Correspondence.

Mortar Batteries on War Vessels.

To the Editor of the SCIENTIFIC AMERICAN:

I was much interested in the article on battleship construction in last week's SUPPLEMENT. The idea occurred to me that if a special ship could be constructed to carry 11-inch mortars, it would revolutionize warfare on the sea as much as Ericsson's "Monitor." I think that the East and West are bound to try conclusions at some future time as surely as Greece and Persia in ancient times. Force still rules the world, and will rule it for an indefinite time to come. I think the Yankee has got to hustle to keep ahead of Japan in naval science.

Spencer, Mass., July 20, 1907. EVERETT H. MORSE.

International Yacht Racing on the Pacific Coast.

To the Editor of the SCIENTIFIC AMERICAN:

Your article on page 526, "American Yachting Season of 1907," might well have been completed and the subject rounded up geographically by reference to the "Alexandra" cup race out here. A $2,000 cup given by Gov. James Dunsmuir of this province and named after Her Most Gracious Majesty our Queen, was competed for as an international trophy for the first time during the past week. The North Pacific Yachting Regatta being held this year at Seattle, the governor consented to take his trophy into foreign waters on the occasion of the first competition, an act somewhat without precedent on this continent, and strangely enough quite unnoticed and wholly unappreciated by the yachtsmen of Puget Sound.

Two yachts were entered—it is a 29-foot class event—"Spirit," a Herreshoff design, built and sailed by Geary of Seattle, and the "Alexandra," a Fyfe design, built by Watts of Vancouver to the order of the Royal Vancouver Yacht Club and sailed by W. E. Graveley, formerly of Toronto.

First race was on the 2d, "Spirit" winning by 5 seconds. Second race on the 5th, "Alexandra" winning by 3 seconds. Third race on the 6th, "Spirit" winning by 3 minutes.

This annual has been established through efforts of Vancouver Club, which is one of four in Canada having and entitled to the honor of adding "Royal" to its name, while its decked yachts have the privilege of flying the "blue ensign." J. H. MACGILL.

Vancouver, B. C., July 7, 1907.

Steering and Equilibrium-Preserving Devices for Aeroplanes.

To the Editor of the SCIENTIFIC AMERICAN:

In a specially prepared article which appears in a recent number of the SUPPLEMENT, Mr. R. H. Goddard describes an interesting device for steering and balancing aeroplanes.

He proposes that inventors make use of the gyroscope (a spinning top) which when revolving rapidly always tends to rotate in the same plane of action.

This mechanism is to be secured to the frame of the aeroplane in such a way that as the machine tilts in any direction, corresponding electrical contacts are closed by the swinging gyroscope, and certain automatic changes made in the arrangement of the wings or weights controlling the aeroplane.

This idea is quite clever, but unfortunately the particular type of mechanism brought forward by Goddard has certain defects which render its application to a motor-driven aeroplane practically impossible.

The principal drawback is met in designing the devices to act under the direction of the gyroscope in adjusting the wings or shifting the weights. In the first place, they must perform the changes very rapidly, and this necessitates the application of considerable power, independent of that used to propel the machine.

Second. The shifts must be made exactly to the extent required, and the slightest derangement of the mechanism (necessarily very delicate) renders the contrivance worse than unmanageable.

Third. It would be quite impossible to install a device depending for its efficiency on the movements of balanced parts on a machine propelled by a reciprocating engine, as the least vibration of the framework, if transferred to the controller, would render the arrangement quite ineffective.

It might be inferred from the foregoing that the application of the gyroscopic principle to the controlling of aerostats is impossible, but I do not believe this to be the case.

It must be remembered that this device has been used with notable success on submarine vessels, which require to be steered and balanced in much the same way as do ships of the air.

However, the fluctuations of air currents as compared to the steadiness of water must be considered as an important factor by the inventor who proposes to install a gyroscope of the type used in torpedoes on an aeroplane, and it is quite possible that some new vagary of the wind may be brought out by this device, that will defeat our entire purpose.

The gyroscopic principle may be applied to the balancing of objects in positions of unstable equilibrium, by one of two systems:

First. By the use of a small gyroscope of inconsiderable weight, directing the movements of larger and more powerful mechanism.

Second. By means of two or more wheels of considerable weight (gyroscope 1/20 weight of whole machine) which may be revolved directly at high speed by the motor used for forward propulsion.

The latter type of apparatus has proved efficient, and has no delicate parts to get out of order and break when the aeroplane comes to earth. If properly balanced, such an aeroplane also tends to decrease the vibration and racking of the framework caused by the motor.

A gyroscope powerful enough to control in one plane of action an aeroplane of about 300 square feet of supporting surface may be made from an ordinary bicycle wheel weighted at its circumference with a metal rim. This should be revolved at a speed of about 500 R.P.M., and if a metal case can be provided that will enable the wheel to revolve in a vacuum, its efficiency will be greatly increased. L. J. LESH.

Montreal, Quebec, July 26, 1907.

A Reply from Prof. Michaud.

To the Editor of the SCIENTIFIC AMERICAN:

In a letter published in the June 15 issue of the SCIENTIFIC AMERICAN, Mr. D. E. Keen objects to the theory which attributes to the nervous element of the eye the setting upright of the inverted retinian images. According to Mr. Keen, the cause of the phenomenon is purely mechanical, and lies in the fact that "the different portions of the retina merely see the object in the direction from whence they receive the light." The following diagram, which shows the path of the luminous rays in the case of ordinary vision (distance from object to eye being shortened to spare space), will help the reader to understand Mr. Keen's theory:

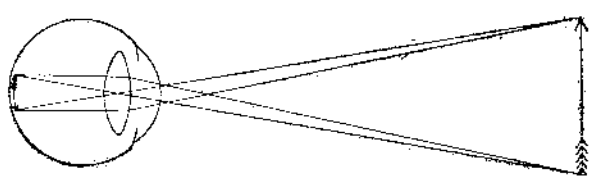

Fig. 1.

Although the image of the arrow, on the retina, is inverted, according to Mr. Keen, we see it right side up because most of the rays which emanate from the upper part of the arrow strike the retina just as if they came directly from a point situated above, while the rays which come from the inferior part of the arrow have such a direction as to cause us to believe that they come directly from below.

This theory might prove acceptable if it were not that one fact, at least, contradicts it, and that fact is precisely the experiment, "A Curious Illusion," published in the May 25 issue of the SCIENTIFIC AMERICAN. The accompanying figure illustrates the path of the rays when the card with three holes, two of which are in the plane of the drawing, is kept close to the eye, while the card with one hole is placed at a few inches from the other.

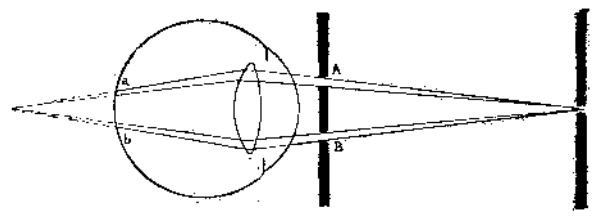

Fig. 2.

A glance at the diagram shows that the luminous pencil which has passed through the upper hole *A* strikes the retina in *a* as if it came from a point situated higher than the portion of the retina which it reaches. The contrary is true for the pencil which strikes the retina in *b* after passing through the lower hole *B*. According to Mr. Keen's hypothesis, the retina should perceive the holes *A* and *B* in the direction of the rays which emanate from them. The hole *A* should appear as it stands on the card, as its image stands on the retina, that is, above the hole *B*. No inversion should take place. An inversion does take place, and that inversion cannot be explained, as in the case of ordinary vision, by the supposition that the different portions of the retina merely see the object in the direction from whence they receive the light. The hole *A* is seen in the direction of the rays which emanate from the hole *B*, and *B* is seen in the direction of the rays sent by *A*.

GUSTAVE MICHAUD.

Costa Rica State College, June 29, 1907.

A New Way of Printing Books.

To the Editor of the SCIENTIFIC AMERICAN:

If any one will take up a magazine or kindred publication of the ordinary binding, or even one of the many books which are daily read by millions, and note the position of the printed matter, he will recognize that owing to the shape of the opened page at scarcely any time are the characters on the line before him at equal distances from both his eyes; and that these distances, as he reads across the page, are constantly varying, owing to the convex or curved form which the page assumes when it is opened for reading. This is more pronounced in magazines, though the line on the open page of most books is far from level.

This necessitates that the focus of one eye be continually altered from that of the other for every word read on the line according to whether it is nearer to or farther from that eye of the reader than it is from the other. Is not this a great ordeal for the very delicate and mutually sympathetic system of nerves and muscles that regulate the focusing of the eyes?

Would it not be a great boon to the millions of daily readers to have the pages of the thousands of bound periodicals so printed that the focus of the eyes in reading would be mutually the same? This could in a great measure be accomplished by printing the lines parallel instead of transverse to the binding, that is, have the print read from the bottom to the top of the present page instead of across, so that when the work was opened each line would be level from end to end and could be held so that the two eyes might have the same focus at the same time and not be obliged to make continual and trying changes such as are requisite with the present method?

This would make reading, from the fact that it would be easier for the eyes, more profitable and enjoyable to the reading public the world over; and might it not in the course of a few generations greatly reduce that large number who suffer from certain forms of ocular defects due to the eyes being mutually out of adjustment? W. F. RONALD.

Daytona Beach, Fla., July 1, 1907.

Official Meteorological Summary, New York, N. Y. July, 1907.

Atmospheric pressure: Highest, 30.18; lowest, 29.59; mean, 29.88. Temperature: Highest, 89; date, 8th; lowest, 61; date, 5th; mean of warmest day, 82; date, 18th; coolest day, 68; date, 29th; mean of maximum for the month, 82.5; mean of minimum, 67.1; absolute mean, 74.8; normal, 74; excess compared with mean of 37 years, + 0.8. Warmest mean temperature of July, 78, in 1901. Coldest mean, 70, in 1884. Absolute maximum and minimum of this month for 37 years, 99 and 50. Average daily deficiency since January 1, —1.5. Precipitation: 1.18; greatest in 24 hours, 0.55; date, 20th; average of this month for 37 years, 4.38. Deficiency, — 3.20. Accumulated deficiency since January 1, —3.74. Greatest precipitation, 9.63, in 1889; least, 1.18, in 1907. Wind: Prevailing direction, south; total movement, 6,847 miles; average hourly velocity, 9.2; maximum velocity, 45 miles per hour. Weather: Clear days, 8; partly cloudy, 16; cloudy, 7; on which .01 inch or more of precipitation occurred, 7. Thunderstorms, 2d, 7th, 8th, 11th, 12th, 18th, 20th.

The Current Supplement.

An explanation of the action of the gyroscope in every-day language, and free from mathematics, is something to be desired. With this idea, C. M. Broomall contributes an article to the current SUPPLEMENT, No. 1649, which will enlighten those of our readers who are unable to comprehend the highly complicated mathematics which underlie this ingenious piece of apparatus. Mr. Randolph Bolling describes how silver is reclaimed from photographic solutions. Some of the technical and commercial aspects of wireless telegraphy are presented by Mr. William Weaver, Jr. The zoological park which Mr. Carl Hagenbeck has been erecting at Stellingen, a suburb of Hamburg, is now completed. It was formally opened a short time ago in the presence of a distinguished gathering of zoological experts. Mr. Harold J. Shepstone describes this wonderful park most interestingly. Excellent pictures accompany his text. D. Sidersky writes on the industrial uses of caseine, a subject of considerable importance when it is considered to what a great extent the adhesive properties of caseine are utilized. Caseine is used in the paper industry, in woodworking, in glue making, in painting, as a textile mordant, as a plastic material, and as a clarifier of wines. Major B. F. S. Baden-Powell contributes a most instructive article on aeroplane laws. The physiological functions of the nectary and the sources of honey are authoritatively treated by Gaston Bonnier, who is probably the foremost authority on the bee in the world. Our Berlin correspondent records the astonishing achievements of Dr. Rueckle, an arithmetician of wonderful ability. Prof. F. H. Oliver writes on The Seed; a Chapter in Evolution. Mr. J. H. Morrison examines the origin of the St. Swithin's Day legend.