

LONGER EARS FOR SHIPS

By ROBERT H. MOULTON

SIR HIRAM MAXIM

AS A RESULT of the Titanic disaster, Sir Hiram Maxim, the inventor of the Maxim gun, has evolved a plan for giving ships a "sixth sense" that will enable them to avoid icebergs in a fog by the same means by which a bat finds its way about in the dark. For a year or more he has been working on a device which he claims will enable a vessel to detect a floating object several miles away, to estimate its size, shape and distance, and to recognize the character of a neighboring shore, so that a harbor, for instance, may be safely entered in a fog. All this is to be done simply by receiving and recording the echoes sent back by the objects to be detected; but the sound that produces the echoes is not high enough in pitch to be audible. Its vibrations are powerful and slow and are given out by a huge siren at the ship's bows. The echoes are received and recorded by apparatus that serve as ears and which are able to give us much more information than a real ear could do.

This latest collision preventer is another adaptation of a phenomenon in the natural world. Sir Hiram Maxim has taken his cue from the bat, which he was reminded is enabled to tell the distance of objects by the beat of its wings.

In bats the sense organs are highly developed. When a bat flies about in total darkness the beat of its wings sends out a series of pulsations, or waves. These waves strike against all surrounding objects and are reflected back and received by the sensitive organs which form part of the face of the bat. The extremely delicate nature of the bat's wings, together with the sensitiveness of its sixth sense contained in its delicate face nerves, enables the bat to judge the distance of any object by the lapse of time between the sending out and the receiving of the waves. It is this exceptional mechanism, and not any faculty of seeing in the dark, which enables the bat to fly unerringly without the least light to guide it. This was proved a hundred years ago by the Abbe Spallanzani, who made experiments by blotting out the eyes of bats with red hot irons and found that they got along just as well without eyes as with them. Other experiments, without cruelty, may be made to show the same thing.

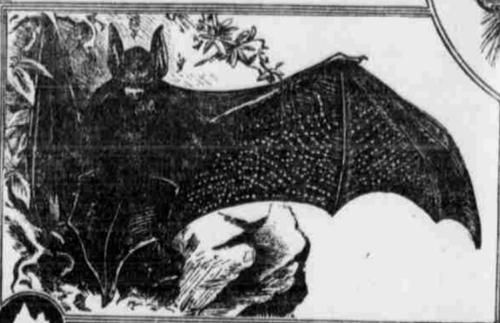
We all know that if we capture a wild bird and liberate it in a large room with closed windows, it makes a wild and furious rush for what its senses tell it is an opening through which it can escape. Its eyes do not reveal the presence of the glass, and the result is a broken neck. A bat liberated under similar circumstances makes the same dash for freedom. The flapping of its wings, however, brings its sixth sense into action and it soon perceives that it is face to face with a solid wall and stops short before it touches the glass.

Sir Hiram proposes to apply this sixth sense to sea-going vessels. His apparatus will produce atmospheric vibrations of about the same frequency as those produced by the bat, but of energy at least three hundred thousand times as great. These will not be audible, but they will travel at least twenty miles, so that they could be received and recorded by a suitable apparatus at that distance, and would be able to travel at least five miles and return back to the ship a reflected echo that would be strong enough to be detected.

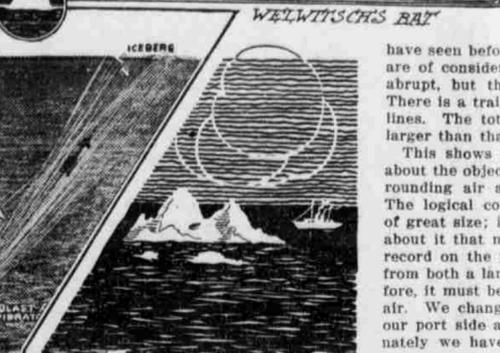
In describing his invention, Sir Hiram states that it might be considered an artificial ear. The apparatus is provided with a large diaphragm tightly drawn over a drum-shaped cylinder, and so arranged that the atmospheric pressure is always the same on both sides, quite irrespective of any air blast. It is therefore always able to vibrate freely in response to the waves of the echo, and its vibrations are made to open and close certain electrical circuits which ring a series of bells of various sizes. If, for example, the object is very small or at a very great distance from the ship, a very small bell rings, while a large object at a distance of two miles would ring a larger bell, and a very large object a still larger bell. The apparatus gives an audible notice if anything is ahead of the ship.

Another apparatus, similar to the first, is provided, but instead of ringing a bell it produces a diagram of the disturbances in the air—that is, when there is no noise except that due to the action of the ship or the sea waves, a wavy line is produced on paper, but whenever the vibrations sent out by the vibrator strike an object and return, the wavy line on the paper becomes very much increased in amplitude, so as to be easily observed, and the distance that the object is from the ship can be measured by the length of the paper strip between the giving off of the vibrations and the receiving of the echo. In this way the distance of the object can be determined with a considerable degree of accuracy, and the size of the object may be determined by the amplitude of the waves that return.

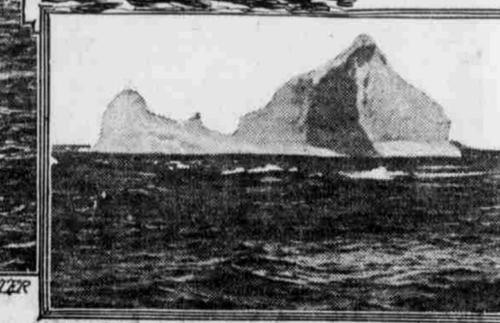
The apparatus for producing the atmospheric vibrations should be placed well forward on the main deck or in any other position where it can



HEAD OF BLAIRVILLE'S BAT



VIBRATIONS DIAGRAMMATICALLY REPRESENTED



AN ICEBERG, FOUR-FIFTHS OF WHICH IS SUBMERGED

be turned from port to starboard. Of course, there would be no use for the apparatus except in dark, stormy or foggy weather unless it was to be used in communicating with other ships.

If the sea were perfectly clear the blasts sent out would be recorded at the very instant of their production, but no echo would be produced. But if there should happen to be an object of any considerable size at a distance no greater than two or three miles the zigzag line on the paper would be changed, the amplitude of the waves would be greater and would be very noticeable. To make sure, the blasts could be repeated several times; and then if the result was always the same, it would indicate the presence of some object, and the length of paper between the primary blast and the echo would indicate the distance that the object was from the ship. It might be so arranged that one inch of paper represented a mile.

To many it will appear difficult to reveal not only the presence of objects at sea, but also their size, distance and character, by simply sending out vibrations and receiving echoes. Sir Hiram assures us, however, that such an echo properly received and recorded will not only indicate size and shape with a fair degree of accuracy, but direction and distance with great accuracy. It will distinguish a ship from an iceberg, will show whether the object is stationary or moving, and, if moving, the direction and velocity of such movement.

Let us embark, in imagination, on a ship equipped with Sir Hiram's invention. We are well out at sea, our ship making 20 miles an hour, and we find, upon sending out several blasts, that the echo reaches us in 20 seconds. We infer that, as it took ten seconds for our vibrations to reach the object and another ten seconds for the reflected vibrations to return, the distance is slightly over two miles. One minute later we send out another blast, but the result is no stronger than before, so we change the direction of the blast and find that the greatest effect is produced when the blast is sent out dead ahead; also, that the distance between the object and our ship is being reduced at the rate of 35 miles an hour. Inasmuch as our ship is making only 20 miles an hour, it is evident that the unknown object is a ship making 15 miles an hour and traveling toward us slightly to our starboard.

Our next blast shows us that the ship is only a mile distant, and very much to the starboard. We follow her direction and when she is in a position to present her broadside to us, we find on sending out a blast that the echo is very strong, the bells at the receiver ring violently and the recorder makes a large and distinct marking on the paper strip. The weather has been so thick that we have not seen the ship, but we have a fair idea of her; we know her speed and the direction in which she is sailing. Later on, we receive a series of records from each blast, showing that there are several small objects in our vicinity, probably fishing boats. We are able to locate them and measure their distance, and if any of them are dead ahead of us, we change our direction so as to give them a wide berth.

Subsequently we have a new experience. We send out a blast and receive back an echo showing that there is an exceptionally large object very nearly dead ahead of us. We know it is large, because the distance indicated is ten miles and the record quite distinct. By sending out

repeated blasts we find that the distance between us and the object diminishes about one-third of a mile in a minute. This, of course, is due to our own speed and indicates that the object is stationary.

When we are two miles apart the reflection of our blasts rings the bells and the indicator shows a different record from what we have seen before. The markings on the paper strip are of considerable size and commence sharp and abrupt, but the ending is not sharp or distinct. There is a trailing out of spots made by the zigzag lines. The total length of the echo is thus made larger than that produced by the primary blast.

This shows that there is some kind of a cloud about the object of a different density from the surrounding air and that it is of considerable size. The logical conclusions drawn are: the object is of great size; it is stationary and it has something about it that modifies the echo. Consequently the record on the paper strip resembles that obtained from both a large, solid object and a cloud. Therefore, it must be a large iceberg surrounded by cold air. We change our direction so as to pass it on our port side at a distance of half a mile. Fortunately we have barely passed when the fog lifts and discloses an enormous iceberg surrounded by smaller pieces that have broken off.

Returning to realities, Sir Hiram states that while the apparatus will work exactly as described with the devices already designed, he is not going to rest at this point. He says that he will shortly produce a recording instrument with a selective power that will not receive any vibrations except those due to the echo of the blast sent out. This will eliminate all noises due to the ship and the sea, and produce a very clear record.

QUEER SPRIGS OF GENTILITY

Prince Alexander of Serbia is not, as many suppose, King Peter's eldest son. The latter is Prince George, and was known as the crown prince until his wild escapades compelled even the indulgent King Peter to deprive him of all rights to succession, and banish him to an inaccessible part of the kingdom. His doings both before and since would fill a book. A French tutor, returned to Paris after two months at the Konak, tells many queer tales of his pupil's doings. One morning they were busy at a Latin lesson when a mouse ran across the room. Quick as a flash Prince George had it by the tail. The next instant he was dashing off with it to the sentinel at the palace gate, and, holding it up to the frightened man's face, insisted on his biting off its head. Upon the other's refusal he threatened violence, and would certainly have proved as good as his word had not the king arrived in the courtyard at that moment from his morning ride.

Not that King Peter ever had much authority over his eldest son. Servian statesmen have never forgotten the painful scene between father and son at which they were once obliged to assist. At a special meeting of the cabinet the then crown prince entered uninvited. King Peter promptly requested him to withdraw. Taking a seat, his highness refused, saying: "I am the future king and have a right to be here. I must know what happens and so shall take part in the council." Once more King Peter ordered him away, but the other as stoutly refused, and a heated altercation ensued, during which the ministers melted away, leaving the king and his hot-headed son to settle their difference alone. On another occasion the prince was present at a birthday dinner given in honor of the czar at the Russian ministry. After toasts had been proposed to Emperor Nicholas and King Peter, Crown Prince George arose and drank to the union of Bosnia, Herzegovina and Servia. The icy welcome that greeted these words was such that his highness had immediately to leave the banquet.

This and other escapades caused such a revolution of public opinion that Prince George was finally compelled to renounce his rights of succession in favor of his younger brother, and certainly the country has benefited by the change. Prince Alexander is a decidedly different type from the other. A little tot of three when his mother died, he and his baby sister, today the wife of Grand Duke John Constantinoivitch of Russia, were at once taken off to St. Petersburg to be brought up by their aunt, Grand Duchess Peter. There he received a sound education and was for a time one of the czar's pages. He would probably have entered the Russian army had not the dreadful events of 1903 completely changed his plans. As soon as King Peter was settled on the throne his three children were summoned to Belgrade. At the palace, however, he continued his studies. Two officers were engaged to give him private lessons on law and military science. Servian, Russian and French he speaks perfectly, and lately he was working hard to brush up his German. Though the crown prince's apartments at the palace are very plainly furnished, there is a wealth of bookcases. He is a great reader, and is familiar with the principal literary works of four countries.

NEBRASKA IN BRIEF.

Lincoln banks will send \$50,000 in gold to New York.

Sioux City Jobbers are kicking on Nebraska class rates.

Sunday baseball for Lincoln will be voted upon at the November election.

The State Normal board will construct a model high school at Peru.

Mrs. Arabel McCullough, past 60, of Stella, has made 3,300 rose beads this year.

Over 10,000 people attended the three days Platte county fair at Columbus.

Frank J. Polzkill shot and fatally wounded W. W. Thomas in a quarrel near Stapleton.

The Grand Island chapter of the International Typographical union has been organized.

As a result of a fight at Walthill, I. H. McCauley received injuries from which he died.

A new parsonage is being built for the pastor of the Grace Lutheran church at West Point.

The opera house at Papillon has been purchased by the Masonic lodge of that city for \$13,000.

The plant just finished of the Crystal Ice company at West Point represents an outlay of \$11,000.

A 14-year-old boy robbed the Friesen's Implement company of Fairbury in broad daylight of \$10.50.

Omaha coroner's jury found that Mrs. Emma Hickens shot and killed Bruno C. Hanson of Battle Creek.

Crackmen blew the safe in the office of the Odell Farmers' Lumber company at Odell and escaped with \$100.

Property of the Water Board in Florence is held exempt from taxation by a decision of the supreme court.

The new \$3,000 pipe organ installed in St. Bonaventure's church at Columbus during the summer is now in use.

Because he was addicted to joy jaunts with other people's automobiles, Charles Munn of Ansley was fined \$25.

The large barn on the farm of George Sunkin near Seward was destroyed by fire. The loss is estimated at \$2,000.

The Woman's Christian Temperance union in their convention at Hastings voted to hold the 1915 meeting in Omaha.

Fire caused several thousand dollars damage to the grocery stock of O. L. Stewart and the saloon of H. J. Duntz at Beatrice.

It is reported that the Burlington will add another ice house of 5,000 tons' capacity to its present plant at McCook this fall.

Worry over business troubles is believed to have led Oscar Brown of Aurora to shoot and kill his wife and to commit suicide.

Charles Smith, a farmer living north of Lexington, was killed by driving his automobile off an embankment into Buffalo creek.

Curco Antonio, an Italian laborer at the Superior Cement Plant, was shot and killed by a fellow workman while he lay in bed asleep.

D. S. Dalbey's resignation from the Gage county board of supervisors has been accepted by the members of the board in session at Beatrice.

The German societies of Grand Island alone have raised \$2,000 for the war relief fund which is being handled by the German Alliance in Omaha.

Thomas Endicott of Alliance is in serious condition from a bullet wound. He dropped his gun, which was discharged, and the bullet penetrated his right lung.

Miss Anna V. Day, connected with the state superintendent's office at Lincoln, has resigned to accept a place as dean of a woman's college at Milwaukee.

After a hot campaign in a fight for bonding the city of Blair to the extent of \$35,000 for a municipal electric light plant, the bonds carried by a majority of 65.

Sam Bevins of Woodrow, Kas., who admitted forgery at Alma, was sentenced from one to twenty years in the penitentiary by Judge Bungan at Hastings.

The tri-state fair came to an end at Crawford after a successful three-day session. Exhibits were attractive and attendance broke all previous records.

The Farmers State Bank of Overton has organized for business with a capital stock of \$25,000 paid up. It has received a charter from the state banking board.

Rev. Peter Grobbel, pastor of St. Anthony's church at St. Charles, near West Point, is marooned in Europe. He was heard from at Lusanne, Switzerland, July 28.

The Hastings Woman's club has organized branches in the sixteen townships of Adams county to raise funds for the new building for the Sunny side Home for Old People.

Fire destroyed the old livery barn owned by William Spence at Louisville, and several other buildings and their contents to the extent of several thousand dollars.

Thrown from his auto when it became unmanageable on a hill, William McGimpsey, who resides near Osceola, was seriously injured.

Glaring auto headlights will not be allowed on the streets of Omaha after October 12. The ordinance requiring dimmed headlights on all automobiles becomes effective on that day.

Frank J. Polzkill, who on the evening of September 24 shot W. W. Thomas at Stapleton, was exonerated from a felonious charge by a coroner's jury as having committed the deed in self-defense.

ONE UNI SPORT PAYS

FOOTBALL IS MONEY MAKER FOR ATHLETIC DEPARTMENT.

ANNUAL FINANCIAL REPORT

Good Showing Made by Cornhuskers at the University of Nebraska Last Year.

Lincoln. — Football is the only branch of inter-collegiate sport at the University of Nebraska that pays its own way. All other sports are money-losers and could not be maintained by the athletic department of the Cornhusker institution were it not for the profits gleaned from the game of the gridiron. These are the salient facts which stand out in the annual financial report just filed by Treasurer T. A. Williams of the university athletic board, following an audit by Prof. H. W. Caldwell, chairman of the finance committee.

The treasurer's report is for the year ending September 1, 1914. It shows, in spite of the losses sustained in all sports excepting football, that Cornhusker athletics have flourished and that the treasurer had a balance on hand at the end of the year amounting to \$2,094.68. The total receipts from all sources were \$31,960.93 and the total expenditures were \$29,289. Football receipts totalled \$29,866.25, the net profit from that branch of sport being \$8,355.97. Other sports resulted in the following losses: Track, \$1,285.45; basketball, \$231.30; wrestling, \$62.74; soccer, cross country, tennis and inter-departmental baseball, \$170.53.

Corporations Fail to Pay Tax.

Between 500 and 600 corporations, doing business in Nebraska, some organized in this state and others elsewhere have not paid their state occupation tax for 1914, or the added penalty for delinquency.

Within another month these corporations will become liable to lose their charters if the secretary of state and the attorney general see fit to bring suits.

The secretary of state has sent out notices again to all delinquent corporations. Despite the failure of a large number to pay, the corporation tax law passed by the 1913 legislature has brought in nearly \$100,000 to the state.

New Motor Car Schedule.

The Union Pacific railway has filed with the railway commission a schedule on which the motor car ordered placed on the branch line of that road from Columbus to Spalding will run. The car will leave Spalding at 4:30 in the morning, arriving at Columbus at 7:30. Until the company publishes its new train schedule on the main line, local passenger No. 24 to Omaha, which arrives in Columbus at 7:13, will be held for the Spalding motor. Returning to Spalding the motor will leave Columbus at 7:10 in the afternoon and arrive at Spalding at 10 in the evening. Service will begin October 11.

Cattle Moving Lively.

The cattle movement on the Nebraska railroads is now very heavy, it began the middle of August and is expected to reach into November. The last of September and the first part of October shipments are at their highest point. Sheep from Wyoming are now moving. A Burlington official stated that the cattle shipments from the sandhills were about 10 per cent heavier than last year and from other places about the same as in 1913. A heavier shipment of sheep from Wyoming is anticipated this season.

Will Ask Legislature's Aid.

Following the decision of the state supreme court forbidding them from practicing without a regularly granted license from the state board of health members of the chiropractic profession of the state are said to be preparing to submit a bill at the next session of the legislature asking recognition of their method of healing. The matter was the subject of a law introduced at the 1912 session, but the measure did not make rapid progress.

State Treasurer's Report.

The report of State Treasurer George for the month ending September 30, shows a balance on hand in the treasury of \$632,357.97, as against \$684,905.56 the month previously. Expenditures amounted to \$235,186.05 and receipts \$202,638.46. Of the amount \$9,969.94 is cash on hand, and \$622,448.03 on deposit. Trust funds invested amount to \$9,859,124.19.

Report on Paroled Men.

Secretary J. W. Shahan of the State Board of Charities and Corrections has sent out letters to all parles having paroled convicts on their hands and is beginning to receive reports called for asking for the condition and behavior of the paroled men. In every case so far, with one exception, the men are feeling well satisfied and are doing well. The exception is a young man who seems to be possessed of a roving disposition, and it keeps his employer busy encouraging him to stay until his time is out.