. Some species invariably rest with the head of the insect turned away from the earth, looking skyward, while other species always roost with the head looking downward. One wonders why nearly allied species, with the markings and ground color of the underside of the wings, which is the only side visible among this group when roosting, should invariably adopt these unlike positions on the stems of grass.

Some of the fritillaries (*Argynnidæ*) and *Melitææ* often affect the heads of flowers as the night resting place, though I fancy this is rather accidental than otherwise. It may be those frequenting the flowers at night were "caught" in that position by the sun going down while they were feeding off the honey in the flowers, as so often seen with humble bees. We cannot find a large proportion of say *Argynnis euphrosyne* or *Melitæa athalia* out of the total population of these species in any locality affected by them at rest on the flower heads. Still it is not uncommon to find both species in that position on a dull morning after a bright day. I have seen seventy of the latter kind on heads of thistle and other flowers in a single morning, in the great wood near Hailsham, in Sussex. So, likewise, may we find the grizzly skipper at rest, though chiefly on lower growing flower heads. *Hesperia comma* sits upon the smooth stems of young hazel boughs in woods, on the borders of the chalk downs where it flies, and *H. sylvanus* has much the same habit. Another of our skippers, *Nisontades tages*, may be taken in sufficient abundance by searching the dead seed capsules of the plants of black knapweed of the previous year. This species roosts in a

which it closely resembles and mimics both in form and color. It remained motionless until noon on the following day, when the sun shone for a short time, and it flew away. The similarity between the unexpanded blossoms and the resting butterfly was an excellent example of protective resemblance."

About three years ago I was visiting a house well covered with ivy of a variety with rather large leaves. One recently grown branch had developed a few whitish or cream colored leaves, as a "sport" among the ordinary green leaves. This branch being near the dining room window, was convenient for observation. Every evening for several days, about sunset, a large cabbage white butterfly (*Pieris brassicæ*) used to search out one of these half dozen white ivy leaves, and roost upon it for the night. The protective value of the creamy white leaf for the creamy white underside of the butterfly was perfect. The butterfly seemed to be the same individual on each evening.

The drawing of some three dozen *Plexippus* butterflies at rest on a dead branch of a shrub is taken from a photograph by Prof. C. F. Nachtrieb, of the Department of Animal Biology, in the United States of America, who lent the picture to *Insect Life*, the excellent journal published by the entomological division of the United States Department of Agriculture, in January, 1893 (vol. v., p. 206). This butterfly is larger than any species native to our islands, so an idea may be gathered of the appearance of the branch as seen by Prof. Nachtrieb. Being in color yellowish orange, with black veins, these roosting butterflies would have the appearance, when seen at a distance, of withered leaves attached to a dead branch.

Without becoming speculative as to how far the power of reason, as apart from instinct, guides, we cannot fail to see how important for the preservation of butterflies is the selection of suitable roosting places during the helpless period of sleeping. — *Science Gossip*.

NANSEN'S EXPEDITION TO THE NORTH POLE.

THE remarkably brisk rivalry that has lately developed in the field of polar exploration gives ground for the hope that during the next few years many Arctic discoveries may be made which will be of great importance to science, so that in the near future the map of the North Polar regions will present quite a different picture from that with which we are familiar. The methods employed for conducting such expeditions, to say nothing of the latest scientific discoveries—such as electric light and the phonograph—that lend their aid, have opened a new era in polar explorations. The most notable ones, as far as the expeditions themselves are concerned, which will try to reach the North Pole from many different directions, are the following: The Norwegian expedition of Dr. Fridtjof Nansen, who hopes to reach his goal from the island of New Siberia; the North American expedition of Lieut. Peary, who will push to the north by way of Greenland; and the expedition of the Englishman, Fred. Jackson, who will take Franz Josephsland as the starting point. Besides these, an expedition consisting of eight persons will be sent out from America, for the purpose of exploring unknown Arctic regions. This party, which will be conducted by a German connected with the geological survey of the United States, Robert Stein by name, will go north along the western coast of Grinnell Land, because those who are supposed to know about such matters claim that the best route to the extreme north is along a stretch of western coast which extends to the pole. In connection with polar explorers we may mention the Norwegian, Martin Eckroll, a wealthy merchant of Lofoten, who is greatly in-

ANOSIA PLEXIPPUS, ROOSTING.

position quite unlike others of the group native to these islands. It folds its wings under the body, like a noctuid moth. On one evening, on the Horsley Sheep Lees in Surrey, I searched a dead plant of *Knapweed* for varieties of this dingy skipper butterfly and took sixteen specimens off about ten seed heads. Being unable to find more, I shook the plant into my entomological net, with the result that four additional butterflies were shaken off. The protective position selected was so perfect that all my trained experience failed to show me the remaining four on the plant.

I quote Mr. F. W. Frohawk's notes, taken when he sketched the white butterfly sleeping on a pea flower, herein reproduced from his drawing.

"August 19, 1885, between 10 and 11 A. M., dull day, found *Pieris rapæ*, female, at rest on pea blossom,

interested in Arctic expeditions, and has a theory that a so-called sledge boat, drawn by a number of dogs, could go over the ice from Spitzbergen to Franz Josephsland, and from there over the North Pole to the eastern coast of Greenland.

The polar expeditions mentioned, with the exception of the first two, will start next year. The Peary expedition, consisting of ten persons, started last summer, in the sealing boat *Falcon*, for Whale Sound, in the northern part of the western coast of Greenland, where the expedition will winter. In the spring the expedition will start by the route followed by the former Peary expedition over the inland ice to Independence Bay—shown in the accompanying map—and when this point is reached, they will divide into groups, one of which will be led northward by Lieut. Peary, while another will explore the unknown coast from Ia-