

Correspondence.

AN ERROR CORRECTED.

To the Editor of the SCIENTIFIC AMERICAN:

Please allow me to call attention to an error which occurred in the article of D. M. Morris in the number of April 10th. In the paragraph beginning "Assume 1 as a base with 1 1/4 as the sum of the other two sides," 1 1/2 evidently is meant for 1 1/4, for 2/3 is not the reciprocal of 1 1/4, but of 1 1/2, and 13/12 and 5/12 are not parts of 1 1/4 but of 1 1/2.

But using 1 1/4 or 50/40 as the sum of the two sides, the difference would be 32/40, and twice the greater side would be 82/40 or the greater side 41/40, leaving the other side 9/40.

JAMES LYNCH.

Georgetown College, Washington, D. C.

STEERING OF SHIPS.

To the Editor of the SCIENTIFIC AMERICAN:

In reading the article on the superiority of lock to sea-level canal, in the issue of March 27th of your valuable paper, I find a statement which may or may not have any bearing on the point in question, viz., the easiness of navigating along long tangents, but which conveys an idea as popular as it is erroneous. The statement referred to is the following: "The ship proceeds on a given course, until the lights or buoys show her to be in range for the next course, when the helm is put over and the ship's head swung sharply around."

Now the fact is that in making a turn the ship's head is never swung around. It is the ship's "tail," or stern, which swings. The rudder when put at an angle to the longitudinal axis of the ship will force the stern of the ship to one side or another, thus effecting a turn. That lack of understanding of this fact may have disastrous consequences, and that a correct idea will be of value in narrow channels or in danger of collision, is evident, and I remember two events in which this fact played a most important part.

The one happened to two English battleships leaving harbor and running parallel to each other with but a narrow space between them. Outside of the harbor lights order was given to separate at a sharp angle. The captains turned their rudders in opposite directions, naturally thinking that in so doing the distance between the ships would increase. But what followed was a collision; the sterns of the ships being forced against each other. The case went to court martial, and the cause was fully explained.

The other event happened to a sailing vessel, steering say N. W. on a foggy day. Suddenly the captain saw a steamer coming out of the fog a little aft of the middle of his ship on the larboard side. Now this captain, instead of turning west or, as one should think, away from the steamer, turned north. Calculating that in so doing the stern of his ship would move away from or at least in the same direction as the steamer. A collision followed, but not a very serious one; still, the captain was accused of poor seamanship, but was acquitted on explaining the principle on which he had acted.

ALEXANDER KIELLAND.

Cashmere, Wash.

Radio-active Properties of Uranium and Its Salts.

BY A. J. JARMAN.

Radium and uranium are obtained from the same source, viz., uranite or pitchblende, the name uranium being given to it by its discoverer, Klaproth, in 1789. Both of these elements possess the property of radio-activity, and both of them emit similar rays. Six years have passed since the writer first made some important tests relating to the effects of the rays emitted by the metal uranium and some of its salts upon the human body. These tests, which are being continued at the present time, have proved to be of considerable value from a therapeutic standpoint.

The rays that are emitted from uranium, and its oxides in particular, have proved to be of such an extraordinary character, that the following record cannot fail to prove of interest in the line of scientific research.

The yellow oxide of uranium is very effective, as well as the cyanide and ferrocyanide. The cyanide of uranium is insoluble in a solution of potassium cyanide 99 per cent pure even at boiling point, while the ferrocyanide is soluble in such a solution in a cold state.

The molybdate of uranium is a pale lemon-colored plastic material, which turns green upon exposure to white light.

Pieces of tempered spring steel were taken and cut into lengths, varying from two and a half inches and half an inch wide to five and six inches, the ends being filed to a semicircular shape. These pieces of steel were then strongly magnetized, and cleaned; they were then submitted to the process of coating with the uranium oxide by means of electrolysis, the solution used being composed of equal parts by weight of uranium chloride and ammonium chloride in distilled water at a temperature of 60 deg. Fahr. The battery force employed consisted of two half-gallon Bunsen cells, using a saturated solution of bichromate of potassium in place of nitric acid. The outside containing vessels were charged with common sulphuric acid and water in the proportion of one part acid to eight of water, with an amalgamated zinc cylinder placed therein. The elements were then coupled in series. A strip of steel or carbon was used as an anode, and the steel strip as the cathode. In the course of a few seconds a brass-like deposit took place, due to the rapid formation of the yellow oxide of uranium upon the surface of the steel strip. The strip

was then carefully removed, dipped in clean water, and dried by holding it with a pair of pliers over an ordinary gas jet. After a number of these strips are prepared, they are wrapped tightly in tissue paper, and pasted so as to retain the uranium oxide upon the surface. They can then be sewn into a belt to surround the body, made into any appliance to be worn upon the body, not necessarily in contact; they may be worn over the underclothing, because the radioactive rays are not impeded by woolen or cotton fabrics. In cases of lumbago, severe pain in the back, and affections of the knees, where the blood circulation is defective, the relief from pain, and the increase of vitality in the body generally, is astonishing.

The following test has been put into operation many times, to prove that there are active rays emitted from the coated strips of steel:

Several 5 x 7 Lumière Sigma sensitized photographic plates were placed in ordinary photographic printing frames, glass side down, previously fitting a double thickness of stout black paper in front of the plate; then upon the sensitive surface (all operations being performed under a double thickness of deep ruby glass) several coated metal strips were placed, some being crossed, and some in a straight line, then over these was placed a piece of clean glass plate, then the pad and back of the printing frame were adjusted, and the whole was wrapped in several folds of black velvet and placed in a well-made case, then locked, and placed in a dark closet also locked, and allowed to remain unmolested for a period of eighty to one hundred hours, and afterward submitted for development under deep ruby light, with the result that excellent radiographic negatives were obtained in the course of a minute or two. Upon fixing, washing, and drying, prints could be made from them by any photographic process.

The impression made upon the plates by these radioactive rays was clearly observed somewhat like a halo surrounding the steel strips, while within this halo a well-defined impression of the shape of the steel strips was plainly seen. The radio-active rays emitted from uranium and its salts are much lower in intensity than from radium, which makes them safer in their application. It was owing to this effect that the writer proposed about four years ago the name "radio-pathic," because it appeared to express effectively a name for therapeutic use. Three years ago a physician requested the writer to prepare a knee cap for personal trial upon a stiff knee from which he was suffering. It was not typical rheumatism. His knee became so stiff at times that he could not bend it. The knee cap was made, the physician used it, with the result that the swelling decreased and the pain and stiffness disappeared. No other remedy was used but this simple radio-pathic appliance. Another case, in this instance what is known to medical men as neuritis, a severe twitching of the right arm at the lower part; an armband and a body belt, prepared as above, were made by request. After wearing the appliances for about one month, the distressing nervous symptoms entirely disappeared, and at the end of one year's use of the appliance did not return.

In a case of abdominal tumor, the wearing of a body belt six inches wide, fitted specially with the radio-active strips, caused the stoppage of the growth in eight months, causing a reduction in the girth of the abdomen of four and a half inches. When such an appliance is worn around the body, it produces an extraordinary energizing or vitalizing effect. Pains in the back and loins are relieved by six hours' use. Quite unlike an electrical appliance, it is not necessary for the elements to touch the body, since there is no blistering effect liable to occur due to the intensity of radium or its bromide when that is used.

Other bodies placed near these radio-pathic strips are also affected by them. Photographic plates are quickly affected, and become irreparably fogged. Further experiments at present under way with the ferrocyanide of uranium bid fair to bring about some unlooked-for results in the researches of radio-activity.

Lunar Superstition and Potatoes.

After exhaustive experiments in potato planting, the United States Department of Agriculture has to say that, in season, one time is as good as another to put potatoes in the ground.

Almost everyone, even if he were not reared in the country, has heard of the idea about planting potatoes in the dark of the moon. The field workers of the Department of Agriculture have been investigating the matter, and have found that seventy-five per cent of the farmers of this alleged enlightened country put in their crops and do a good many other things about the farm governed solely by the moon's phases. Many farmers will tell you that if you plant potatoes in the dark of the moon they will run to tubers, and if in the light of the moon they will run to tops, and crops are planted accordingly.

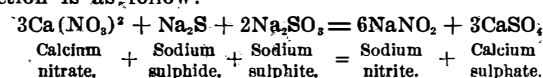
There is usually a basis in fact for any superstition; and the moon superstition is so deeply rooted,

that a number of experts from the Department of Agriculture, while going up and down and across the land, have made it their business to study the question, and see whether there might not be a germ of truth or, at least, some reason for the general belief that the moon's phases have an effect on animal and vegetable life. They have concluded after patient investigation that the moon myth is one of the comparatively few myths that date back to pure savagery, and has absolutely not an atom of scientific foundation on which to stand. The agricultural experiment stations all over the country have been defying this superstition for several years and raising just as good crops when the moon was one way as when it was the other. Therefore, once and for all, it is conclusively decided that there is nothing to the theory that potatoes should be planted in the dark of the moon.

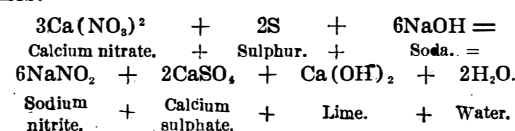
All of this may not seem very serious investigation for a great government to undertake, but the work nevertheless has been interesting to the scientists, and if they have succeeded in weaning a few from the old superstitions about planting potatoes, they have been well paid for their work.

Sodium Nitrite.

Sodium nitrite is very extensively employed in the manufacture of "azo" dyes. The salt is produced by various methods. Sodium nitrate (Chili saltpeter) is converted into sodium nitrite by simple heating, but this process is made almost impracticable by the simultaneous conversion of much of the nitrite into oxide. The nitrate can also be reduced to the nitrite by the action of lead, or of various sulphides and sulphites. Sodium nitrite reduced by lead is a by-product of the manufacture of litharge, into which the metallic lead is oxidized in the process of reduction of the sodium salt. Sodium nitrite is also produced by passing nitrous acid vapor into a solution of soda. Finally, experiments have recently been made in the production of sodium nitrite by the action of calcium nitrate upon a mixture of sodium sulphide and sulphite. The reaction is as follows:



Sulphur and caustic soda may be substituted for the sodium sulphide and sulphite. The equation then becomes:



The calcium sulphate precipitated spontaneously, and the lime formed in the second reaction may be precipitated by sulphuric or carbonic acid. On concentrating the liquid the sodium nitrite is obtained in crystals.

Benzoates in Butter.

Benzoate of soda or of potash is sometimes added to butter as a preservative. The benzoate can be detected by the following process: The butter is melted and stirred with a hot saturated solution of lime. The watery part of the mixture, after cooling, is drawn off, acidulated with phosphoric acid, and shaken with half its volume of ether, any tendency to emulsifying being corrected by adding a few drops of alcohol. The ether is poured off and evaporated, and the residue is allowed to dry in the air and is then gently heated with sulphuric acid to 212 deg. F. or a little higher for the purpose of dissolving the benzoic acid. The cooled solution is mixed with about one-tenth its volume of fuming nitric acid, heated for a few seconds, then cooled and mixed with two or three times its volume of water. Saturated solution of sodium sulphite is then added gradually, with constant agitation, until the evolution of yellow fumes ceases. Strong ammonia is then poured on the solution. The presence of benzoic acid is revealed by an orange-red coloration.

A Berlin journal states that an international understanding is to be set on foot for supplying all the leading cities of the Continent with automobile kitchens or open-air cooked food supplies. This will be a new use for the automobile, and the vans will circulate mainly in the lower quarters of the cities and in the outlying districts. At a very moderate price they will give a supply of cooked food. On the first trial of the new system, the vehicles will be fitted with two kinds of ranges or heaters, one of which will use a gas flame and the other will be an electric heater. Each automobile is mounted by two persons, one of which is the driver and the second the cook. The latter will also act to sell the food when the vehicle is stopped. In the front part of the car is mounted an ice-chamber of large size which will contain the raw meat principally, besides non-alcoholic drinks. The latter will be supplied as well as the food. It is stated that the first trial of this novel system will be carried out simultaneously at Berlin, Paris, and Moscow.