inner glass wall accompanied by interference colors, which has suggested to others that the forces might be those of contraction rather than expansion, and probably produced by, rather than merely relieved by, alpha ray bombardment.

Two factors seem to control the process, intensity of radiation and degree of strain. For example, the walls of the connecting tubing showed no cracks, on account of the smaller volume of radon contained per unit of area, but nevertheless careful examination disclosed a single crack at a point where a joint and again where a bend had been made, both at points of extra stress.

A few of the larger cracks had come all the way through the wall to the surface, although the alpha rays penetrate only about .002 mm.

For future radium collection an ordinary glass flask has been substituted. The graded joint to the rest of the pyrex system is kept covered by mercury, except during actual collection, to avoid prolonged exposure to alpha rays.

Both Rutherford and Mme. Curie long ago found that fused silica is not a suitable container for radium, owing to its cracking. It is, therefore, interesting to find this same quality in glass of high silica content but not in ordinary glass of lower content.

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A NEW TERM FOR THE 10^{-8} CENTIMETER UNIT

ONE of my favorite indoor sports consists in attending meetings of societies devoted to the physical sciences, and listening to the pronunciation by different speakers of the Swedish word ångström, used to designate the 10^{-8} cm unit. Although the correct sound is something like *awngstrem*, at least 75 per cent. of American scientists, including not a few Nobel prize winners (of all people!), shift the vowels and render it *engstrawm*. In print this word also suffers, being sometimes spelled with a simple *a*, and sometimes even with *e*. Some organizations have indeed adopted *a.u.* as the official abbreviation, thus obscuring its derivation.

One way to deal with this situation would be to obviate entirely the necessity of using the word, and the proposal is therefore made here that units of 10^{-8} cm be given a new designation, namely atom-meter, with the abbreviation *am*.

The following advantages are possessed by the proposed symbol. It is one character shorter than the widely used *a.u.*, yet differs from this so little that substitution of the one for the other could be carried out with a minimum of misunderstanding. It does not commit an error in transliteration, but starts with the same vowel as the word for which it stands. And it fits into the international series of designations for units of length, adding to the series *km, m, dm, cm,* and *mm* one more roman-character abbreviation.

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THE EXCELSIOR GEYSER, YELLOWSTONE NATIONAL PARK

IN an article describing a new geyser in Yellowstone National Park[1] it is stated that the old Excelsior Geyser has been extinct since 1888.

In the summer of 1890 I was directed by Professor Richard Rathbun, in charge of scientific investigation of the U. S. Fish Commission, to join Professor S. A. Forbes in a survey of the lakes and streams of Yellowstone National Park.

We arrived at Cinnabar on the seventeenth of July and spent our first night in the park in camp at Swan Lake Basin, about four miles from the Mammoth Hot Springs Hotel, a short distance south of "Golden Gate." The following night we camped on Canon Creek, a small tributary of Gibbon River.

At about 8:30 on the morning of the nineteenth we reached what our guide, Elwood Hofer, called Teton Hill, so named, he said, because the Teton Mountains were here visible. The Lower Geyser Basin lay at our feet, and one peak of the Tetons could be seen far to the south. At one point a column of steam was rising which we estimated to be from eight hundred to one thousand feet in height. Hofer identified this steam as coming from Excelsior Geyser, which he said had been inactive since 1888.

Two hours and a half later we arrived at the Excelsior Geyser and learned that there had been eruptions in the night and morning and that the steam which we had seen from Teton Hill had risen from the last eruption. Here, also, Hofer's statement that the geyser had not been active since 1888 was confirmed.

On August 18, Professor Forbes and I were collecting on Fire Hole River from the Upper to the Lower Geyser Basins. The following extracts from notes made at the time may not be without interest in this connection.

At the bridge just below Riverside Geyser, the temperature of the water, eighty feet down stream from the bridge, near shore on the geyser side of the stream, before the eruption was 17° C. During the eruption it rose to 21°. At the center of the stream before eruption it was 15°, during eruption 16°; on the opposite side before eruption 15°, during eruption

[1] *Science Newsletter*, August 11, 1928, p. 76; SCIENCE, August 17, 1928, p. xii, of *Science Supplement*.

no change. A few minutes later the temperature of the middle and opposite sides of the stream was 16°, on the geyser side 17°.

At the foot-bridge, one hundred yards down stream from the overflow of Excelsior Geyser, shortly before an eruption took place, the temperature of the water on the geyser side in shallow water was 35°. A little farther out in deeper and swifter water, 32°; on the opposite side near shore 22°. Here the water was unmixed with geyser water and the bottom was dark colored. Where warm water runs the bottom is lighter colored. Soon after these temperatures were taken there was an eruption of the geyser, when a large flow of boiling hot water entered the stream. Immediately after the eruption near the geyser shore the temperature was 55° at the point where it had been 35° before the eruption. On the opposite side of the stream near shore there was no change of temperature.

Life, both animal and plant, had been killed by the hot water in the center and on the geyser side of the stream for a distance of probably as much as a half mile down stream. On the opposite side of the stream neither animal nor plant life had been affected by the hot water. For example, tubes of caddis-fly larvae, built of pine needles, and suggesting the stick-chimneys of log-cabin days, were abundant on stones everywhere on the bottom of the stream from shore to shore. The larvae in tubes on the side of the stream opposite the geyser were living and active. Those in the middle of the stream and on the geyser side were dead.

Some idea of the immense volume of water which enters the Fire Hole River from Excelsior Geyser may be formed when it is noted that the stream at this point is nearly one hundred feet wide, with an average depth of some eighteen inches and with a swift current.

Some fifteen or twenty minutes after the eruption the warm side of the stream had cooled down to 23°.

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INTERMITTENT VISION

IN SCIENCE for October 26, Dr. Harry S. Gradle asks for an explanation of phenomena which he observed as a passenger on the air mail. In a later issue of SCIENCE Professor Gaehr and Mr. Packard describe phenomena which they believe to be of the same general class. In explanation of the phenomena described by Dr. Gradle I have the following comments to offer:

(1) When successive impressions are given to any portion of the retina at a rate which produces a fused or continuous sensation, a quick lateral movement of the eye causes momentarily a resolution of the fusion into the component sensations. For example, if blue and yellow sectors are combined to gray on a rotary color mixer, a quick movement of the eye momentarily resolves the gray surface into the component blue and yellow sectors. The reason for this is obvious. The movement of the eye momentarily interrupts the succession of the impressions on any given portion of the retina, therefore the combination of impressions is prevented and the components are sensed as separate. This resolution of the fusion into its component sensations can be produced in other ways which interfere with the succession of impressions on the same portion of the retina, *e.g.,* by moving a pencil or light wand rapidly back and forth between the eye and the rotating disk near to the surface of the disk, by rotating a sector or sectors in front of the disk, etc. From these considerations we would expect the blades of the propeller to become momentarily visible when a quick lateral movement of the eye is made.

(2) The rate of succession needed to give a uniform, continuous sensation varies from the center to the far periphery of the field. Over portions of the peripheral field a more rapid rate of succession is needed to obliterate all trace of separateness of impression than is required at the center of the field. Over such portions of the field one would expect therefore to see the blades of the propeller in a flickering succession when the rate of rotation is sufficiently high to produce a fused or continuous impression at the center of the field. These conditions would apply to Dr. Gradle's observation in case an excentric fixation was taken and held.

(3a) With a far fixation and relaxed accommodation the size of the pupil is increased, the amount of the increase varying with the intensity of illumination present. An increase in the size of the pupil would cause a proportionate increase in the amount of light entering the eye. With increase of intensity of light the rate of speed of succession needed to give a continuous impression is greater. An increase of intensity of light due to an expanded pupil should therefore tend to resolve a continuous impression into a flickering succession of impressions. (b) An increase of intensity of light also causes an increase in the difference in sensation aroused by two surfaces of a given difference in coefficient of reflection. This would tend to increase the visibility of small and shadowy physical differences in the field in objects not near the threshold of acuity.

(1) and (2) above are based on direct experimental evidence. (3) is an inference from experimental data at my command.