Drouillard's Drifter Balloon Float.

The drifter balloon float is an ingenious and very simple apparatus which is used to carry from a vessel in distress to land, and *vice versa*, a rope by means of which the passengers and crew of the vessel can be rescued.

It is formed by a specially-shaped balloon, which presents to the wind a plain surface 1.8 meters long, 1.3 meters high, and 1.2 meters wide at base (71, 51, and 47 inches). This balloon tows an apparatus formed by two pieces of timber joined to form a right angle, of which the vertical beam is 2 meters long and 0.55 meter high (79.7 and 21.6 inches) and the horizontal piece 1.2 meters by 0.3 meter wide (47 by 11.8 inches). In order that it may be maintained in a proper position, there is lead attached to the under side as ballast. This "drifter" again tows a rope 1,500 to 2,000 meters (4,918 to 6,560 feet) long, which is to be used as a pass rope between the vessel in distress and the land.

The drifter is connected with the balloon float by a regulating arrangement by means of which, before the drifter is thrown at sea, an angle from 60 deg. to 90 deg. from the direction of the wind is supposed to be obtained.

The balloon float is composed of three wooden or light metal hoops, covered with a special tissue. When not in use it folds up like an accordion and occupies a very small space.

The apparatus as used for experiments is covered with cotton cloth, but when in practical use it is to be covered with strong sail tissue in order to be able to stand heavy seas and contact with the rocks when landing. To use it one draws the folds apart and it inflates itself automatically; the valve is then closed and the balloon is fastened to the drifter. The inflation can be completed, if necessary, by various means indicated by the inventor; its weight is 7 kilogrammes (15.4 pounds).

When not in use the drifter is folded up into four parts by means of hinges and occupies a very small space. When in use its four parts are maintained open by two hooks and an iron bar; the required angle is then regulated by means of the webfoot (*patte d'oie*), the line employed as a pass rope is attached, and the whole apparatus is thrown into the sea. The weight of the drifter is about 30 kilogrammes (66 pounds).

The balloon float then draws the drifter to a distance with a speed and strength proportionate to the force of the wind, for the stronger the wind the more efficacious the appliance; the drifter steers it like a rudder.

On the arrival of the line carrier either on board the ship in distress or on the shore, it is drawn out of the water. If ashore, the person who receives it draws out the iron rod which maintains the vertical piece of timber on the horizontal one, and discloses a steel hammer weighing 3.5 kilogrammes (7.7 pounds) and an iron stake of the same weight, which are incased in the vertical timber. The stake is then driven into the soil, the towed line solidly fastened to it, and a connection is thus established between the land and the ship in distress.

The balloon float is provided externally with loops and strings, to which, in case of collision or foundering of the ship, 18 to 20 persons can cling and there wait for help. They may be carried to land by the balloon float.

On September 17 and 18, 1902, a small model apparatus drifted against the wind at an angle of 120 deg. in the course of trials carried out in the roads of Royan in the presence of deputies and prominent persons.

During the trials which took place at La Pallice-Rochelle on the 19th of September, 1903, the inventor proposed to carry a rope from land to a ship in distress (a buoy was moored instead of a ship). The apparatus, set at 90 deg., was thrown into the sea from the north lighthouse at La Pallice, and, in spite of a contrary current of about 2 knots, passed within 6 meters (19.7 feet) of the buoy, at a distance of 400 meters (1,312 feet) from its starting point, making an angle of 90 deg., the time occupied being only thirteen minutes. The wind was light (6 meters, or 19.7 feet, per second) and east-northeast, while the direction taken by the apparatus was north-northeast.

Many prominent persons were present at this experiment and warmly congratulated the inventor.

The invention should prove to be a very useful one on account of its simplicity and practicability.

Statistics of Cities Having a Population of Over 25,000 in 1902 and 1903.

The Bureau of the Census has just published Bulletin 20, presenting statistics of cities having a population of over 25,000. This bulletin contains comparatively few statistics relating to the population living in these cities, but is for the most part a compilation of data relative to the resources, transactions, plant, and machinery of the municipal corporations, forming a sort of statistical inventory and balance sheet.

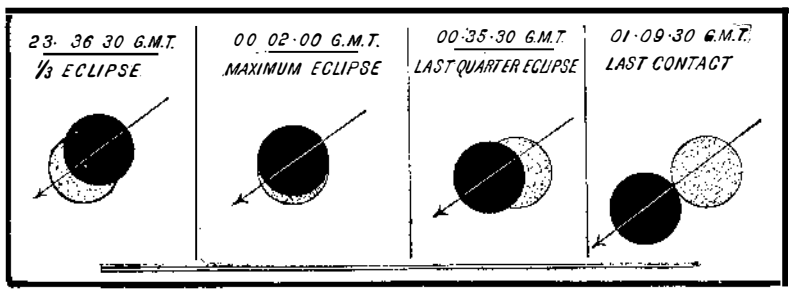
One finds in these tables such facts as the length (in miles) and the area (in square yards) of the paved streets classified with reference to kind of paving; miles of sewer; number of street lamps; miles of street railway track; number of school buildings and number of teachers and pupils; the number of public libraries with the number of volumes they contain; the number of almshouses and orphan asylums with the number of inmates; the number of policemen, and the number of arrests they have made; the number of firemen and fire engines, the number of fires occurring during the year, and property loss from such fires; the number of marriages recorded in the office of the city or county clerk and likewise the number of divorces. There are also tables showing the total population of each city, and the deaths and death rates from each of the principal causes of death.

But by far the greater part of the tabular matter consists of financial statistics presenting the expenditures and receipts of each city classified by departments and offices, the public debt, sinking funds, etc. By reference to these tables one may readily compare the cost of government and of the several departments of government in different cities.

In the aggregate the financial transactions of the 175 cities included in this report equal in magnitude those of the national government. The total corporate receipts for these cities amounted to $541,624,203, while the revenues of the United States government in the fiscal year 1904, exclusive of postal revenues, were $540,631,749. The total corporate expenditures of the cities were $535,804,200; the expenditures of the United States government were $582,402,321. The national debt in 1904 amounted to $895,157,410; the aggregate debt of the 175 cities, exclusive of sinking fund assets, was $1,134,578,783. The receipts, expenditures, and debt for the city of New York represent about one-third of the city totals.

OBSERVATION OF SOLAR ECLIPSE AT SEA.

By the courtesy of Mr. Vernon H. Brown, of the Cunard Company, we have been favored with the following observations of the solar eclipse of August 29 to 30, as taken on board the R. M. S. "Lucania" by Capt. J. B. Watt. The accompanying diagrams, drawn at the time, show the apparent path of the moon across the sun's surface, and the apparent positions of the sun and moon at the times given. The observations were taken during a westward passage.



THE ECLIPSE OF THE SUN AS OBSERVED ON THE "LUCANIA."

Correct G. M. T.	Position. Lat. N.	Position. Long. W.	Correct A. T. S.	Distance between limbs. ⊙ D.	Correct time interval.
H. M. S.			H. M. S.		M. S.
23 36 30	43° 41½′	46° 50′	20 28 29	10′ 30″	25 30
00 02 00	46 37	46 53¼	20 53 25	03 50	33 30
00 35 30	46 32¼	47 19¾	21 25 30	13 00	34 00
01 09 30	46 28¼	47 30	21 58 50	31 45	.. ..

Sun's diameter = 1·0. Magnitude of Eclipse = 0·879.

Sun obscured by clouds until 23 h. 36 m. 30 s. G. M. T. when distance between limbs was 10′ 30″.

Maximum Eclipse occurred at 00 h. 02 m. 00 s. G. M. T. when distance between limbs was 03′ 50″.

Last contact occurred at 01 h. 09 m. 30 s. G. M. T. when ⊙ diameter was 31′ 45″.

Interval between Maximum Eclipses and last contact 01 h. 07 m. 30 s.

Official Meteorological Summary, New York, N. Y., August, 1905.

Atmospheric pressure: Highest, 30.24; lowest, 29.67; mean, 29.99. Temperature: Highest, 88, date, 11th; lowest, 57, date, 28th; mean of warmest day, 82, date, 11th; coolest day, 62, date, 16th; mean of maximum for the month, 78.8; mean of minimum, 65.6; absolute mean, 72.2; normal, 72.6; deficiency compared with mean of 35 years, —0.4. Warmest mean temperature for August, 77, in 1900. Coldest mean, 69, in 1903. Absolute maximum and minimum for this month for 35 years, 96 and 51. Average daily deficiency since January 1, —0.4. Precipitation, 5.23; greatest in 24 hours, 1.81, date, 15th and 16th; average of this month for 35 years, 4.61. Excess, +0.62; deficiency since January 1, —1.09. Greatest precipitation, 10.42, in 1875; least, 1.18, in 1886. Wind: Prevailing direction, south; total movement, 7,177 miles; average hourly velocity, 9.6 miles; maximum velocity, 37 miles per hour. Thunderstorms, 6th, 8th, 10th, 13th, 15th, 16th, 24th, 29th, 30th. Clear days, 8; partly cloudy, 12; cloudy, 11.

The "Mizpah Ledge"—A Tonopah Miner's Experience.

BY H. C. CUTTING.

After completing a compilation of the statutes of Nevada in 1900, my health became very much impaired by the long strain of office work, so that I decided to turn my attention to prospecting and mining. Going south from Reno into Esmeralda County, a locality which was very familiar to me, I first heard of the discovery of Tonopah on arriving at Hawthorne, the county seat, a small town set right out in the desert, whose perspective on all sides was only a barren waste of sand and sage brush, with a background of precipitous mountains. At Sodaville I heard a great deal of talk of the new find, which was about sixty miles east by south of that place. I learned that the discovery was made by Jim Butler, whom I knew quite well by correspondence, as Jim had served as county superintendent of schools during my term as State superintendent of public instruction. I heard that he had given leases to a number of the prospectors then in the country, and soon received a letter from him inviting me to come down to Tonopah, offering me a lease as an inducement for the trip.

Arriving at Tonopah on the 14th day of January, I was the possessor of just four silver dollars. My first investment was in a poker game, which netted me a month's board and $12, with which I commenced operations on lease No. 19.

The camp at that time consisted of half a dozen or more tents and about thirty people, all highly enthusiastic over the new camp, and indulging in dreams of wealth which in a number of cases were realized. Everyone was flat "broke," including the owner of the property, but the little store, which had on sale a small and varied stock, was generous in extending credit to the men whose sole capital was a pair of willing hands and a lease on the big find. My lease, as I have stated, was No. 19, the first on the Mizpah Ledge, the other leases from 1 to 18 having been granted on the Valley View and Burro Ledges. Not a scratch of the pen secured any of these contracts. They were all oral, and the boundary of each man's working ground was marked simply by setting up a stone monument at each end of the ground allotted, which in most cases was one hundred feet on the strike of the ledge.

We experienced a hard struggle to get tools to work with, powder with which to break the ground, and food to support us while we were delving in Mother Earth's treasure box. It was just as remarked by a stranger who arrived in the camp after the lessees had been working about four months: "There is nothing in this camp but money"; and after we had been working about three or four months we had plenty of that, but it was extremely difficult to get supplies. We were more than sixty miles from the nearest railroad station, and the base of the supply was at Reno, 240 miles distant. The railroad facilities were very poor, as the Carson and Colorado Railroad, which runs from Moundhouse south, was narrow gage, very poorly equipped, and the sudden rush of business just about paralyzed the little road.

It required a long time to stock the road from Sodaville, the railroad terminus, to Tonopah with wagons and horses sufficient to supply the people who rushed in, and there was never a time when anyone in the camp could say that he had a "square" meal. For ten days at a stretch the camp lived on sardines, canned salmon, and crackers. This condition put the boarding-house keeper out of business, for these items of food were very expensive, but they were all that could be secured.

During this leasing period in the development of Tonopah the brotherhood of man was most strikingly manifested. Everything in the camp was common property, and no one quarreled with his neighbor. If my neighbor had powder, he divided it with me as long as it lasted. If I had an overcoat and he had none, he wore mine. You were liable to find some new arrival in your bed when you came off the hill after a day's work, but it was all taken good-naturedly.

A circumstance which is worthy of special mention, and is perhaps unprecedented in the annals of mining camps, was the fact that nothing but Jim Butler's word was given to secure to the lessees their rights on the property. There was not a quarrel nor a lawsuit in the camp, although a difference of six inches in a man's line might result in a difference to him of a sum written with five or six figures. I recall when I drew the papers by which the present owners of the mine took the property over from Butler, that an effort was made to have the discoverer cancel the leases he had given, but he refused, and consented to sell only with the expressed agreement that those working on the property should continue to operate under their leases until the first of the year, when they expired; and every promise given by Jim Butler was carefully carried out and secured. Had I the literary ability and you the space, I feel that a

sketch of Jim Butler would furnish a story which would interest and entertain your readers, as Butler is unmistakably one of the most picturesque characters the West has produced.

In reviewing the many events which have passed since the discovery of the now famous Mizpah Ledge, I almost hesitate in a task which is truly worthy of the pen of the romancer. For the history of Tonopah and its original discovery reads more like a fabled tale of old than a stern narration of a modern quest for gold.

Glancing backward over the five years which have passed since Jim Butler, a picturesque type of the Western prospector, through the sheer caprice of fortune stumbled on the golden ledge, I can scarcely realize that the few open cuts, which marked the first development work, should to-day be the open ways to a mine whose visible ore is far into the millions, and a camp whose fame will in time exceed that of Virginia City, Placerville, or Nevada City, of the generations that have passed.

I doubt very much if the outside world realizes that in these mines, developed in a brief period of five years, there is very nearly two hundred million dollars' worth of high-grade ore in sight. During the leasing period of the one mine, which continued for one year from January, 1901, the camp produced in the neighborhood of five million dollars in ore. Many men were made rich, and the foundation of my own fortune came with the operation of Lease No. 19, the first worked on the Mizpah Ledge.

Correspondence.

The Scientific American Wrappers.

To the Editor of the SCIENTIFIC AMERICAN:

I was pleased to note to-day that my paper came enclosed in a wrapper. As I have had more or less trouble in receiving the paper torn and slightly soiled on account of its not being in a wrapper, I can appreciate the change.

This paper I prize highly and strive to keep in a neat and clean condition, as at each year's end I have it nicely bound into a volume, therefore we subscribers who value our paper cannot help but appreciate the new idea. ERNEST C. CHESWELL.

Malden, Mass., September 1, 1905.

[We note with pleasure the comment of our subscriber, and we would be pleased to have other expressions of opinion. We have installed a Belknap Rapid Addressing machine which prints the address on and cuts the wrapper off from a continuous web of paper. This will add to the certainty of the subscriber's receiving his paper in good order. The speed of operation, 60,000 a day, will also insure its prompt delivery.—EDITOR.]

Is the Mosquito the Only Cause of Yellow Fever?

To the Editor of the SCIENTIFIC AMERICAN:

Just at this time, when the mosquito theory of yellow fever transmission is undergoing its first real test in our country, many persons are asking themselves the question, Does this theory account for all known cases of yellow fever? In many instances it apparently does not, e. g., where the disease has followed the reception of a lock of hair from a dead yellow-fever patient by persons at a distance from the place of the epidemic, or the handling of clothing, goods, etc., from infected districts. These instances are too well authenticated to be doubted; but, so far as the writer knows, they have not been explained under the mosquito theory, and for this reason the theory has not been wholly accepted by many.

In reading of the brilliant Cuban demonstration of the theory, it seems to me there is a gap in the series of experiments wherein may lie a suggestion, if not an explanation, of the cause of infection in cases like those alluded to. It is stated that the *Stegomyia fasciata* does not feed upon yellow-fever fomites and that the said fomites cannot directly transmit the disease. But I have nowhere read that uninfected mosquitoes and non-immune persons were shut up with yellow-fever fomites for two weeks, or any other length of time. No matter what may be the opinion in regard to the mosquito's feeding upon fomites, it seems reasonable from a scientific point of view that an experiment of this kind should have been made. Perhaps it was made, but, if so, it has not been mentioned, so far as my knowledge goes.

If a mosquito can be infected by fomites, cases such as have been mentioned might be explained under the mosquito theory. If the mosquito cannot be infected by fomites and fomites cannot directly transmit the disease, how are such cases to be accounted for under the theory? C. H. CARSON, JR.

Savannah, Ga., August 31, 1905.

Improvement of Fog Horns.

To the Editor of the SCIENTIFIC AMERICAN:

The numerous collisions which occur between vessels at sea during the prevalence of fog, and the narrow escapes which we occasionally hear of, but which are generally kept discreetly quiet by captains and vessel owners, would seem to show that the system of fog horns as at present in use is by no means perfect or satisfactory. One defect in them is that, although the sound of a fog horn may be heard by the crew of another ship, there is no means of telling in what direction the vessel on which it is sounded is going, or even where it is, because fog renders futile all reliable calculations as to distance and direction. And again, all or nearly all fog horns, I believe, whether on vessels or on dangerous points of land, are pitched on the same note, which is also conducive to errors, which in some cases end disastrously, as, for instance, when the captain of the steamer "Montreal," lying in the Straits of Belle Isle in a fog some years ago, mistook the fog horn of the steamer "Lake Erie" for that of the fog horn on Cape Ball, and steaming north to avoid the supposed danger of the Newfoundland coast crashed on to Belle Isle, when the boat became a total wreck—fortunately, without loss of life.

Now, why should not vessel fog horns be built with a musical scale of not less than five notes, and more, if necessary. Taking the scale of C major, the notes would be C, D, E, F, G. To avoid confusion with lighthouse and shore fog horns, a vessel should never use less than two notes, and the order in which these notes are sounded should serve to show in what direction the ship is moving. As an example of what could be arranged:

The notes C, D would mean "Going due north."
The notes D, C would mean "Going due south."
The notes C, E would mean "Going due east."
The notes E, C would mean "Going due west."
The notes C, D, E would mean "Going due northeast."
The notes C, E, G would mean "Going due northwest."
The notes E, D, C would mean "Going due southeast."
The notes G, E, C would mean "Going due southwest."

The intermediate points of the compass, such as NNE, SSW, etc., could all be indicated by adding another note or two to the scale. This is based on all vessels going north and east using the ascending scale, and those going south and west the descending scale.

There would be a little difficulty, of course, as regarding sailing vessels that had no steam for sounding their fog horns, and it would necessitate their carrying a supply of horns pitched on different keys to be used by the blower in their proper order.

Such, in brief, are the suggestions I would make, and should these ideas or similar ones be utilized with the result of making sea-travel safer and freer from the risks which now attend it, these few lines will not have been written in vain. G. DE W. GREEN.

Toronto, Canada, August 30, 1905.

Automobile Notes.

A number of serious accidents to autos racing on the track—accidents in which several well-known drivers have been maimed for life—have well nigh put a stop to track racing. The risks run are too great, and the gains to the makers of the cars practically *nil* save for the advertising value of a fast car. The speeds reached are too great for any short, curved course to be traversed in safety, even if it were dustless, which is generally anything but the case. Track racing is poor sport at the best, as close finishes are rare, and generally only about half the cars entered compete. If the energy which has been spent in the promotion of race meets is now diverted into the perfecting of the regular road machines, there is every reason to believe that the greatest good of the greatest number will be reached thereby.

Although a halt has been called to track racing, road racing both here and abroad continues to be more or less popular. The second contest for the Vanderbilt trophy will be run over a 28.3-mile course on Long Island, on October 14, the course being encircled ten times by each contestant, and there being no controls. Five Italian, French, German, and American cars will compete. The American cars will be selected in an eliminating trial on the 23d instant. The Richard-Brazier cars, which won the Bennett cup the last two years, will not compete, but a car of the same make that won the Vanderbilt trophy last year, viz., Panhard, as well as a Renault, De Dietrich, Darracq, and Hotchkiss, are entered.

A record 200-mile run was made recently from Paris to Havre in 4 hours by a 40-horse-power Mercedes car. Two well-known New York ladies missed the boat train, but, securing an automobile and two chauffeurs, they followed it over the roads. Although the roads were very slippery from rain, the car succeeded in making Havre in time to catch the steamer, it having made but one stop for fuel during the entire distance. If it is possible to do so well on roads, how much better time could be made on rails. It would seem as if the railway companies would have several automobiles adapted to run on their tracks, always ready for use in case of just such emergencies.

The high-speed motor car has at last had a road test in which it served a practical purpose, viz., the delivery of the Paris edition of the New York Herald at the seaside resorts of Trouville and Dieppe some five hours earlier than it was possible to deliver it by trains, owing to improper facilities. The newspaper was delivered an entire week at each resort, and the 129 miles between Paris and Trouville were covered one day in 2 hours and 10 minutes. The papers left Paris at 4 A. M., and by 6:30 they were on sale at the watering place. High-powered Mercedes and Bollée machines were used in the two services, and both ran perfectly and made very fast time. The latter especially made a splendid performance under adverse weather conditions.

An 820-mile French reliability test took place recently in the south of France and through the Pyrenees Mountains. Marks were awarded on average speed between controls, fuel consumption per ton-kilometer, speed on the level and on hills, brakes, ease of starting, elegance and comfort, the mechanism and the chauffeur's management of it, and the condition of the car at the finish. Some 50 cars, among which were some new French makes and a Spanish car, went through the test successfully, and showed themselves to be very reliable, despite the fact that heavy rains made the roads very slippery a considerable part of the journey. One car, which was driven too fast around a turn, smashed into a parapet and killed its owner.

A long-distance tour for a trophy offered, designed, and executed by Prof. Von Herkimer was recently run off in Germany. A total distance of 573½ miles was covered in 3 days, the longest stage being from Munich to Baden Baden—222¼ miles. The second day Nuremberg was reached, and the third brought the tourists back to their starting point. Although supposedly a tour, this event degenerated into a road race, the contestants being enveloped in clouds of dust and having scarcely any pleasure. Despite unnecessarily fast driving, 69 cars finished the tour out of 79 that started and 34 of these had no tire or mechanical troubles whatever. A 40-horse-power Mercedes won the trophy with only 25 marks against it, and a 40-horse-power and 60-horse-power Mercedes were respectively second and third. Five English Daimler cars competed and made a good showing, one of them being driven by a lady. Had tire trouble not counted, there would have been a good many more perfect scores.

The motor bicycle has been receiving a good deal of attention lately in America, France, and England. In SUPPLEMENT 1546 we described a motorcycle race that was held some months ago in France. Last month the Federation of American Motorcyclists conducted an endurance contest from New York to Waltham, Mass., in which, out of 44 starters, 34 finished, 28 of them with perfect scores. An average speed of 15 miles an hour was maintained, and not allowed to be exceeded by the winners. Among the successful contestants were 3 Curtis, 3 Wagner, 4 Thoroughbred, 3 Metz, 3 Yale-California, 11 Indian, and 1 each Tribune and Reliance machines. No less than 23 machines arrived exactly at 7:20 P. M.—the earliest minute at which they were allowed to finish. The roads were good most of the way, but between Springfield and Worcester they were very sandy, and caused all but the most expert riders considerable difficulty in traveling over them. A number of riders dropped out because of bad falls, and not from troubles with their machines. At the meet of the Federation, G. H. Curtis (whose two-cylinder machine we illustrated in our February 20, 1904, issue) won a 25-mile road race in 34 minutes, 21 1-5 seconds; and F. C. Hoyt, on a 1¾-horse-power Indian bicycle, covered 31 miles on the Waltham cement cycle track with a fuel consumption of 1 pint of gasoline. A six-day motorcycle reliability test over a 767-mile course was also held in England last month. Out of 32 machines that started, 22 finished, some 16 of them with perfect scores. The test included the climbing of several long grades and a "surprise" stop and start on a hill. Besides the motor bicycles, several light tri-cars went through the run successfully.

New Land in the Arctic Regions.

News received from Reikjavik from a member of the Duke of Orleans's Greenland party, says the expedition discovered a new and unknown land, which was named Terre de France, and also discovered that Cape Bismarck is part of a large island, and not on the mainland, as hitherto assumed.

After reaching 78 degrees 16 minutes north, the "Belgica," with the French expedition on board, headed in a southeasterly direction.

Discovery of a "Nova" at Harvard.

A new star, a " nova," was discovered at the Harvard Observatory August 31 by Mrs. W. P. Fleming in the constellation Aquila, which at 8 P. M. just now is about on the meridian and half way from the southern horizon to the zenith. A "nova" is not a common thing in astronomy, though among the most interesting and suggestive of phenomena. According to Prof. Pickering, only eleven of them have been discovered since 1848, and none at all had been noted in the 178 years preceding that date.