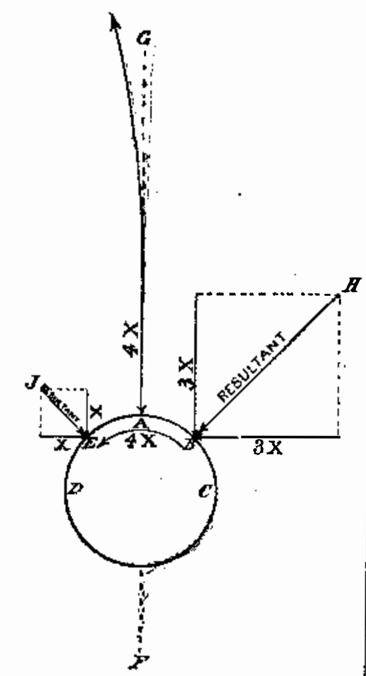
Correspondence.

THE ART OF PITCHING IN BASEBALL.

To the Editor of the Scientific American:

In the number of your paper for July 31 you publish quite a long article on curve pitching, which I read with much interest.

Upon one point, however, I think the author has been misinformed, viz., that the ball curves *toward* the side on which it meets the greater resistance. The accompanying sketch will show my theory of the art of curve pitching, and the one, I believe, most generally accepted.



Let a ball be moving from F to G with a velocity such that the resistance of the air at A will be represented by the line, $4x$.

At the same time let the ball be revolving on its own axis, from right to left, at the *same* rate, viz., so that the resistance of the air to its revolution, at any point on its circumference, shall be represented by the curved line, $4x$. Then the resistance of the air to the motion of the ball from F toward G will be expressed as follows:

At A, resistance $= 4x$.
" C, " $= 4x + 4x = 8x$.
" D, " $= 4x - 4x = 0$, etc.

Taking intermediate points, for example, at 45° either side the center line, F G, we can assume for such points that the resistance of the air will be:

At B, $4x + 2x = 6x$, and
" E, $4x - 2x = 2x$.

Owing to the angle at which the ball meets the air at these points, the resistance must be considered as the resultant of two forces, as shown in sketch by the lines marked $3x$, $3x$, and $x\,x$.

Hence we find that the ball is acted upon by the two resultants, H B and J E. Under the combined action of these two unequal resistances, the ball will take some direction *away* from the greater resistance, and will curve to the left.

This is called the *out* curve, and the *in* curve is exactly the reverse in its action.

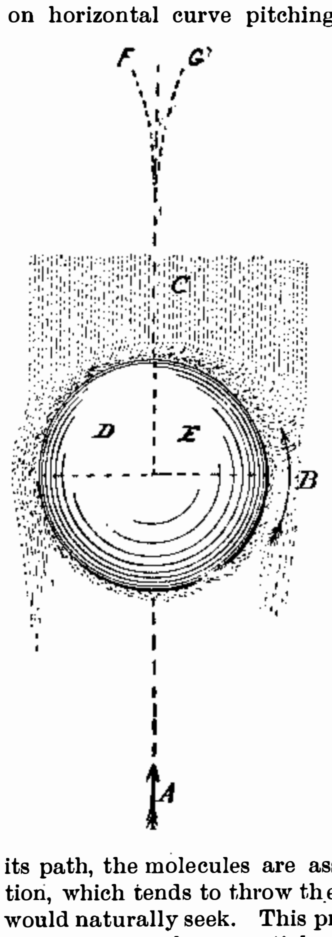
This theory of the action of the air is supported by the results of practice and experiments.

G. G. TOWNSEND.

Cumberland, Md.

To the Editor of the Scientific American:

I read with interest the article by Henry Chadwick on horizontal curve pitching in baseball, which appeared in your issue of July 31.



The real philosophy of the horizontal curve is as follows:

In the subjoined diagram, arrow A indicates the direction of the ball's trajectory after receiving its initial propulsion from the pitcher. Arrow B indicates the direction of its rotation (right to left) on its perpendicular axis, imparted to it also by the pitcher. The atmosphere, C, through which the ball moves with a velocity of, say, 100 feet per second, offers resistance to its forward hemisphere amounting to several pounds to the square inch, its molecules being forced aside to the right and to the left to make room for the advancing ball. On the left quarter, D, in escaping from its path, the molecules are assisted by its rapid rotation, which tends to throw them in the direction they would naturally seek. This produces a thinning out, or what resembles a partial vacuum, when compared with the state of air existing on quarter E. Here the molecules are not only unassisted, but are actually retarded, by friction with the rotating ball, in their effort to escape by the only way possible—toward the curved arrow B; in consequence of which, a compression of the atmosphere occurs on this quarter.

I have shown that the ball is moving through a medium whose density is much greater at quarter E than at quarter D; the result is manifest. A curve is described toward F. The atmosphere at E, because of its greater density, acts on the ball as a cushion, from which it continually rebounds.

Give the ball an axial rotation in the opposite direction, and, governed by the same law, it will describe a curve toward G.

The SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 410 and 423, contains additional information on this theory. K. E. E. MUNSON.

Millerton, N. Y.

Cause of the Charleston Earthquake.

To the Editor of the Scientific American:

In your issue of the 18th Sept. you publish a letter, over the signature Edward W. Byrn, which suggests a theory accounting for the Charleston earthquake.

Mr. Byrn takes the ground that "the escape of the vast volumes of petroleum and natural gas from the wells sunk into the bowels of the earth may furnish a cause for the earthquake in this region," and that these materials issuing from internal cavities release the superincumbent strata of rock, which, in consequence, falls, and the ensuing earth tremors are most severely felt along the line of weakness near the Atlantic coast.

In the first place, this theory takes for granted that either (1) these cavities have *always* been full of natural gas and petroleum at a fixed pressure, or else (2) that in their formation and storing, the earth's crust was lifted and cavities made, which were immediately filled and supported the rock, as on a cushion.

Now:

1. Almost, if not all, of the theories accounting for the presence of gas and petroleum accept the fact that these substances were formed subsequent to the final comparative quiescence of the earth's crust after ages of upheavals and disturbances. This being so, there must have been cavities for the reception of gas and petroleum before they were formed; and, if the overlying strata kept their position, then, when the cavities were empty, why should they now be disturbed by the withdrawal of the contents of the cavities?

The "enormous pressure" at which they are sometimes found is easily accounted for by the continued accumulation of the gas and oil in confined space, as the increase of pressure would by no means hinder the chemical combination of the materials of which they are formed.

2. That the pressure has raised the strata and made the cavities is highly improbable, to say the least. That a pressure of some hundred pounds should raise a mass of rock from 1 to 2,000 feet in thickness and indefinite surface is beyond possibility.

As a matter of fact, no disturbance in the gas and oil regions was noticed at the time of the earthquake, and up to the present time no increase or diminution of the supply has been reported from any part of these districts.

I think Mr. Byrn's theory is entirely untenable, unless we radically change our views of the formation and storing of gas and petroleum. P. M. F.

Patentees Must Use or Allow Others to Use.

The commonly accepted doctrine of American patent law is that no person has the right to make, use, or sell a patented invention without the consent of the patentee; whoever does so is liable as an infringer, and the court, on due proceedings, will enjoin him from the use. But in the case of Hoe & Co., the well-known printing-press makers, against Knap, tried in the U. S. Court, northern district of Illinois, Judge Blodget declined to enforce the above doctrine, holding as follows:

The proof on the application for a preliminary injunction was to the effect that the complainant, the owner of this patent, had never used it, and never constructed a printing press with the Crowell device. The argument is that the owner of this patent was a very large manufacturer of printing presses; that they did not manufacture and keep printing presses in stock, but only made them to order; and that they have received no order as yet to make a press containing the Crowell device. The question, therefore, arises whether the court will grant an injunction in favor of the owner of a patent who has not, after a reasonable time, put it into use, against another who is using it. I think, under a patent which gives a patentee a monopoly, he is bound either to use the patent himself or allow others to use it on reasonable or equitable terms, and as I refused an injunction on the motion before the hearing, I shall refuse an injunction in the interlocutory degree, and allow the defendants to continue to use the patent on their giving bond as they have heretofore.

PHOTOGRAPHIC NOTES.

The Relative Rapidity of Emulsion Plates.—At a meeting of the London and Provincial Photographic Association on the 9th ultimo, we find reported in the *British Journal of Photography* the statement that gelatino-chloride plates are from 25,000 to 30,720 times slower than rapid bromide plates. The chloride plate was exposed twelve inches from a gas burner for eighty minutes, and the bromide at ninety-six inches distant for ten seconds. Mr. A. Mackie said he had tested collodio-bromide plates against ordinary bromide, and found them to be three hundred times slower.

Enameling Colored Photographs.—Mr. C. Brangwin Barnes in the *Photographic News* says: The picture which is to be subjected to the double process of coloring and enameling should be printed a shade lighter than one meant to be treated in the ordinary way and turned out plain. Care should be taken not to overtone it, a sepia gray being the tint calculated to produce the best results; and it should be untrimmed, a margin of at least half an inch all round being left. After fixing and washing, it should be pinned, while still damp, on to a drawing board, and when dry it is ready for the artist's hands. Ordinary moist or cake water colors may be used, but to minimize the chances of failure, we found the so-called albumen colors the best to use. The colors I refer to were introduced by M. Lambert some years since, for coloring chromotype photographs, and were sold on cards by the Autotype Company, from whom I believe they are still obtainable. Care should be taken not to put the tints on too high, as enameling serves to intensify them, and carmine should be used very sparingly, not only because the color is fleeting, but because it has a tendency to run into spots, and give a rough appearance to the finished picture. The print being colored and ready for enameling, a sheet of glass (preferably plate glass) is prepared in the usual manner—that is, either with a solution of yellow wax in benzole, or with powdered talc. I personally prefer the first mentioned, as the print usually comes off cleaner and more easily. A few drops of the solution are poured on the glass, which should be perfectly clean and free from scratches or flaws, and gently rubbed over the entire surface with a piece of clean flannel until it begins to set. It is then polished off with another piece of the same material until it appears clean, and polished again. To test if enough wax remains, the tip of the finger should be pushed along the surface, near the edge, when, if properly prepared, it will meet with a considerable resistance and produce a grating noise. It is then coated with enamel collodion in the same manner that a plate used to be coated for the wet process, or that a negative is varnished, and care taken that the collodion be not allowed to run into crapey lines.

Immediately the collodion sets (not dries) it is immersed in a dish of cold water until all greasiness disappears. The colored print should then be carefully collodionized in the same manner as the plate, and when the film is thoroughly set it should be passed through a solution of gelatine in hot water, then laid upon the plate and carefully squeegeed until all air bubbles disappear, which may easily be seen from the back of the glass. It is then put aside under pressure for an hour, when it is ready for mounting—or, rather, for a sheet of thin cardboard to be attached to the back by the aid of thin Russian glue, gelatine having a tendency to reduce the gloss of the finished result. It is then again placed under pressure for about an hour, and then set up to dry in a cool place. When thoroughly dry, the blade of a knife may be placed under the edges, and the picture will come off perfectly flat, and with a high enamel surface; and if the operations have been carefully performed, the coloring will be found as clear and perfect as when first done. It now only requires trimming and affixing to the final mount, which is best done by the aid of coaguline, applied to the edges only.

This may appear, at first sight, a very tedious and difficult process, but after one or two pictures have been enameled, it will become quite easy to manage.

Fast Ironclads.

An official paper issued at Rome gives the following particulars regarding the fastest ironclads in the world: Italia (Italian), 18 knots an hour; Lepanto, Umberto, Sicilia, and Sardegna (Italian), 17·50; Warspite (English), 17·20; Imperieuse (French), 17; Ruggiero di Luaria, Morosini, and Andrea Doria (Italian), 16·50; Nile, Trafalgar, Sanspareil, Anson, Camperdown, Benbow, Rodney, Howe, Collingwood, Colossus, and Edinburgh (English), 16; Duilio (Italian), 15·50; Dandolo (Italian), 15·20; Devastation (French) 15·17; Alexandra (English), 15; Foudroyant, Admiral Baudin, Formidable, Neptune, Hoche, Marceaux, and Magenta (French), 15; Hercules (English), 14·69; Redoubtable (French), 14·66; Temeraire (French), 14·65; Dreadnought (English), 14·52; Affondatore (Italian), 14·50; Terrible, Indomptable, Caiman, and Requin (French), 14·50; Admiral Duperre (French), 14·47; Sultan (English), 14·30; Neptune (English), 14·20; Inflexible (English), 14; and Vauban (French), 14.