Correspondence.

A CORRECTION FROM PANAMA.

To the Editor of the Scientific American:

On page 118 of the current volume of the Scientific American is shown a picture entitled "New Police Headquarters." People seeing this illustration will think us a rather unruly lot to require such a large general police office. The building is really the new administration building, and houses the offices of the governor of the Canal Zone, the sanitary departments, the quarantine offices, the police offices, the collector of revenues, customs and posts, the office of the secretary of the Commission and of the Canal Record and a pay office.

On page 119 is shown "one of the better-class residences." This is in no way one of the "better-class" residences, but is one of plain boards, cheaply constructed and shoddy in every particular. "Better-class residences" in Panama are of stone, brick, cement or *mamposteria* (a sort of mixture of large and small stones and mortar).

Thinking you might wish to correct so false an impression as the illustrations will no doubt make, I am taking the liberty of sending you this information.

Ancon, Panama. E. C. McFarland, Chief Clerk.

RAINMAKING BY EXPLOSION.

To the Editor of the Scientific American:

In your issue of March 27th you criticise severely—and perhaps justly—attempts to create precipitation by means of explosions in the upper atmosphere. But have you touched the root of the subject?

There is water in the shape of vapor at *some* altitude everywhere, even over the most arid parts of the globe. This has been well proven. To cause its precipitation, all that is needed is a local fall of temperature in the moisture-laden layer to the dew point, and perhaps the presence of a certain amount of dust particles or their equivalent. Such a fall is brought about naturally by impact, either against a cold layer above or below, or the chilled slopes of a mountain range or peak. Such impacts result from complex movements depending upon the rotation of the globe on its axis and around the sun, and upon the aerial tides produced by the sun and moon.

You are doubtless quite right in assuming that no explosion effected by any human means would be powerful enough to act as a substitute for any of the above-mentioned processes in their entirety. But, is it not possible that an explosion, or some other impulse correctly applied at the right place and time, would produce a sudden local change of conditions sufficient to start in movement a chain of phenomena that would *naturally* lead up to a precipitation? That is perhaps all that we can hope to do. The forces about us, and particularly those that operate upon the atmosphere, are continually in a state of unstable equilibrium. The air lies (or moves) in layers, each of which differs in density, in temperature, in chemical composition, and in content of vapor. All the materials for a downpour exist. One will surely occur as soon as the proper conditions are brought about. The change has its inception in some small incident involving the expenditure of but an insignificant amount of external energy. The rest follows as a matter of course.

The use of explosives is simply an effort to start natural forces into motion, to change their direction, or to alter the procession of events to our advantage. That success is attained so seldom is probably due to the haphazard method of conducting the experiment. Before such an attempt, the condition of the air above the locality selected should be carefully studied, with the object of ascertaining as correctly as possible the altitude at which the moisture-laden layer exists at the time, the general course in which it is traveling, the temperatures above and below it, the effects of surrounding topography, etc. These known, is it not likely that explosions from captive balloons at the proper altitude would initiate movements culminating naturally in precipitation?

There are other agents also that might advantageously be employed. Take the case of a locality in some arid region, say western Kansas or eastern Colorado. Assume that experiments with kites and captive balloons proved that during July a moisture-laden stratum, traveling northwestward at an altitude of a mile, was generally to be found. Above and below it the air would have different temperatures, density, and direction. Now, what would happen if a shell, loaded with liquid air, was exploded at the right point in, above, or just below the layer containing the sought-for moisture? A trained meteorologist could perhaps answer the question.

That man will in time obtain sufficient knowledge of the phenomena of the upper air to enable him to produce precipitation almost at will, and almost anywhere, is the belief of many thinkers. The subject is one that might advantageously be taken up by the Carnegie Institution of Washington. We need specific information as to local atmospheric conditions throughout the year over regions where the rainfall is deficient. With this carefully collected and studied, there are probably several ways by which the natural course of the phenomena may be altered, at a trivial expenditure of external energy, and desired effects produced. Theodore F. Van Wagenen.

Zacatecas, Mexico.

FORMULÆ FOR OBTAINING INTEGRAL SIDES OF RIGHT-ANGLED TRIANGLES.

To the Editor of the Scientific American:

In a recent edition of the Scientific American there appeared several formulæ, derived by Dr. Hands, of Victoria, B. C., for obtaining integral sides of right triangles. While these formulæ are very ingenious, they distinguish two cases, namely, odd and even. I venture to suggest the formula $n^2 + 1$, where $n^2 + 1$ is the hypotenuse, and $n^2 - 1$ one leg, irrespectively of the character of n. The second leg is necessarily $2n$.

Thus $n = 2$ gives 5, 3, and 4.
$n = 3$ gives 10, 8, and 6.
$n = 4$ gives 17, 15, and 8.
$n = 5$ gives 26, 24, and 10, etc.

When n is odd, the results may be divided by 2. When $n = 1$, the hypotenuse and leg are equal and coincide.

Joseph F. Ritt.

College of the City of New York.

To the Editor of the Scientific American:

Dr. Hands's interesting letter has put me in mind of a small investigation of my own, which may or may not be original.

There exists a general type of quadrilateral figure, which may be called a *birectum*, having two opposite angles right-angles, and consequently

$$a^2 + d^2 = b^2 + c^2$$

Find a general method by which *integral* values may be provided for a, b, c, d.

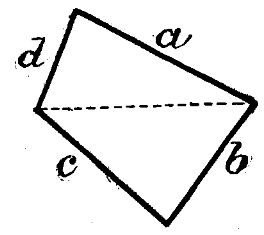
From the question, we have

$$a^2 - c^2 = b^2 - d^2$$

$$\text{or } (a - c)(a + c) = (b - d)(b + d)$$

It is clear, therefore that the process will consist in factorizing some number in two different ways.

Moreover, a little consideration will show that, in both cases, the factors must differ by an *even* number [since, for instance, $(a + c) = (a - c) + 2c$].



No *prime* number gives two factorizations; but take an odd number, such as 15, that is not prime.

We have $15 = 3 \times 5 = 1 \times 15$.

The factors differ by 2 and 14 respectively, and so we may write the equation of factors

$$(4 - 1)(4 + 1) = (8 - 7)(8 + 7)$$

$$\text{whence } 4^2 - 1^2 = 8^2 - 7^2$$

$$\text{and } 4^2 + 7^2 = 8^2 + 1^2$$

In the case of an even number, such as 24, the factorization 1×24 gives a difference of an *odd* number between the factors, and so is unsuitable.

$$\text{But } 24 = 4 \times 6 = 2 \times 12$$

$$\text{whence } (5 - 1)(5 + 1) = (7 - 5)(7 + 5)$$

$$5^2 - 1^2 = 7^2 - 5^2$$

$$\text{or } 5^2 + 5^2 = 7^2 + 1^2$$

[The factorization 3×8 would be unsuitable.]

And so in other cases.

It will be noted that a circle can always be described about a *birectum*.

Immo S. Allen.

London Institution, Finsbury Circus, London.

Motor-Boat Races at Monaco.

The motor-boat races at Monaco last week were very interesting. Among the competitors were the "Dixie II.," which won the international race in Long Island Sound last fall, and the "Standard," another new American boat, with very powerful double-acting gasoline engines.

The chief race, the first day, was for the prize of Monte Carlo. This race was for the high-powered racers, and was over a 50-kilometer (31.07-mile) course. There were five starters, the first boat across the line being the "Alla-Va," which was of the hydroplane type. The "Panhard-Levassor," which has the same power plant as last year, namely, four 4-cylinder, 120-horse-power motors connected together in pairs and driving twin propellers, crossed the line second, and was closely followed by the "Wolseley-Siddeley II." The last-named boat quickly overhauled the Panhard, and was in first place before the first round was half over. The "Alla-Va" abandoned the race in the first round. The "Wolseley-Siddeley" and the "Panhard" ran a very close race. The "Wolseley" increased her lead up to the last round, but in this round the "Panhard" gained three seconds, and at the finish she was showing greater speed than at any other time. The "Dixie II." could not be driven at full speed on account of the rough sea. The official times of the English, French, and American boats were 49 minutes 4-5 second (37.95 miles an hour); 49 minutes 14 3-5 seconds (37.85 miles an hour); and 1 hour 28 minutes 2-5 second (23.08 miles an hour). The failure of the "Dixie" to make her usual speed on account of the rough sea was a disappointment to American enthusiasts. Those interested in hydroplanes were also shown that these speedy craft could not operate in rough water. The pounding of the waves against their flat bottoms would soon demolish them. An incident of the first day was the sinking of the German racer "Prince Heinrich." This boat was built and launched in seventeen days, but she was so flimsy that the hull split open and the boat sank. All the crew were rescued. Another race on the first day, April 5th, was for single-cylinder cruisers. A 50-kilometer course was covered by the "Sizaire-Naudin" in 1:43:13, and the "Nautilus-Anzaui II." was second in 2:12:33.

The second day was taken up with races for the 8- and 12-meter cruisers. These races were run under good weather conditions, although the sea was more or less agitated. Fifteen boats started in the 8-meter cruiser race, and six abandoned the race before it was half over, one of these being Mr. Moore-Brabazon's "Brabançonne," which was the favorite. The race was won by another English boat, the "Gyrinus II.," which was built and engined by Thornycroft. She covered 50 kilometers (31.07 miles) in 1 hour 31 minutes 53 seconds, at an average speed of 20.29 miles an hour. The "Fleur-d'-Eau," a Swiss boat, was second, and the "Excelsior Buire V.," a French boat, was third. In another 50-kilometer race, in which ten boats started, there were four hydroplanes. All of these craft suffered from vibration and pounding of the waves. The race was won by a boat of the ordinary type, the "Liselotte," the hull of which was built by Tellier and fitted with Mercedes engines. The time was 1:6:37—an average speed of 27.98 miles an hour. The Fauber hydroplane, fitted with a Motobloc engine, was second in 1:16:11; and the "Ricochet XII." third in 1:22:29. The 12-meter boat race was won by the "Delahaye" hydroplane, which shot ahead at the start and maintained its position to the finish, although buffeted by a heavy sea. The time of the winner was 1:13:55. The "Alexander-Mercedes II." was second in 1:23:46, and the "Megevet-Picker IV." third in 1:24:50.

On the morning of the third day three 18-meter cruisers covered the 50-kilometer course in fast time. The sea was calm, which enabled them to make an excellent performance. The winner was the "Chanticleer," fitted with a Brasier engine, its time being 1:9:2. The "Tele Mors" was second in 1:13:50; and the "Lorraine" third in 1:28:20. In the afternoon the eliminating contest for the French boats for the International Grand Prize Race was held. The "Panhard" led throughout, and finished the 50 kilometers in 1:47:24, an average of 17.37 miles an hour. The "Ricochet" was second in 2 hours 17 minutes, and the "Fauber" third in 2 hours 52 minutes. The last two boats mentioned were hydroplanes. They and the "Panhard" were the only boats that finished out of eleven starters.

The long-distance race was held on the fourth day. Out of 33 cruisers which started in this 200-kilometer (124.3-mile) race, only five finished. The winner was the "Chanticleer." Her time was 4:45:58, corresponding to an average speed of 26.08 miles an hour. The "Tele Mors" was second in 5:6:36, and the "Alexander-Mercedes II." third in 5:42:27. The "Megevet-Picker IV." and the "Odette" were the only other boats that finished. The "Gallinari" held third place until within half a mile of the finish, when she broke down.

The most important race, called the "Coupe des Nations," was run under ideal weather conditions on April 9th. The distance was 100 kilometers (62.14 miles). There were seven starters. France was represented by the "Panhard-Lavassor," the "Fauber-Labor-Motobloc," and the "Ricochet XII."; Germany by the "Liselotte"; Italy by the "Nibio"; Great Britain by the "Wolseley-Siddeley II."; and America by the "Dixie II." The "Standard," which had been practically rebuilt, cracked one of her cylinders while being tried out, and was unable to enter the race. The start was a fine one, the "Wolseley" leading over the line and being closely followed by the "Dixie II.," the "Panhard," and the "Liselotte." At the end of the first round, the "Wolseley" led the "Panhard-Levassor" by but 20 seconds, while she was a full minute ahead of the American boat. The other craft were left far behind. On the second round the "Panhard" appeared to be losing, and at the end of the fourth round the British boat was three minutes ahead of her, was running better than usual, and taking the turns at high speed. An exciting moment was at the end of the fifth round, when the "Dixie II.," which had been gradually gaining over the "Panhard," caught her at one of the turns, the two boats rounding the buoy together. After three more buoys had been passed, the "Panhard" again forged ahead of the "Dixie," but the latter made faster time on the straight-away, and before the end of another round she again passed and left behind the "Panhard." At the end of the eleventh round the "Wolseley" was 9 minutes ahead of the "Dixie," and the latter was 2 minutes ahead of the "Panhard." The "Liselotte" was lagging far behind, but running steadily. Just after finishing the thirteenth round the "Dixie II." abandoned the race, owing to the breaking of its water-circulating pump. Two minutes later the "Panhard" came to a stop; a connecting rod had broken and punched a hole in the bottom of the boat. She was towed to the pier, and sank just after reaching it. With these two boats out of the race the "Wolseley-Siddeley" won easily in 1:55:3-5. Her average speed was 32.25 miles an hour. Both the "Fauber" and the "Ricochet" hydroplanes had engine trouble during the race. The latter boat abandoned the race in the tenth round. The Italian boat covered but three rounds. Late in the afternoon the "Gobron" racer took fire and was considerably damaged.