*Mr. Andrée's Balloon Voyage to the North Pole.**

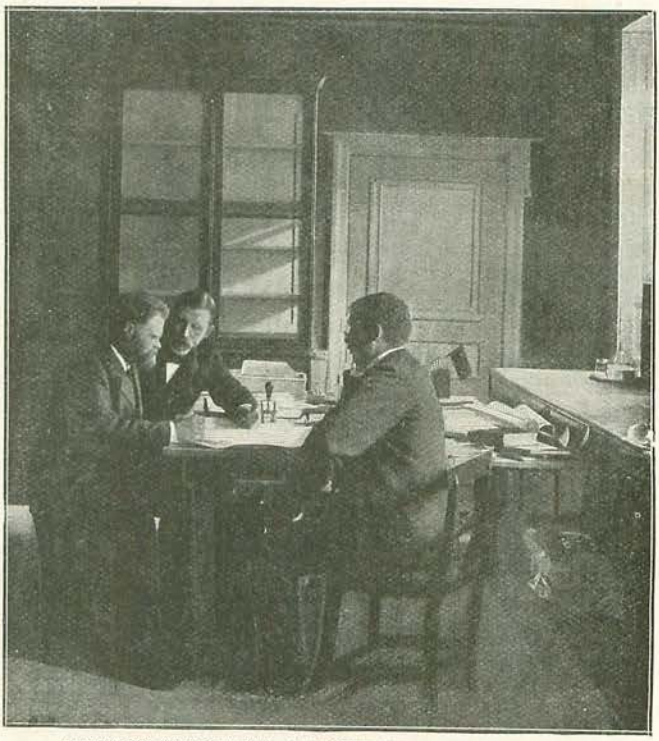
By Alfred T. Story.

BY the time these lines are in print Mr. S. A. Andrée, the adventurous Swedish aeronaut and scientist, and his companions, Dr. Ekholm and Mr. Strindberg, will, all being well, have launched themselves in their great balloon from the northernmost point of Spitzbergen in the hope of reaching, if not the North Pole itself, some point very near it. Whatever may be the outcome of this latest of the many daring attempts to solve the problem of the Pole, it must be acknowledged that it is a brilliant conception for overcoming one of the chief difficulties that have stood in the way of previous endeavours to reach the Pole—namely, that of the ice, which has in the end stopped the progress of all ships, if it has not broken them up entirely.

When Mr. Andrée first made his proposed voyage known to an English audience (at the Geographical Congress in 1895), he received but scant encouragement at the hands of men of science, and probably less from the public generally. One scientific man, indeed, characterized the idea as foolhardy; and in all likelihood the majority of people who have not taken the trouble to follow Mr. Andrée's reasoning in the matter may be of much the same opinion. But the same might be said of most of the multitude of expeditions that have gone in search of the Pole, as well as of many other undertakings. Every attempt to do something that has not been done before looks foolhardy to most people, until the reasons upon which the adventurer acts are seen to have been justified by results.

I have gone carefully into Mr. Andrée's reasons for hoping to be able to reach the Pole by balloon, and have also seen the careful way in which he has gone to work to prepare his plans and apparatus, and although one must admit that there are numberless accidents, or unforeseen conditions, which may militate against his success, yet with luck, the chances are much more in his favour than they are in Nansen's.

The idea of attempting to reach the Pole by balloon is one Mr. Andrée has had in his mind for some years. In 1876, when on his way across the Atlantic, he was struck by the regularity of the trade winds. This led him to reflect upon the possibility of making long balloon voyages, and especially of crossing the Atlantic from Europe to America. The impossibility, however, as he thought, of getting the money for such an enterprise caused the idea to be practically laid aside until 1892. Then the splendid feat of Nordenskiold and the exploits of other Swedish scientists and explorers in the Arctic regions excited in Mr. Andrée the desire to do something with the balloon in the same regions. Hence arose the idea of utilizing the balloon to cross the Polar region and perhaps to reach the Pole.



THE THREE ADVENTURERS—A CONFERENCE IN THE POLAR-OFFICE.
From a Photograph.

Up to this time his study of balloons had been mainly theoretical; but now he commenced experimenting practically with them. He first of all made some trips with the Norwegian aeronaut, Cetti. After that he obtained a grant of £300 from a fund for scientific purposes called "Lars Hjertas Minne" (*i.e.*, Memorial). With this money he purchased a small balloon capable of holding 40,500 cubic feet of gas, with which he made some ten or twelve ascents. At first he used to go up from the neighbourhood of Stockholm; but afterwards, for convenience sake, he generally made his ascents from Gothenburg. Here he had the assistance of his brother, Captain Ernst Andrée, who, from his practical experience as a seaman, has been able to give him great assistance. Then, the winds in Sweden being generally westerly, this gave him the advantage of travelling over land and alighting on land, in place of going across the Baltic as beforetimes. Generally in these ascents he was very fortunate, but on one occasion he came down upon an uninhabited island in the Baltic, where he had perforce to remain all night. He was rescued in the morning by fishermen, and carried to Abo, in Finland.

MR. S. A. ANDRÉE.
From a Photo. by Florman, Stockholm.

The experience of balloon navigation acquired during these trips strengthened Mr. Andrée's belief in the possibility of reaching the Pole by air-ships, as well as his resolve to make the attempt if he could get the means wherewith to fit out his expedition. Baron Nordenskiold, the celebrated Arctic traveller, supported him warmly, and he had not long to wait for the money. He estimated that he would require in all something like £7,220. Towards this sum one Swedish gentleman, Mr. Alfred Nobel, gave £3,460. The King immediately increased it by a gift from his private purse of £1,730; Baron Dickson added an equal amount; and a private individual in Stockholm brought the amount up to the required £7,220 by a donation of £300. This practically closed the subscription, but Colonel Sellstroem, a patriotic Swede of Buenos Ayres, sent an additional £200, as he put it, "for extras that are sure to be required."

Having thus secured the means for his undertaking, Mr. Andrée went to work in earnest. He travelled in England, France, and Germany, adding to his knowledge of balloons and their manufacture. On his return he carefully revised what he had seen, drew up the plan of an air-ship such as he wanted for his purpose, and gave it to M. Lachambre, the famous balloon manufacturer of Paris, to construct, at a cost of £2,000.

DR. NILS EKHOLM.
From a Photo. by Florman, Stockholm.

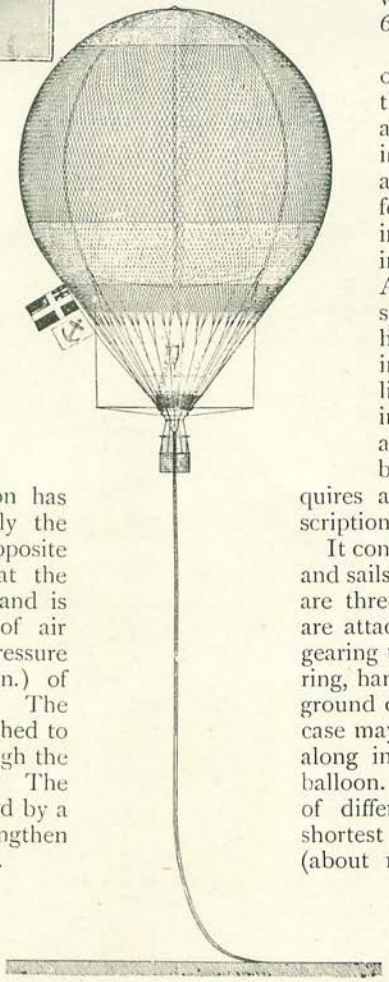
The finished balloon is 75 English feet in height from the appendice, or opening, to the summit, or 97ft. in all from the cap to the bottom of the basket, or gondola, in which the air-navigators will have their sleeping place during their sky-voyaging. The upper two-thirds of the balloon proper are

MR. NILS STRINDBERG.
From a Photo. by Florman, Stockholm.

made of three thicknesses of silk, the lower third of two thicknesses, the whole being stuck together with varnish. In addition two coats of varnish are given to the outside of the silk, and two to the inside; the network in which the ballon is inclosed is of Italian hemp five millimètres in thickness (about 2in.). At the balloon's largest diameter, the meshes of the netting are about 13in. square, decreasing in size, of course, as the balloon narrows upwards and downwards. The balloon has no valve at the top, as is generally the case, but has instead two on opposite sides of the equator, and a third at the appendice. This latter is automatic, and is designed to prevent the entrance of air into the balloon. It opens by a pressure equal to ten millimètres (about 4in.) of water and lets out superfluous gas. The upper valves are opened by lines attached to them on the inside, and passing through the balloon near to the automatic valve. The upper end of the balloon is protected by a cap of varnished silk. This is to strengthen it against snow and the rays of the sun.

All the ropes — forty-eight in number—coming from the network terminate in the suspension or bearing ring, which, as Captain E. Andrée puts it, is to the balloon what the keel is to the ship: in short, it is its foundation, the strongest part of the whole apparatus. This ring is made of wood and is seven mètres (about 7½yds.) in circumference. Strengthened by cross-bars, it serves as a storage place for reserve ropes, anchors, etc.

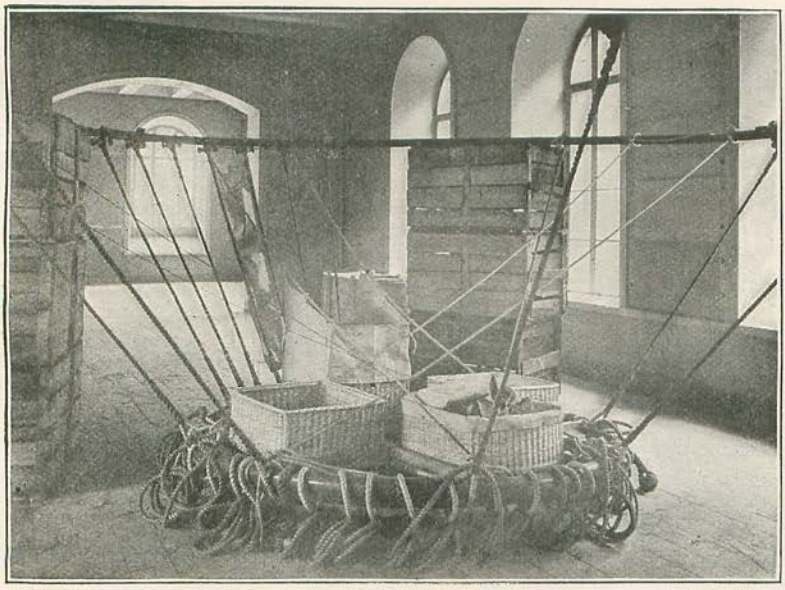
Another contrivance for carrying stores of various kinds, including provisions, is as follows: the spaces between the ropes descending from the network to the suspension-ring are covered on the outside by canvas. Inside the canvas are sewn pockets in rows one above another. They number some 300 in all. In some are stored meat in tins, in others provisions of various kinds; while in others are the materials for a collapsible boat, a tent, and three sledges. This store-house, as we may call it, is 15ft. in diameter in the higher part, and has a circumference of 50ft., while its depth is 6½ft.



From a] THE BALLOON. *[Drawing.*

The bearing-ring, of course, supports the basket and the apparatus for steering. This steering apparatus is a new feature in ballooning, and as it is the invention of Mr. Andrée, and has a special reference to his hopes of reaching the Pole, and likewise of returning to civilization again after he has been there, it requires a few words of description.

It consists of guide-ropes and sails. The guide-ropes are three in number, and are attached by means of gearing to the suspension-ring, hanging thence to the ground or the water, as the case may be, and dragged along in the wake of the balloon. The ropes are of different lengths, the shortest being 310 mètres (about 1,017ft.) in length, the next 320 (about 1,042ft.), and the longest 370 mètres (about 1,205ft.),



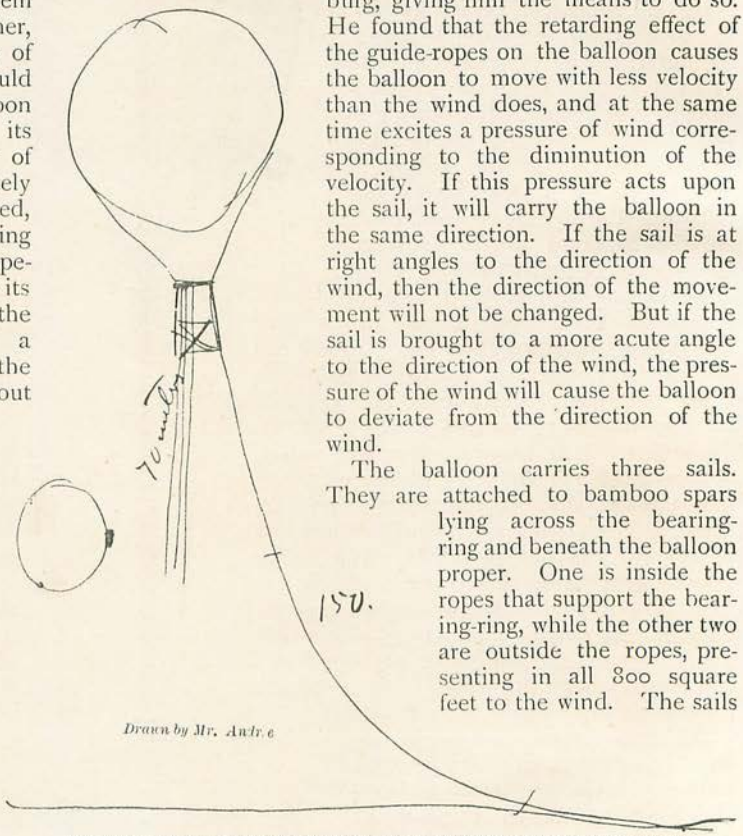
From a] THE SUSPENSION-RING. *[Photograph.*

and they weigh a kilogramme (about 2¼lb.) per mètre. The difference in length is designed to prevent them from hanging close together, in which case, if any of them got lodged, all would be lodged, and the balloon would be stopped in its progress. But if any of the ropes catch separately the balloon can be freed, either by the rope breaking at its weakest point (specially contrived), or by its being detached from the balloon by means of a screw embedded in the rope 100 mètres (about 328ft.) from the suspension-ring. Supposing one of the ropes were to get caught in something, one of those in the balloon would twist the rope at the top, and this would have the effect of releasing a spring and so allowing a screw to be unscrewed.

The guide-ropes are trailed after the balloon, of course, exactly in a line with the direction in which it is going. If the end of the rope be moved right or left in the bearing-ring, the balloon will at once turn round an equal distance in the opposite direction, so as still to keep it exactly in its wake.

This Mr. Andrée found to be the case when he was once crossing the Baltic and had dropped the end of a rope into the water to "slow" the motion of the balloon. He seemed to see a principle in this, and at once began to test it for the purpose of steering, Mr. Douglas Kennedy, of Gothenburg, giving him the means to do so. He found that the retarding effect of the guide-ropes on the balloon causes the balloon to move with less velocity than the wind does, and at the same time excites a pressure of wind corresponding to the diminution of the velocity. If this pressure acts upon the sail, it will carry the balloon in the same direction. If the sail is at right angles to the direction of the wind, then the direction of the movement will not be changed. But if the sail is brought to a more acute angle to the direction of the wind, the pressure of the wind will cause the balloon to deviate from the direction of the wind.

The balloon carries three sails. They are attached to bamboo spars lying across the bearing-ring and beneath the balloon proper. One is inside the ropes that support the bearing-ring, while the other two are outside the ropes, presenting in all 800 square feet to the wind. The sails



Drawn by Mr. Andrée

DIAGRAM SHOWING RELATIVE LENGTHS OF GUIDE-ROPES AND BALLAST-ROPES.

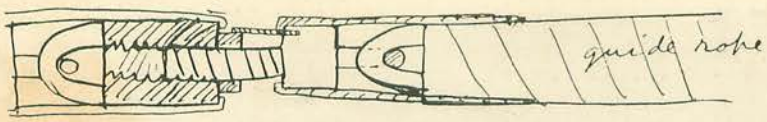


DIAGRAM SHOWING METHOD OF DETACHING BALLOON FROM GUIDE-ROPES.
Drawn by Mr. Andrée.

are suspended by broad straps from the top of the balloon, the straps being held in place by being threaded in and out of the netting.

In the ordinary way the sails would only help to carry the balloon directly before the wind. But if the guide-ropes are moved a point or two to the right on the bearing-ring, the sails, instead of being directly before the wind, are brought to a slight angle to it, and the action of the ropes dragging behind keeps them there, with the result that the air-ship, in place of going directly before the wind, moves in a direction at a certain angle to it.

These guide-ropes serve another purpose in the guidance of the balloon: that is, they tend to keep it at a certain and equal mean distance from the ground.

"I shall never go beyond 150 mètres (about 492ft.) from the earth if I can help," Mr. Andrée observed in explaining the management of his balloon. "I may be obliged to go up higher if I meet with very high land, but so far as possible I shall keep to my mean height of 150 mètres."

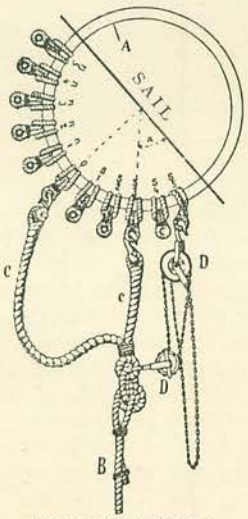


DIAGRAM OF STEERING APPARATUS.

Mr. Strindberg, busily engaged with a pen making a diagram, remarked: "There will necessarily be a slight variation of distance from the ground; for when the sun shines the gas will be made lighter, and hence the balloon will rise a little. In the same way, if the sky be overcast the gas will be cooled—made heavier—and the balloon will descend somewhat. This will show you what I mean," pointing to the diagram here given. "The balloon may rise to 300 mètres (about 984ft.) or it may descend to 135 mètres (about 443ft.). Twenty degrees Celsius (equal to 36deg. Fahr.) in the temperature of the balloon would make this difference."

But if the balloon wishes to rise there is at once a check put upon it, because it has to lift the guide-ropes, which are dragging upon the ground or in the water, and which in all weigh 1,000 kilogrammes (about 2,204lb.). On the contrary, if there is a disposition to descend, it decreases the weight it is carrying with every foot it sinks, because it has so much less rope to bear, and hence the downward motion is arrested. Thus there is a constant force at work tending to keep the balloon at a mean distance from the ground.

The guide-ropes—which are 4in. ones—are for the first 100 mètres (about 328ft.) of hemp, the lower part being of coir, and are thoroughly saturated with vaseline to prevent their sinking when in water, and to diminish friction. By means of tackling, the guide-ropes can be moved easily from point to point of the suspension-ring, as required for the purpose of steering.

This principle of steering has, since Mr. Andrée announced its discovery, been tested with success in the Mediterranean; and Mr. Strindberg has also tested it with success in France.

While speaking of the

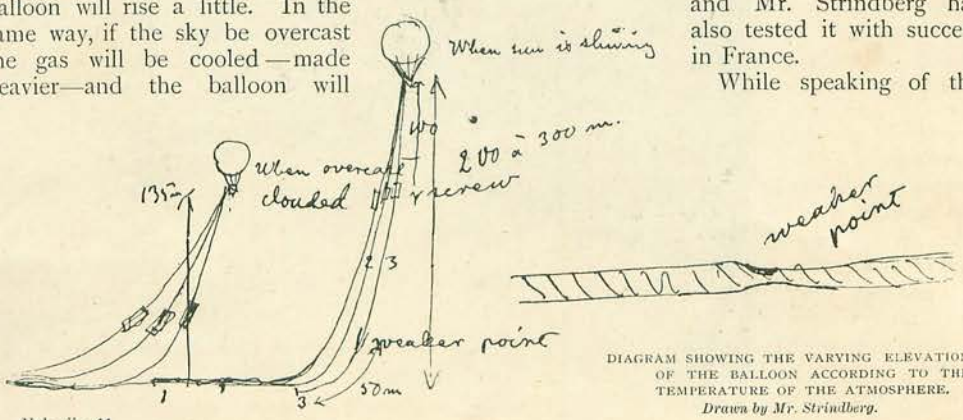
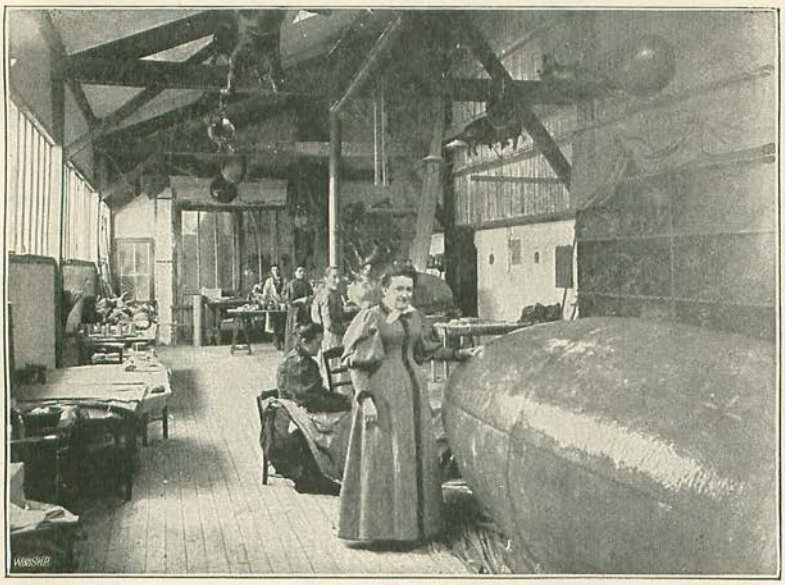


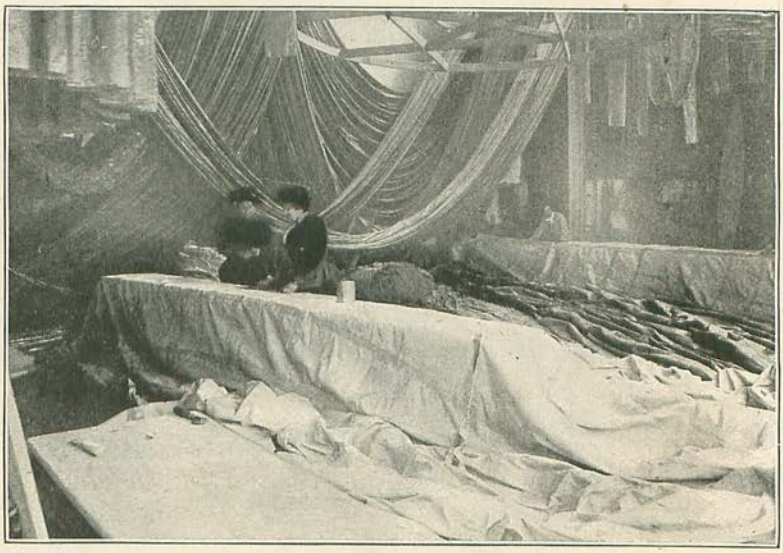
DIAGRAM SHOWING THE VARYING ELEVATION OF THE BALLOON ACCORDING TO THE TEMPERATURE OF THE ATMOSPHERE.
Drawn by Mr. Strindberg.



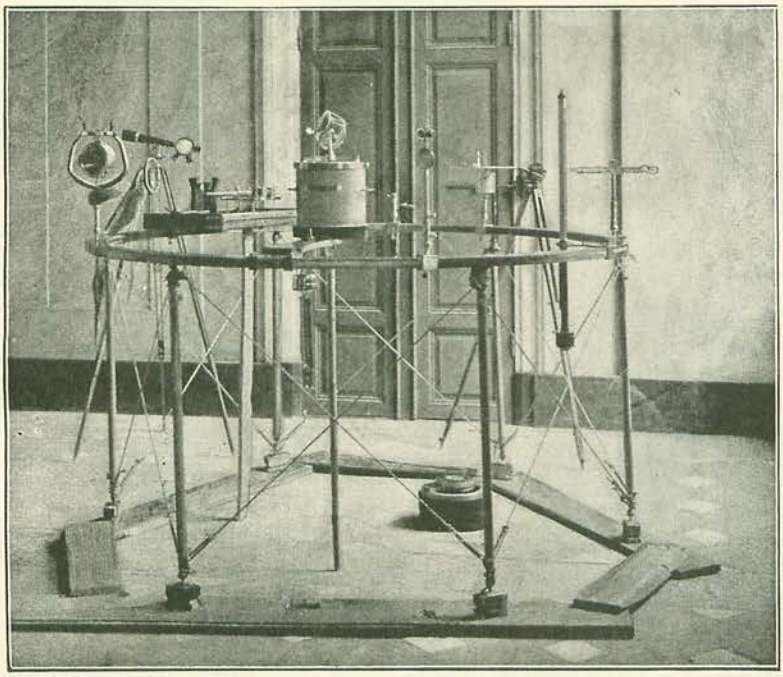
From a] IN THE BALLOON FACTORY. [*Photograph.*

guide-ropes, it should be said that the balloon is provided with another set of hanging ropes, as shown on page 80. These are used for the purpose of ballast, and can be cut away if need be. They are of the same size and composition as the guide-ropes, and in case any of the latter should be lost, they can be used in their place.

The basket, or gondola, is circular in shape, about 5ft. in depth, and 6½ft. in diameter. The lower edge on one side is cut away, so that if it strikes the ground it will not turn over. The edge thus shaved away is the one facing the direction the balloon is going. The basket is provided with a strong wicker-work lid, in which is a trap-door large enough for the exit and entrance of the travellers, whose sleeping-place is in the basket. Only one person, however, will sleep at a time, the other two being in the meantime at work in the "observatory," as the space immediately above the basket is called. The observers stand upon the lid, above which they have a free space of some 8ft. At a convenient height (about 3½ft.) is a ring of equal circumference with the basket, and upon this are fastened the scientific instruments with which they work: barometers, thermometers, sextants, altazimuth, anemometer, an instrument for determining the direction and velocity of the clouds, one for recording the intensity of the sunlight, another for showing the true horizon, compasses, a magnetomètre, a theodolite, and last, but not least, two photographic cameras; indeed, instruments of every kind and shape for astronomical, geographical, and meteorological observation. Some of these are entirely new and novel, the invention either of Dr. Ekholm or Mr. Strindberg. The wonder is how the three voyagers will ever find time to use them all and to record



From a] MAKING THE BALLOON—COVERING THE SEAMS. [*Photograph.*



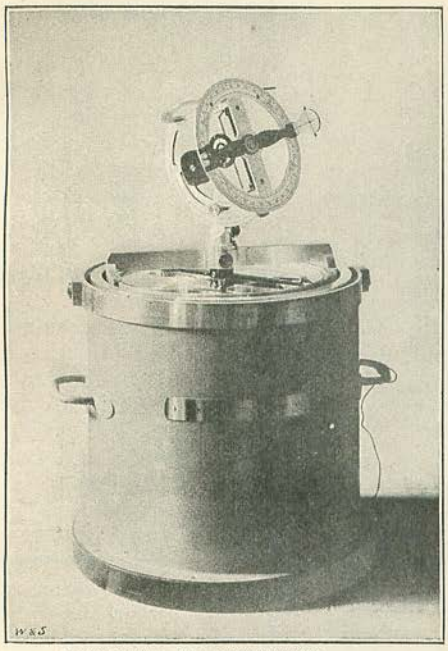
From a] THE OBSERVATORY. *[Photograph.*

the results of their observations. The marvel decreases to some extent when we remember that they will have no night, and that two of them will be constantly at work —"all round the clock," as Dr. Ekholm observed.

The accompanying illustration will give the reader some idea of the "observatory," but when *in situ*, suspended from the balloon, a canvas covering will extend round the supports, which will, to some extent, protect the observers from the wind. Inside, the canvas is provided with pockets for holding recording books, instruments when not in use, etc.

All the explorers seem to be possessed of a demon of work. During the latter months of preparation Mr. Andrée was at work in his room at the Academy of Science, Stockholm, most days at four or half-past in the morning, and he seldom left off before midnight. Everything connected with the balloon was tried and tested by himself with the utmost patience. And this he thoroughly enjoys. Someone having remarked: "When you once get up in your balloon, Mr. Andrée, you will be anxious to get the voyage over and reach home again?" "Oh, no!" he replied; "we shall not have time to think of that. There will be so much work to do, that we shall not be able to note how the time goes—so many observations to make and so many figures to set down in our books." He added: "I only hope we do not go too

From a] THE SLEEPING-BAG OF REINDEER-SKIN. *[Photograph.*



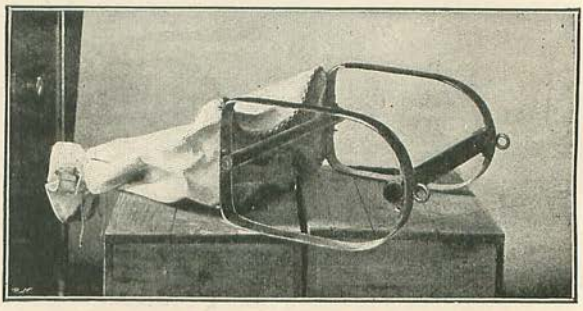
ALTAZIMUTH—FOR ASTRONOMICAL OBSERVATIONS.

quickly, else we shall not have time to make our observations. If it were possible, I should like to stand still sometimes."

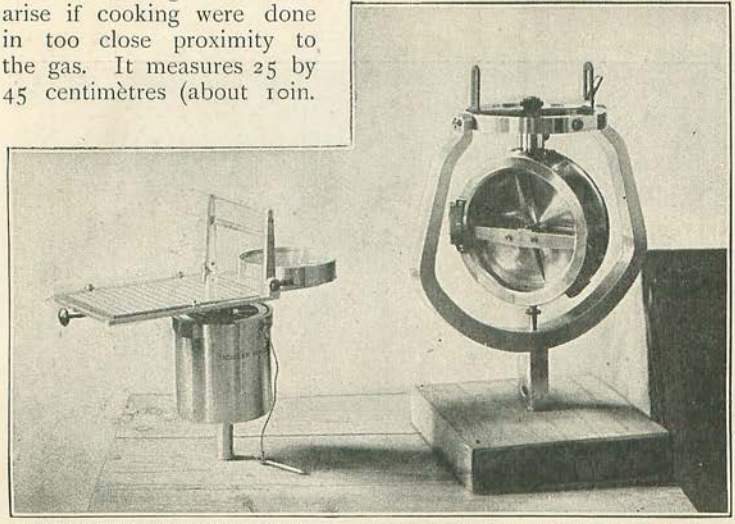
While speaking of instruments and apparatus, one very important apparatus should not be forgotten. This is a cooking-stove specially invented by Mr. E. Göransson, Mr. Andrée's first employer, to obviate the danger that would arise if cooking were done in too close proximity to the gas. It measures 25 by 45 centimètres (about 10in. by 17in.), and when in use hangs by a rope 25ft. below the roof of the basket. By means of a string running down an india-rubber tube, a match is struck and a spirit lamp is lighted. In half an hour water is boiled, soup made, or meat cooked; then by a puff down the tube the lamp is extinguished, and the food is ready to be hoisted up and enjoyed. It cannot be used, however, in a high wind.

Speaking of this and other inventions made especially for the expedition, Mr. Andrée remarked, "I have made something like thirty inventions in connection with the balloon; then manufacturers have made others to overcome difficulties; so that with Dr. Ekholm's and Mr. Strindberg's in regard to instruments, I may say that sixty or seventy inventions in all have been made in order to carry out specially the design of the expedition." One of these is an invention by which they will have fresh bread all the time.

It only remains to refer to the "trawl," the collapsible boat, and the sledges, to



TRAWL—FOR USE EITHER ON LAND OR IN THE WATER.



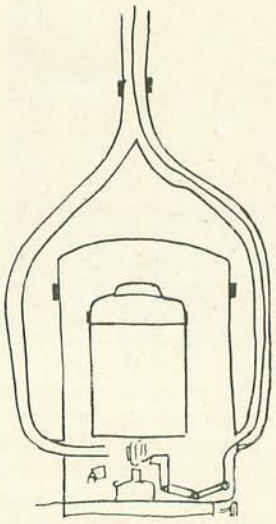
CLOUD MIRROR—FOR DETERMINING THE MOVEMENT AND VELOCITY OF CLOUDS.

INSTRUMENT FOR MEASURING THE INTENSITY OF TERRESTRIAL MAGNETISM.

finish with the balloon and its various fixings and apparatus. The boat is 12ft. in length by 4ft. in breadth; the frame-work of it is of ash, and the covering of silk, the same as that of the balloon. No nails are used in its construction, the keel, ribs, etc., being tied together with sinews. It carries three persons and 600 kilogrammes (about 1,323lb.) of freight. Two men can put it together in six hours, and it is so light that any of the

party can carry it without help. I can speak with confidence of its sea-worthiness, as, together with Mr. Andrée, the designer and manufacturer, M. Plym, and two other gentlemen, I had a trip in it on Lake Mälar.

It may be noted here that the silk used for the balloon and the boat has been found, when prepared with varnish, so impermeable by wind or water, that the aerial voyagers have had suits made of it to wear when in their sky-observatory. Their other clothing includes sleeping bags like those used by Nansen in his Greenland expedition.



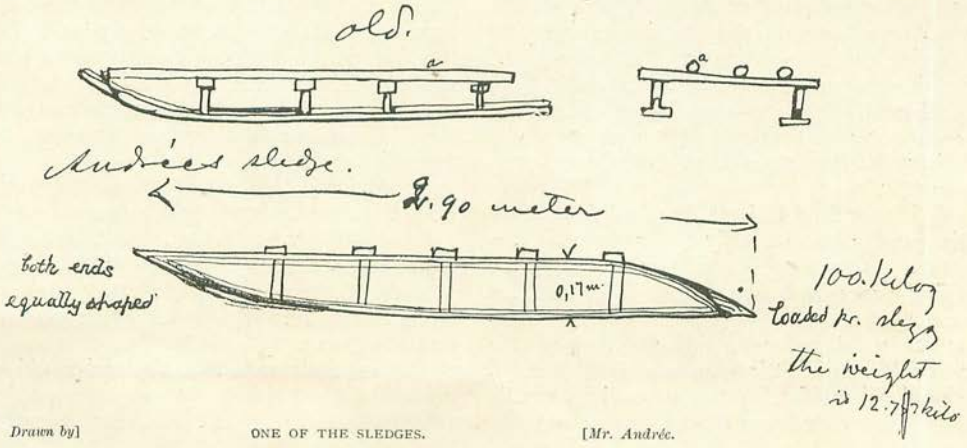
THE SUSPENDED COOKING-APPARATUS.
Drawn by Mr. Andrée.

The sledges, like the frame of the boat, are made of ash. They are nearly three mètres (about 9ft. 10in.) in length, weigh a little over 12 kilogrammes (about 26½lb.), and carry 100 kilogrammes (about 220lb.) each. They are made from the design of Mr. Andrée, and the accompanying diagram by him will show in what they differ from the old form of Arctic sledge. In short, they are of the same shape top and bottom, so that if the runners get damaged by the ice, the sledge can be turned right over. "By that means," said Mr. Andrée, as he finished his sketch, "I get as good as two sledges out of one."

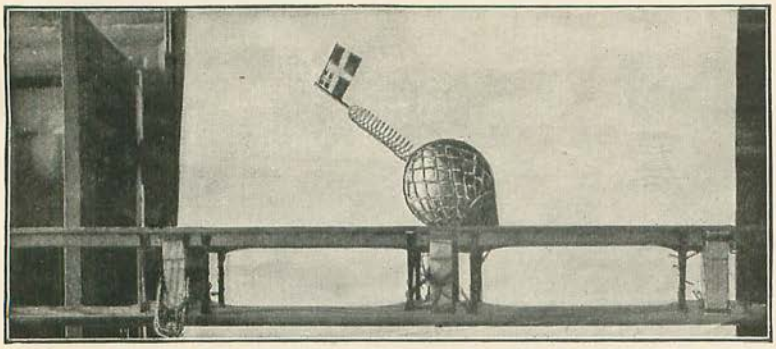
In the next illustration one of the sledges is shown on its side, and upon it is a small apparatus which may be worthy of a few words. It represents a small buoy, made of cork and covered with copper wire, terminating in a spiral bearing a Swedish flag. The idea is to drop one at each degree of latitude as a way-mark. They are so buoyant that they will always bear the flag aloft, and if crushed flat betwixt ice-blocks, they immediately resume their rotundity on being released and wave the national emblem. Within each is a brass tube in which will be placed a record and chart of progress made.

As regards the use of the boat and the sledges, it is proposed to have recourse to them only at the last extremity. The sledges are designed chiefly for employment in the event that, after the explorers have descended to earth, they should have to travel long distances over snow and ice, as they might have to do in Siberia or North America. The stores include, of course, leathern sledge harness for each person.

As to the men who are committing their lives to this elaborately constructed and expensively fitted machine for floating through the air, they form a striking trio. Dr. Ekholm, the oldest, is a man bordering on fifty years of age, though he bears his years well, appearing to be in the best of health, as he certainly always is in the best of spirits. He is sparely built, of medium height, and fair complexion, with a high and prominent



Drawn by] ONE OF THE SLEDGES. *[Mr. Andrée.*



ONE OF THE BUOYS TO BE DROPPED AT EACH PARALLEL OF LATITUDE—STANDING ON A SLEDGE

forehead. He is a doctor of science, and one of the best-known meteorologists in Europe. So long ago as 1882-83 he had charge of a Swedish scientific expedition to Spitzbergen, in which Mr. Andrée took part. He is the author of several treatises on subjects connected with meteorology.

Mr. Andrée is an engineer by profession, but is now the examiner-in-chief of the Royal Patent Office in Sweden. He is very tall, standing over 6ft., broad-shouldered, and altogether of herculean frame. It is possible that he may return from his voyage before completing his forty-second year. In a city notable for handsome men, he is remarkable for his good looks. With a well-marked Wellington nose, which people in Sweden regard as an augury of success, and a piercing blue-grey eye, he seems cut out for command. Like Dr. Ekholm, he is very fair, with blonde moustache and hair. Very quiet in manner—almost reserved, indeed—he appears at first a little repellent to strangers. But amongst those who know him he is genial and full of laughter and the brightest of good-humour. Indeed, as regards his humour, no one can talk with him long without being struck by it. It bubbles out on all occasions. For instance, when speaking of the provisions he was carrying, after saying that these would be 700 kilogrammes in all, he remarked, "A lot of that will be water—liquid—of course, but it will not be all water. When we get to the Pole we shall want to drink some champagne, naturally."

It is very droll to hear Mr. Andrée recount his yarns, and one only hopes he may preserve his spirits and good-humour during the trying times that are before him and his companions.

The third and youngest member of the party, Mr. Nils Strindberg, is, like his chief, a man of magnificent physique, and apparently well fitted to undergo any amount of fatigue. He is not yet twenty-four years of age; but he has already distinguished himself at the University, especially in science, and is a teacher at the High School for Science in Stockholm. Dark in complexion, with the ruddy hue of youth, he is possessed of a fine open countenance, and has the frank, ingenuous manners of a boy. He takes immense delight in the prospect of the voyage to the Pole, for which he has prepared himself by several balloon ascents in France. He speaks English a little, and when asked if he was at all nervous on going up in a balloon for the first time, he replied: "Oh, no, the pleasure was huge! It was *immense*!" He certainly could not have been very nervous, for over dinner he confessed that a young French lady had placed an album in his hands when he was about to ascend, and had asked him to write some verses in it when as high up as the balloon would go. "And did you write them?" was the natural query. "Certainly," said he. But he would not tell what they were.

This young gentleman, although born so far north, is not at all wanting in that *esprit* wherein the French take so much delight, and of which they are rather disposed to imagine they possess the sole secret. Naturally the North Pole was apt to intrude itself into all conversations in which the explorers took part, and so it happened that one person asked Mr. Strindberg how they would know when they reached the Pole. Said he: "We shall know we are at the Pole the instant the south wind becomes a north wind." That question could hardly have been answered more neatly—not even by Mr. Andrée, who is noted for his quick repartee. Here is an instance. He was asked by a very unscientific person: "In what direction does the Pole lie from Spitzbergen—north or north-east?" "About that," said Mr. Andrée. To another person who asked: "What would you do if your balloon collapsed and you came down into the water?" he gave the instant answer, "Drown!"

But one feels sure that the end would not come about so simply and undramatically as that, and in talking the matter over quietly

Mr. Andrée tells you: "If we were to come down in the water the basket might swim for a while. If it did, it would be dragged very quickly through the water. I believe we should go quicker than the greyhound of the Atlantic. But if things came to the worst, we would cut the basket loose and climb up on to the bearing-ring." (There is a rope-ladder, it should be said, from the top of the basket to this ring.) "We shall stick to the balloon to the last. In the boat we might go ten or twelve miles a day; in the balloon we would go a hundred."

On one of the occasions when Mr. Strindberg was taking a balloon trip near Paris a number of dogs followed it, barking and seizing hold of the guide-ropes with their teeth. Writing his experience in a letter to Stockholm, he pointed to this as a probable foretaste of what they might expect when travelling with their balloon in the Polar regions, where the bears might imitate the French dogs and hang on to their guide-ropes!

Both Dr. Ekholm and Mr. Strindberg have the greatest confidence in their chief, and well they may, for a cooler or more courageous man is rarely to be found. He is said by those who have seen him in times of danger not to know fear. On one occasion during the expedition to Spitzbergen, already referred to, when walking out alone he met a Polar bear, which came towards him as though desirous of trying conclusions with him. His first thought was: "I should like to have you"; but he had no arms, nothing indeed but a stick. With it, however, he so belaboured Bruin that he turned and fled.

CAPTAIN H. ZACHAU.
Commander of the *Virgo*, which takes the balloon to Spitzbergen.
From a Photo. by Hagman, Landskrona.

Another incident relating to the above expedition may be recorded here as showing Mr. Andrée's devotion to science. One of the experts during the long winter paid special attention to the effect of darkness on the eye, and was one day regretting that he could not have another month of darkness in which to complete his observations. Andrée at once said: "I will remain another month in the dark for you, if you like. It won't matter to me; I have plenty of work to do." This expedition was charged especially with the investigation of the electricity of the air, and Mr. Andrée brought home 15,000 personal observations—such is his passion for work.

The expedition naturally divides itself into three parts: (1) the voyage to Spitzbergen; (2) the balloon voyage thence to —— wherever it may happen to go—possibly to the Pole; and (3) the journey home.

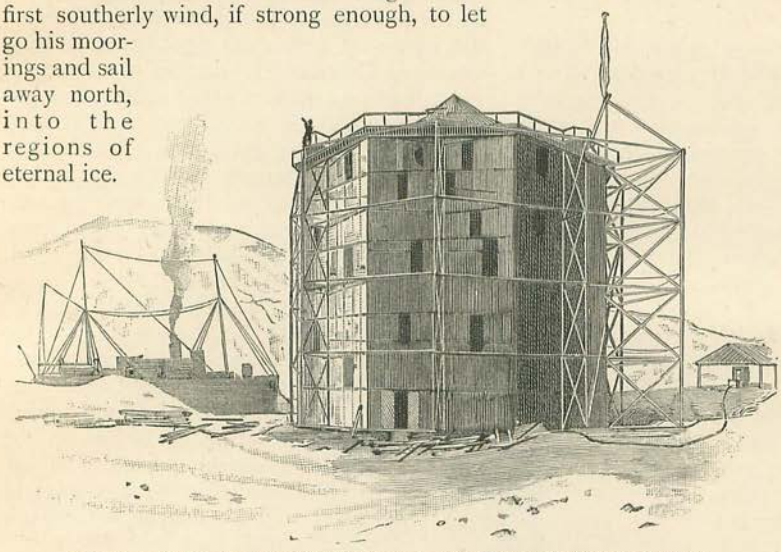
For the transport of the travellers, their balloon, the materials for inflating it, etc., and the necessary provisions to Spitzbergen, the iron ship *Virgo*, of 5,500 tons carrying capacity, Captain H. Zachau — a man of Falstaffian proportions and "infinite jest"— was chartered. It sailed from Gothenburg on June 7th, calling at Tromsö on its way to take in additional stores, stuff for making the gas, etc. From Tromsö the run to Amsterdam Island, Spitzbergen, takes about four days, and Captain Zachau expected to reach his destination about June 18th.

Arrived there, and a landing safely effected, there was much to be done—the wooden house, 95ft. in width and 100ft. in height, for sheltering the balloon during inflation, to be put up, the gas-making shed and apparatus to be erected, and a great deal of detail work to be seen to. The house was constructed at Gothenburg at a cost of £1,000. It is octagonal in shape, and is so substantially put together, that when half of it is taken away the other half remains perfectly stable. This was done with the view of allowing the lee-side to be removed when a suitable wind arose, so that the balloon could get free from the house without being subjected to undue pressure from the wind. The entire structure contains 6,600 cubic feet of wood, and the roof, which is of canvas, is so constructed that it can be removed in a few minutes by pulleys.

From this, and from the apparatus for making the hydrogen gas, some idea will be obtained of the size and power of the balloon. The material for making the gas consists of 40 tons of iron filings, 35 tons of sulphuric acid, and 75 tons of water. Mr. Andrée's

first estimate was that it would take three days to inflate the balloon, but from experiments made at Stockholm, where the apparatus was constructed, he found that the time could, if necessary, be shortened. For putting up the house, making the gas, etc., a large number of carpenters, blacksmiths, and other artisans—including an experienced gas-maker—were taken with the expedition to Spitzbergen.

Everything being ready, it was Mr. Andrée's intention to take advantage of the first southerly wind, if strong enough, to let go his moorings and sail away north, into the regions of eternal ice.



THE BALLOON-HOUSE IN AMSTERDAM ISLAND, FROM WHICH THE START IS MADE.

None of the explorers appear to have the least doubt about their coming safely home from their perilous adventure. The only doubt there seems to be in their minds is as to where they will land, and how far they may have to travel over snow and ice before they reach the borders of civilization. In conversation with them it was curious to note the way in which each looked upon the experiment. Dr. Ekholm is a man of science pure and simple, and it was from that point of view, and that only, that he regarded it; whilst in the minds of his two companions the adventure—the daring of the thing—appeared to count for something.

Dr. Ekholm is the only one of the party who had no previous experience in ballooning, but he had made himself thoroughly acquainted with every detail of the construction and management of the balloon, and with all the literature on the subject. "We have made every calculation," he says, "and I do not know how we can fail. We lose per day of gas one cubic foot. We can afford to lose 1,000 cubic feet without detriment to the efficiency of the balloon." He adds very quaintly, "And we carry food for only four months—about 120 days." To the same effect Mr. Strindberg, when asked if he had any doubts as to the success of the voyage, replied: "Before we tested the balloon for impermeability by the gas—yes. But since we have found by experiment that the loss of gas is so small, I have no doubt at all."

Speaking of the work of observation, Dr. Ekholm says, in his precise way: "The principal instruments and methods are those for determining the geographical position by means of sailors' day's work and of astronomical observation, and the photographic apparatus. They form together what may be termed the sight—mental and physical eye—of the expedition."

The following diagram and explanation of the way in which the balloonists will reckon their position and rate of travel may be interesting to some readers. They are from the hand of Dr. Ekholm himself:—

"A frame, C D E F, with a longitudinal thread, A B (and several transverse ones), is connected with the compass. The direction of the frame is adjusted so that the eye of the observer sees an object on the ground running along the thread, A B, when the magnetic course is read on the compass. Then the angular velocity is determined by observing the time (in seconds) during which the line of sight is moving from the position on the threads, G H and I K, to that on the threads, G H and L M. Then, knowing the height of the instrument above the ground, the velocity is easily calculated. Also, the velocity may be strictly determined by observing the movement along the ground of marks on the guide-ropes, from 100 to 600 mètres (about 109 to 654 yards.)

"Magnetical charts, specially calculated for the expedition by Mr. V. Carlmheim-Gyllen-

skiöld, allow of the ready reduction of the magnetical course to the true one."

In answer to a question about their astronomical observations, Dr. Ekholm says: "They are made by means of a special instrument called the navis-azimuth—the invention of an Englishman—forming at once an altazimuth and equatorial. The true bearing of the compass being approximately known, one determines by means of this instrument at once and without calculation the latitude and longitude even in the neighbourhood of the Pole—only by sighting at the sun or the moon, taking the Greenwich time simultaneously on the chronometer. Also the sextants may be used for the same purpose, and by the aid of specially-constructed charts for applying Sumner's method, the determination may be made nearly without calculation and in a few minutes."

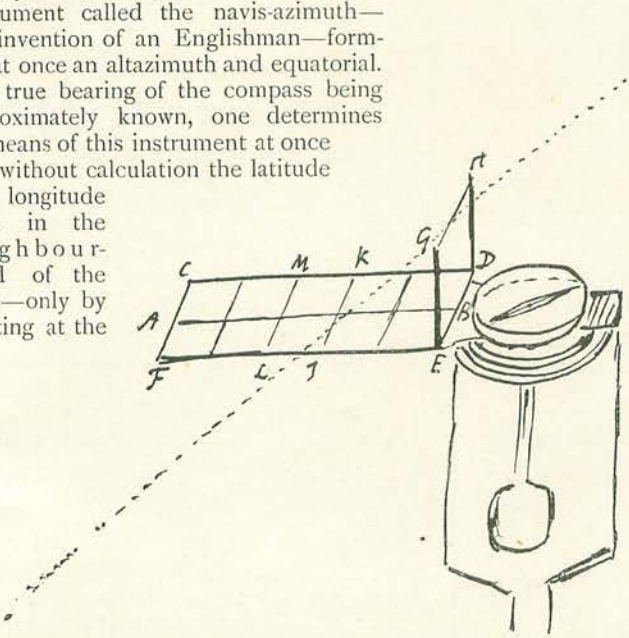


DIAGRAM SHOWING HOW THE BALLOONISTS RECKON THEIR POSITION AND RATE OF TRAVEL
Drawn by] [*Dr. Ekholm.*

It is only by knowing something of the nature of these observations, and understanding to what extent the expedition is planned to carry them out, that its true scope can be appreciated. By this means also the real character of the men conducting it can only be properly estimated. If the expedition prove successful, Mr. Andrée calculates that it will take him and his companions three years to prepare the work for publication, in which the whole of their observations, and the natural deductions therefrom, will be set forth.

As regards the temperature they will experience, Mr. Andrée thinks they will have it about freezing point all the time. "Our chief danger," he adds, "will arise from snow or rain getting frozen on the balloon. If we were to have much snow and it became firmly attached to the balloon, or if much rain were to fall and it froze, that would be a real danger, because it might overweight us and bring us to the ground. But apart from that, I do not see much danger. If we got into a cyclone, we could steer out of it, as a ship does."

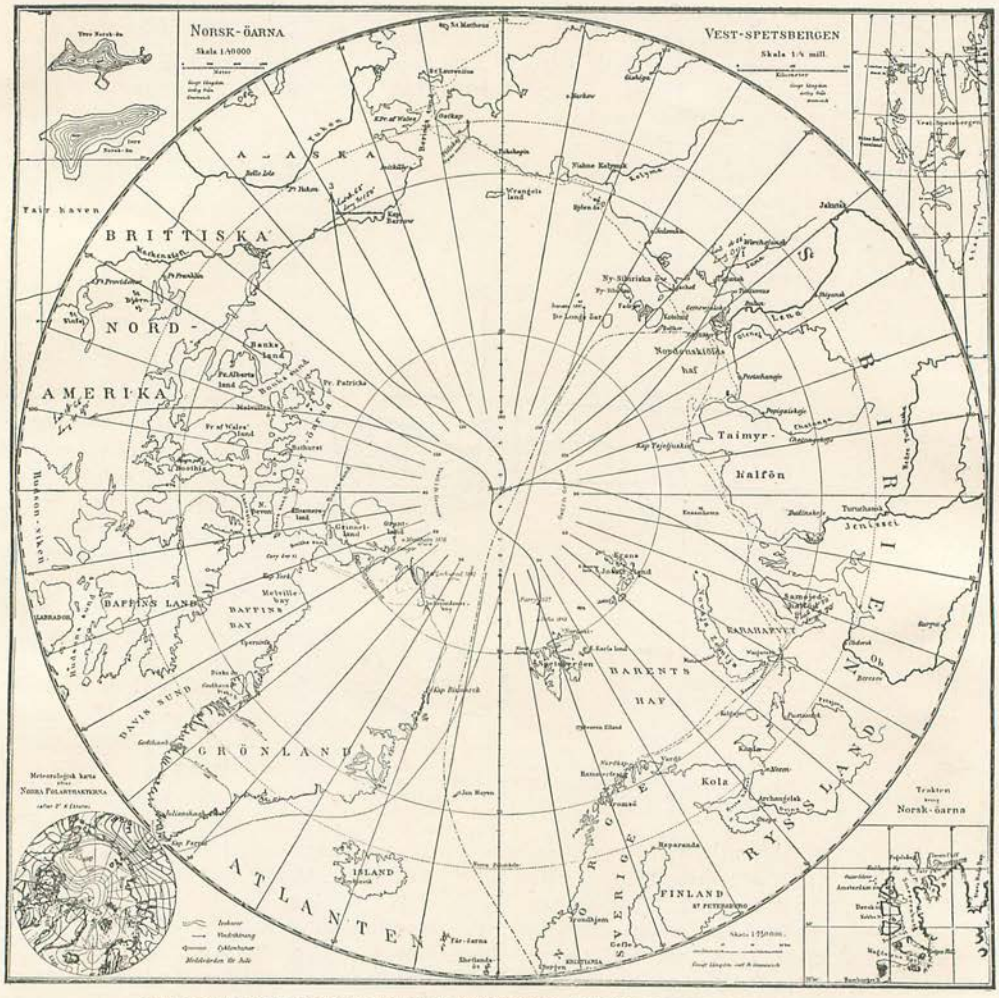
Dr. Ekholm's estimate is that under favourable circumstances they may travel at the rate of from twelve to fifteen miles an hour, and that they might reach the Pole in six days, and Siberia or the North American Continent in two weeks more. "But this," he remarked, "is putting things in the most favourable condition. Possibly we might be six weeks in reaching continental land, and that is really more likely to be the case." Mr. Andrée's estimate is much shorter than this. He reckons the balloon's mean rate of travelling at twenty miles an hour, or nearly that. "So," he says, "we may be at the Pole in forty-two hours, and in Siberia or Behring's Strait in a week!" He laughs as he says so, but adds: "It is quite possible; but I don't think it is very probable. It is more likely that we shall be three weeks or even more. I would rather not do it so quick, because of our observations."

It may here be noted that, judging from what is known of the prevailing winds in the Polar regions, the explorers arrived at the following conclusions as regards the probable place of their landing:—

(1) The greatest probability is that the balloon will land in Siberia, in about latitude 70N. and long. 135E.

(2) That it will land on the Samoyeden Peninsula in lat. 70 N., long. 70 E.

(3) That it will land in the vicinity of Cape Barrow, in Alaska, in lat. 70 N. and long. 155 W., where there is an American Government station.



MAP SHOWING THE STARTING-POINT IN SPITZBERGEN AND THE VARIOUS COURSES POSSIBLE.

(4) That it will land in British North America in lat. 67 N., long. 100 W.

Speaking of these probabilities, Mr. Andrée said:—

"For myself I would like as well as anything to sight continental land at Behring's Strait, and be able to go as far as San Francisco; but that is not likely. What would please me the least, perhaps, would be to come down in Northern Greenland, which would probably compel us to remain there a year. We might, of course, find ourselves brought right back to Spitzbergen, though that, of course, is hardly to be expected.

"In case we are compelled to make a long journey over the ice and snow, we shall have to depend very much upon the animal life we meet with for food. We should not be able to carry food for more than a month. But the Arctic regions abound in life, and we shall have our guns."

How much Dr. Ekholm is sacrificing at the shrine of science may be gathered from the fact that he "took to himself a wife" after the expedition was decided upon, and he had undertaken to go with it. Personally, he wished to postpone the wedding until his return; but the lady felt brave, and desired that the ceremony should take place without delay. "But," said Mr. Andrée, referring one day to his companion, "as the time approaches for our departure she weakens—she finds she is not so strong as she thought she was. It is very sad to see how wistfully she looks at her husband; but she says nothing." Neither Mr. Andrée nor his younger companion is married. But it does

not follow that there are not hearts that will be anxiously awaiting the result of the expedition. Mr. Andrée's mother is still living, a bright and active-minded lady of seventy. Everything concerning the expedition she watches with the greatest interest. Not an article or paragraph appears about it but she must have a copy, and these she dates and puts away with the greatest care. She has specially asked to have a copy of THE STRAND MAGAZINE containing this article, that she may preserve it with the rest. Captain Andrée says the old lady is not so anxious now about her son's perilous voyage. She has got used to his ballooning, and believes that he will come out of the experiment all right. But she was extremely anxious about him when on his earlier balloon flights.

Everyone will wish the plucky balloonists the most favourable of winds and the best of luck, and especially that the good lady of seventy may have the happiness ere long of embracing her son on his return from the Pole, or from those regions of "thick-ribbed ice" where the Pole lurks.

It remains only to say that should the voyagers have the good fortune to return, and they should descend in any part of the Russian dominions, they will be given every possible assistance. Tens of thousands of a circular, of which we give a photographic reproduction, have been distributed broadcast throughout Siberia, instructing all and sundry what to do should the balloon descend in their midst. Similar circulars have been distributed also in Alaska and British North America.

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ОБЪЯВЛЕНІЕ.

Три ученыхъ иноземца шведы: АНДРЭ, ЭКХОЛЬМЪ и СТРИНДБЕРГЪ намѣреваются лѣтомъ 1896 года подвергая жизнь свою опасности подняться съ научною цѣлью на воздухъ подъ облака въ корзинѣ, подвѣшенной къ надутому особымъ воздухомъ огромному пузырю, какъ изображено на верхнемъ рисункѣ, представляющемъ такой пузырь или воздушный шаръ, летящій вдоль морского берега, высоко надъ землею.

Вѣтры могутъ занести шаръ этотъ въ Россію или въ Сибирь, гдѣ въ такомъ случаѣ люди, находящіеся въ корзинѣ шара, дадутъ ему опуститься на землю, какъ то изображено на нижнемъ рисункѣ, представляющемъ спускъ воздушнаго шара въ окрестностяхъ Петербурга. На рисункѣ показано, какъ къ спускающемуся шару бѣгутъ и взрослые и дѣти, мужчины и женщины, чтобы помочь людямъ, находящимся въ корзинѣ, благополучно изъ нея выйти. По этому уже видно, что воздушный шаръ не можетъ причинить вреда даже и малымъ дѣтямъ. Не только не надо, значитъ, опасаться шара, а тѣмъ болѣе людей, находящихся въ корзинѣ, но слѣдуетъ оказать людямъ этимъ помощь при спускѣ, ласковый, добрый пріемъ, какъ дорогимъ гостямъ, всячески стараться облегчить имъ ихъ тяжелое положеніе на чужбинѣ и съ честью проводить ихъ до ближайшаго начальства, такъ какъ ученые иностранцы эти во время пребыванія въ русскихъ предѣлахъ будутъ находиться подъ Высочайшимъ покровительствомъ ГОСУДАРЯ ИМПЕРАТОРА.

Еслибы иностранцы съ шара не могли немедленно заплатить за услуги, имъ оказанныя, это не должно удерживать отъ подачи имъ помощи и всякаго содѣйствія, такъ какъ всѣ издержки, какія будутъ при этомъ сдѣланы, будутъ возвращены, а лица, оказавшія услуги, будутъ награждены Шведскимъ Королемъ.

Всякаго, кто увидитъ шаръ съ людьми пролетающимъ далѣе того мѣста, съ котораго онъ замѣченъ, просятъ сообщать о томъ всѣмъ встрѣчнымъ поперечнымъ, чтобы дошла вѣсть о пролетѣ шара до начальства.

При этомъ желательно, чтобы было указано время, когда шаръ замѣченъ, въ какую сторону онъ летѣлъ, какой о ту пору дулъ вѣтеръ.

Эти свѣдѣнія нужны для успѣха розыска людей съ шара въ случаѣ, если о нихъ долго не будетъ вѣстей.

Не пугайтесь шара, а всячески помогите людямъ при спускѣ его на землю, сдѣлавшемъ этимъ дѣлу доброе, угодное Богу и Великому Государю.

Вѣсти Императорскаго Русскаго Географическаго Общества.

CIRCULAR DISTRIBUTED OVER SIBERIA GIVING THE INHABITANTS DIRECTIONS HOW TO ASSIST THE VOYAGERS IN THEIR DESCENT.