center of the bridge above the water will be 130 feet, and the roadway 80 feet wide. The view from the latter will be one of the finest in the world, both in beauty and extent.

It is believed that this thoroughfare will, when completed, command an independent travel equally great with the existing ferries, which will retain their own business; and that even these two immense means of communication will ere long be insufficient to accommodate the rapidly increasing demands of the multitudes yet to line the shores, so that the building of submarine tunnels will eventually become a necessity.

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Contents:

(Illustrated articles are marked with an asterisk.)

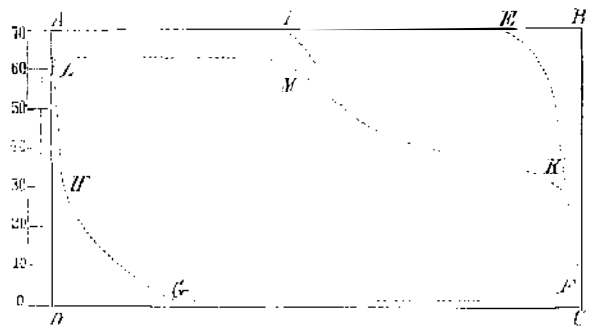
INDICATING STEAM ENGINES.

Questions from our correspondents, in relation to the power of steam engines, recur so often that we think it may be timely to devote some space to their general consideration. We are frequently asked what is the power of an engine of a given size, making a certain number of revolutions per minute, with a specified steam pressure. Most of our readers know that the horse power of an engine is equal to the mean effective pressure on the piston, in pounds, multiplied by the piston speed in feet per minute, and divided by 33,000. Hence those who send us queries of the nature mentioned above doubtless think that it will be an easy matter for us to determine the horse power. As a matter of fact, we suppose that very few of the answers we have rendered to these questions have been anything but rough approximation to the true solutions. We have been careful to hint as much, in working out each example; but perhaps it may be well to give a more definite explanation.

Referring to the rule for finding the horse power of an engine, it will be seen that the mean effective pressure on the piston is required. This, we believe, has never been sent to us. True, our correspondents give the pressure in boiler per steam gage, and sometimes mention the point at which the steam is cut off in the cylinder. They have never sent, however, to the best of our recollection, the amount of back pressure resisting the movement of the piston, the initial pressure of steam in the cylinder, the amount of steam and exhaust lead, and the point at which the exhaust cushion commences. We will endeavor to show how all these things affect the solution of the problem.

The following, taken from a back number of our paper, is a fair specimen of questions of this character: "What horse power has an engine of the following dimensions: Cylinder 9x16 inches, working at 63 revolutions per minute, with a pressure of 70 pounds to the square inch?"

Accepting our correspondent's statement as the correct one, we can readily represent the action of steam in the cylinder during the stroke by a rectangle, A B C D. Thus, while the piston is being acted upon by the steam, A B, 70 pounds above D C, on any convenient scale, will represent the steam or pressure line, the point, A, corresponding, to the commencement of the piston's stroke, and the point, B, to the end. When the piston has reached the end of the stroke, the exhaust valve opens, and the line, B C, represents the fall of the pressure from 70 pounds, per gage, to nothing. The piston then returns, and C D represents the pressure during exhaust. When the piston has returned to the starting point, the steam valve is opened, and the line, D A, shows that the pressure rises to 70 pounds again, for the next stroke. This, we say, is the graphical representation of the action of the steam, according to the data given by our correspondent. Our readers do not need to be told, however, that it is not usual to work engines in this manner, as it produces violent strains, and is far from being economical. The piston moves to and fro, and requires, of course, to be brought to rest before the direction can be changed. If it worked as represented in our diagram, the shocks that would occur each time the motion was reversed would be very severe. It is probable, then, that the exhaust valve commences to open, as at E, before the end of the stroke is reached. There will probably be some back pressure also, so that the exhaust line will be represented by F G, instead of C D. It is quite likely that the exhaust valve closes before the end of the return stroke, so that a cushion line, G H, is produced, and that the steam valve is set with lead, so



that it opens at H. It would appear, then, that perhaps a figure, A E F G H, may represent the action of the steam, instead of A B C D, and it will be seen that, if such is the case, the mean effective pressure per square inch will be considerably less than 70 pounds.

In the majority of engines, the steam valve has some lap, so that it is closed before the end of the stroke, and the steam is allowed to expand, producing an expansion curve, I K, on our graphical representation, in which case, A I K F G H, giving a still smaller mean effective pressure, will represent the action of the steam.

In general, the initial pressure of steam in the cylinder is less than the boiler pressure, from which it would appear that L M K F G H more probably represents the state of affairs, in our correspondent's engine, than A B C D.

Those who have followed us thus far will doubtless accept our original statement, that the best answers we can give to questions like the one under consideration will only be rough approximations. But it is possible to arrive at the truth, in cases of this kind. If a gage were attached to the cylinder, it would mark the varying pressure at different points of the stroke. The steam engine indicator performs this office admirably, recording the pressure at each successive point, thus forming essentially such a diagram as we have already represented. This is the only accurate method by which the mean effective pressure of the steam can be ascertained. The indicator shows, in addition, many things of interest and importance which our space will not permit us to consider at present. The importance of knowing the true power developed by an engine must be apparent to all our readers, and we need not enlarge upon it. The test of an engine with the indicator frequently discloses derangements and imperfections that could not be otherwise discovered. The indicator, however, is an exceedingly delicate instrument, and must be carefully manipulated to secure accurate results; hence tests of this character should be made by those who are truly experts.

We can readily perceive, from the numerous inquiries on the subject, that many of our readers realize the importance of knowing the power developed by their engines, and perhaps our remarks will be useful in showing them the means by which they can have their questions correctly answered.

DR. HENRY DRAPER'S RECENT DISCOVERIES IN SPECTROSCOPIC ANALYSIS.

In a recent number of the *American Journal of Science and Art*, there is an important paper on "Diffraction Spectrum-Photography," by Dr. Henry Draper, which is being reprinted in England, France, Germany, and Italy. Until quite recently, spectroscopic investigation has been conducted almost entirely by the aid of prisms; but the prismatic spectrum is far less suitable for exact inquiry than the diffraction spectrum produced by a grating of fine lines ruled on glass; because in the former case, the red end of the spectrum is contracted and the violet dilated, while in the latter the rays are presented in the true order of their wave lengths. Moreover, no two prisms give spectra that are exactly alike in the amount of this contraction and dilatation; and hence various observer have great difficulty in comparing their results together.

As all diffraction spectra are exactly alike, and, to use a technical term, they have no "irrationality of dispersion," it seems singular that prismatic observation has not long since been abandoned. But gratings have hitherto been very difficult to obtain; and, besides the spectrum produced by a grating is much fainter than that by a prism. Our distinguished townsman Mr. Rutherford has, however, constructed a machine which makes better rulings on glass than any heretofore produced, and it is with one of these that Dr. Draper has worked.

The main object of the present research has been to furnish a photographic map of the violet and ultra violet rays of the spectrum, to serve as a permanent reference map and to complete the great work of Angström, whose "*Spectre Normal du Soleil*" is unquestionably the most laborious and exact contribution to spectrum analysis made in recent times. Angström has, up to the present, failed in his attempts to do the very thing that Dr. Draper has succeeded in accomplishing so thoroughly. In many respects, indeed, Dr. Draper's work at the violet end of the spectrum exceeds in exactness that of Angström int he visible regions, as is well seen in the part between the fixed lines G and H, where the map of one observer overlaps that of the other. Many line that Angström has omitted or misplaced are corrected by Draper; and in one place alone, 17 new lines are added.

By an ingenious device, the wave lengths of rays entirely invisible have been measured with an exactness exceeding that of those that are visible; and errors have actually been detected in some of the fundamental wave lengths of the standard test books.

The photograph which accompanies the paper is of beautiful definition and large size. If the whole solar spectrum were presented on the same scale, it would be about 10 feet long.

GAIL BORDEN.

Upon a shady knoll in the beautiful cemetery of Woodlawn near this city, in full view from the windows of the New Haven railway cars, stands a substantial family monument in granite, which at one time attracted the attention of the passing traveller by the peculiarity of the emblem by which it was surmounted. That emblem consisted of a milk can, cut of solid stone, representing in form and size the familiar utensil so commonly used here in our streets, for the transport and sale of milk. This was the chosen monument by which our friend Gail Borden, inventor and originator of the great industrial product now known as Condensed Milk, had desired to mark his last earthly resting place, when he should have been gathered to his fathers. The desire thus expressed was honorably characteristic of the individual. He was emphatically a man of the people; and although in process of time, by the success of his most excellent and useful inventions, he acquired great wealth, he ever regarded himself as one of the humblest of workers in the family of man; and the possession of riches never led him to put on aristocratic airs. He despised that sort of pridewh'ch makes some people ashamed of the humble origin of their progenitors, and wished that, in this respect, the very stones above his grave should teach a useful lesson. Surely they commemorate the truth that honest industry is better than titled birth.

Gail Borden was born in Norwich, N. Y., in 1801, his parents being New England people. In 1829 he removed to Texas, where he was always esteemed for his probity of character and earnest efforts for the public good. He was at one time a United States Surveyor, afterwards a newspaper conductor, then the Collector of the port of Galveston, when Texas was known as the Lone Star Republic. In 1853 he succeeded in producing Condensed Milk, as a permanent article of manufacture, which he accomplished by concentrating in vacuo. We well remember his early efforts in this direction, which were most persevering and arduous. The Patent Office for a long time refused to issue his patents, but finally yielded, and the new manufacture then received its first impulse. Mr. Borden's patents were obtained through this office. For over twenty years we enjoyed the uninterrupted friendship of this truly excellent man. Genial, kind-hearted, benevolent, his life was a most useful one and his memory blessed. He died on the 11th of January, 1874, aged 73 years, at Bordenville, Texas, where he had established a large factory for the production of concentrated foods, chiefly meats. He leaves a large and interesting family. His remains are to be brought to Woodlawn. The trustees of the cemetery have removed the granite milk can from his monument, as an infringement upon the rules of fastidious taste. But no one can blot out the record of his noble life, nor the splendid results of his long and useful labors.

Gail Borden was the inventor and first introducer, in merchantable form, of Condensed Milk. He may be said to have supplied the world with a new article of food. Medical authorities give it the highest place in the nourishment of the sick and the young. He lived to see the use of this most valuable product extended over the globe. Nearly all civilized nations, following his patterns and instructions, now have their factories for the supply of the article, which, as the years roll on, will be still more highly valued, while the work of its production will employ the industry of thousands of people. Gail Borden may be truly styled a benefactor of his race.

STEAM ON CANALS.

We have before us a report of the trial trips of the steam canal boat, William Newman, through the Erie canal, in the seasons of 1872 and 1873. We have also the report of Engineer Greene on the trials of 1872. His report on the trials of last season has not yet been received. The figures in these reports only confirm what has frequently before been shown by experiment: that it is not sufficient to put a good engine into a boat to ensure success; the boat must also be modeled to suit the engine. The ordinary canal boat, built in the form of a box in order to obtain great carrying capacity, cannot be propelled directly by steam power as cheaply as it can be towed. Thus it appears, from Mr. Greene's report that the engine of the William Newman, in the trip made in 1872, developed an average indicated horse power varying between 30 and 35, to produce an average speed of 2·727 miles per hour. This same speed could probably have been effected by towing with from 3 to 4 horses, and it is easy to see that the steam power is much the most expensive. The power developed in the trial trip in 1873 is not stated; but from the data given, it probably exceeded 50 horse power, to produce a speed of 3·691 miles per hour. It is because such slow speeds are required on the canals that the inefficiency of this mode of propulsion is not at once apparent. If an ocean steamer only utilized about 12 per cent of the power developed by the engines, probably the vessel would not be large enough to contain the machinery that would be required to produce a speed of 14 knots an hour. It appears to

us that the prize offered by the Legislature has stimulated invention in the wrong direction. It is scarcely possible to give a canal boat the form required for a steamer, without seriously reducing the carrying capacity. It would seem better, then, to place the engine on a separate vessel, which could be properly designed, letting this vessel take the place of horses to tow the canal boats.

A YEAR'S INVENTIVE PROGRESS.

The following schedule indicates the progress of invention in the United States during the year 1873, and consists in a list of the number of patents issued by the United States Patent Office to citizens of each State and Territory, to foreign subjects, and to members of the Army and Revenue Marine Service. The table also shows the relative ratio of patents obtained to the population of each political division:

To citizens of	Number of patents.	Population: one to each	To citizens of	Number of patents.	Population: one to each
Alabama	13	23,185	Montana Territory	3	6,83
Arkansas	11	44,042	Nebraska	28	4,393
California	251	2,232	Nevada	19	2,236
Colorado Territory	8	4,983	New Hampshire	127	2,506
Connecticut	622	860	New Jersey	614	1,475
Dakota Territory	20	7,090	New Mexico Ter.	1	91,874
Delaware	43	31,250	New York	2,826	1,551
District of Columbia	169	1,208	North Carolina	58	18,472
Florida	8	23,468	Ohio	832	3,203
Georgia	53	22,341	Oregon	19	4,785
Idaho Territory	1	11,999	Pennsylvania	1,639	2,148
Illinois	844	3,069	Rhode Island	167	1,301
Indiana	311	5,404	South Carolina	25	28,224
Iowa	246	4,854	Tennessee	105	11,986
Kansas	75	4,859	Texas	109	7,510
Kentucky	114	11,590	United States Army	8	3,750
Louisiana	96	7,512	U. S. Rev. Marine	1	
Maine	139	4,510	Utah Territory	8	10,848
Maryland	191	4,088	Vermont	87	3,914
Massachusetts	1,379	1,057	Virginia	76	16,120
Michigan	356	3,326	Washington Ter.	6	3,992
Minnesota	110	3,397	West Virginia	42	10,524
Mississippi	57	15,633	Wisconsin	217	4,860
Missouri	288	5,955	Wyoming Territory	2	4,559

Total to citizens of the United States 12,371, or one patent to each 3,116 of the population. Total granted to citizens of foreign countries, 491. Grand total, 12,862, which includes reissues and designs, but not trade marks.

With reference to sectional distribution, the foregoing schedule reduces itself to the following;

Middle States	5,119	Territories and the District of Columbia	140
Western States	3,038	United States Army and Revenue Marine	9
North Eastern States	2,521		
Southern States	1,474		
Pacific States (Cal. & Oregon)	270		
Total	12,371		

By inspection of these data it is shown that, as compared with the number of patents issued in 1872, the aggregate of 1873 is smaller by 140 for citizens the United States, and by 31 for dwellers abroad. Considering numbers merely, New York stands first, with 2,826, and New Mexico and Idaho last, with but 1 each. Connecticut, however, fairly heads the list, as relative population must also enter into the calculation; her ratio is 1 patent to every 860 souls. The District of Columbia is next, with a proportion of 1 to every 1,208. Arizona and Alaska are entirely unrepresented, and New Mexico has but a single patentee for 1873 among her whole population of 91,874. The Southern States still present a low average; and in proportion to their population, fall b hind all the rest of the country. A slight increase of four patents is noticeable over the aggregate of 1872. The list of States which show an increase over last year includes the following: Alabama, California, Iowa, Kansas, Louisiana, Maryland, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, North Carolina, Pennsylvania, Tennessee, Texas, and Washington Territory, also the United States Army. The remainder have decreased or else remained stationary.

It may be added as an interesting and perhaps significant fact that, in the four political divisions in which the least number of patents have been granted, the circulation of the SCIENTIFIC AMERICAN is the smallest; and in other States, the ratio increases in proportion to the circulation of this paper among its inhabitants. Thus in New York, the State having the largest number of patents, our patrons exceed those of any other State; while in New England and the West, whence, as the statistics show, the most inventions emanate, the SCIENTIFIC AMERICAN has the greatest circulation.

PROCEEDINGS OF THE PATENT CONVENTION.

The Patent Convention, the call for which was recently alluded to in our columns, began its labors at Washington, on January 15th. Some two hundred delegates were present. The following is the organization:

President, J. M. Thacher; Vice Presidents, N. R. Graham, W. W. W. Wood, H. E. Towle, Miles Pratt; Secretaries, J. C. Bancroft, W. C. McIntyre, and C. F. Stansbury. The resolution of the Vienna Congress, declaring that the protection of inventors should be guaranteed by the laws of all civilized nations, for the reasons given, was adopted. The second resolution, declaring that an effective and useful patent law should be based on the principles set forth was modified by adding:

"A patent should be granted for a term of seventeen years, with a privilege of extension for the benefit of the inventor or his heirs for a further term of at least seven years." Several resolutions were offered touching upon the inventors' interests and the patent laws of the United States. C. M. Parks presented a resolution, recommending that Congress make use of the surplus fund of the Patent Office, now in the United States Treasury, for the erection of a suitable building in Judiciary square, for the exhibition of the models of inventions. This fund is stated to be over $1,000,000. Further reports in our next.

VERMIN KILLER.—Doré patents the use of the following mixture for the destruction of bugs, fleas, ants, etc., and their eggs: Bisulphide of carbon 80 parts; petroleum essence 20 parts. The liquid is to be applied to furniture, etc., by a brush.

PSYCHIC FORCE.

Some time ago we published an account by Dr. William Crookes, the distinguished scientist of London, editor of the *Quarterly Journal of Science, Chemical News*, etc., of his experiments and observations in connection with the phenomena of Spiritualism. We gave engravings of the special apparatus designed by Dr. Crookes for the purpose of detecting the fraud, if any existed, and of measuring the actual degree of invisible force that was alleged to be exerted. This apparatus consisted of a self-registering balance, which, to the surprise of the Doctor and his friends, went down before their eyes and registered a considerable degree of force, when the medium, Home, simply pointed his finger at the balance, but did not touch it. The force thus manifested was designated psychic force by Dr. Crookes. The publications of the learned Doctor attracted much attention at the time, and subjected him to the severest ridicule among the learned. He however promised to pursue the investigations and publish further reports. This he has now done, and announces his intention to give still further details. Most of the wonders which he now describes took place in his own house, and were witnessed by parties of friends, all of whom give concurrent testimony as to the actuality of what is stated.

These spiritual performances seem to involve something which, as Lord Dundreary would say, "no fellow can find out," and the Psychic Force theory of Dr. Crookes is perhaps as acceptable as any, while none of them tell us how the thing is done. None of the doings here recited surpass the tricks of the magician Hartz of this city—the box trick, for example, recently mentioned by us. The box is first tied up and sealed, then entirely folded up within a canvas sheet, and again tied and sealed, all being done by a committee of detectives before the audience. Into this box, in the course of two minutes time, Hartz then introduces a man, without disturbing the canvas envelope, ropes or seals. Other equally curious performances might be mentioned, which, we believe, have never been explained.

A correspondent of the New York *Tribune* says that, in classifying the various phenomena that have presented themselves to him in the course of his enquiries, Mr. Crookes refers, first, to the movement of heavy bodies, with contact but without mechanical exertion. This he states to be one of the simplest forms of the phenomena observed, varying in degrees from a quivering or vibration of the room and its contents to the actual rising into the air of a heavy body when the hands of the medium are placed upon it. These movements, and indeed most of the phenomena, are preceded by a peculiar cold air, sometimes amounting to a decided wind, sufficient to blow a sheet of paper about the room and to cause a lowering of the thermometer by several degrees.

The second class manifested themselves as percussive and other allied sounds; sometimes as delicate ticks; sometimes a cascade of sharp sounds, as from an induction coil in full work; detonations in the air, sounds like scratching, twittering as of a bird, etc. The third class of phenomena consists in the alteration of the weight of bodies. The fourth class, namely, the movement of heavy substances when at a distance from the medium, he has seen in many instances. An empty arm chair, at his request, moved to where he was sitting, and then slowly back again, a distance of about three feet. He has seen the movement of a heavy table, and chairs turned with their backs to the table, about a foot and a half off, each occupant kneeling on his chair, with hands resting on the back, but not touching the table. The fifth class is that of the raising of tables and chairs off the ground, without contact with any person.

The sixth class is that of the levitation of human beings, which has occurred in four instances in his presence. He has seen Mr. Home raised completely from the floor of his room in several instances. The accumulated testimony, establishing Mr. Home's levitations, Mr. Crookes considers overwhelming; and he thinks it greatly to be desired that some person, whose evidence will be accepted as conclusive by the scientific world, shall seriously and patiently examine these alleged facts. The seventh class of phenomena consists in the moving of various small articles without contact with any person, which he has very frequently observed, and where there could be no suspicion of trickery. He thinks that when he is in his own dining room, seated in one part of the room, with a number of persons keenly watching the medium, the latter could not, by any trickery, make an accordeon play in his (Mr. Crookes') own hands, when the keys are held downward, or cause the same accordeon to float about the room, playing all the time. He thinks it impossible to introduce machinery which shall wave window curtains; pull up Venetian blinds eight feet off; tie a knot in a handkerchief and place it in a remote corner of the room; sound notes on a distant piano; cause a card plate to float about the room; raise a water bottle and tumbler from the table; make a coral necklace rise on end; move about a fan so as to fan the company, or set in motion a pendulum when enclosed in a glass case firmly cemented to the wall. The eighth class is that of luminous appearances. He has seen a solid self-luminous body, of the size and nearly the shape of a turkey's egg, float noiselessly about the room, being visible for more than ten minutes, and striking the table three times, with a sound like that of a hard solid body, before fading away. He has seen a self-luminous crystaline body placed in his hand by a hand which did not belong to any person in the room, and a luminous cloud floating upward to a picture. In the daylight he has seen a luminous cloud hover over a heliotrope on a side table, break off a sprig, and carry the sprig to a lady; and on several occasions he has seen a similar luminous cloud visibly condense to the form of a hand, and carry about small objects.

The ninth class consists of the appearance of hands, either self-luminous or visible by ordinary light. In one case a small hand rose up from an opening in the dining table and gave him a flower. The hands and fingers do not always appear solid and life-like, sometimes indeed seeming like a nebulous cloud, partly condensed in the form of a hand. He has more than once seen first an object move, then a luminous cloud appear to form about it, and lastly, the cloud condense into shape and become a perfectly formed hand. At this stage it was visible to all present. Sometimes it was life-like and graceful, the fingers moving and the flesh apparently as human as that of any person in the room. At the arm or wrist it became hazy, and passed off into a luminous cloud. To the touch the hand appeared sometimes icy cold and dead, at others warm, grasping his own with the firm pressure of an old friend. In one instance he retained one of these hands in his own, firmly resolved not to let it escape. There was no struggle, no effort to get loose, but it gradually seemed to resolve itself into vapor, and faded in that manner from his grasp. The tenth class comprised direct writing, exhibited sometimes in darkness, sometimes in light, sometimes without any apparent agency, at others through the medium of a hand. The eleventh class embraces the rarest phenomena, namely, those of phantom forms and faces, which he witnessed in a few instances only. The twelfth class covers phenomena that seem to point to the agency of an exterior intelligence, other than that of the medium or some person in the room. Although the hypothesis has been suggested that the medium is the source of this intelligence, by those who think they see in this an explanation of many of the facts, yet Mr. Crookes has reason to believe that, in certain instances at least, they result from the agency of an outside intelligence not belonging to any human being present.

SCIENTIFIC AND PRACTICAL INFORMATION.

EXTRACTION OF QUICKSILVER AT NEW ALMADEN, CAL.

The mineral is treated as at Idria, that is, it is roasted in great cylindrical furnaces in which it is placed between successive layers of wood. The mercurial vapors are condensed in walled chambers. The presence of lime in the minerals greatly facilitates the disengagement of the metal. 4,400,000 pounds of mercury are thus yearly obtained at an expense of about $27 per 100 lbs. At Almaden in Spain the annual product is 2,200,000 pounds, costing from $90 to $180 per 100 pounds.

A NEW USE FOR INFUSORIAL SILICA.

Infusorial silica has been strongly recommended for surrounding ice, ale, and beer cellars, fireproof safes, steam boilers, and powder magazines. A firm in Germany have recently made a series of experiments on a large scale, and they assert that the use of this earth has reduced the melting of ice in a cellar during the summer from 23,500 to 10,000 pounds. This material is not inflammable, and is not in the least affected by the hottest fire; and it prevents the entrance of rats and mice.

ELECTRIC DISCHARGES IN AIR.

By allowing a series of sparks from an electromagnetic induction apparatus to be discharged between platinum electrodes in perfectly dry air, Böttger noticed the formation of yellow vapors; and after the lapse of a few minutes, nitrous acid was recognized by the smell. If the sparks are passed through very moist atmospheric air, or if the sides of the glass vessel in which the experiment is conducted are moistened with distilled water, and some is allowed to collect at the bottom, no yellow vapors are formed; but the air, in a few minutes, acquires the characteristic odor of ozone, while in the water the presence of hyponitric acid can be detected. Iodide of potassium and starch paper, the test in common use for the detection of ozone in the air, is thus shown to be an untrustworthy reagent, as it must in many cases turn blue by nitrous acid. It behoves meteorologists, now that their attention has again been directed to these facts by Professor Böttger, to ascertain the exact condition of moisture under which the acid is produced, and to establish a process for the estimation of ozone, which shall be of absolute certainty.

Dr. Dotch of New York, who has for years occupied himself with the artificial generation of ozone, states that strips of paper saturated with the tincture of guaiacum afford a more sensitive and certain reagent or test for the presence of ozone than either the iodide of potassium and starch or paper containing protoxide of thallium; and that such an ozonometer can be relied on to show at least 10 gradations or shades.

SCIENTIFIC GHOULS.

The tomb of Petrarch was recently opened on the occasion of the centenary of the poet. The bones were found in quite perfect condition and of an amber color; other than which, we fail to note a single fact of the slightest interest in the long account of the ceremony published by a foreign contemporary. It strikes us that the spectacle of a body of scientists, calling themselves the "Academy of Bovolenta," breaking open the grave of a great man, pawing over his bones, and glaring at his dust through their eyeglasses, with apparently no other object than to make him share his coffin with a bottle containing a list of their names, must be refreshingly idiotic.

OZONIZED WATER.

Ramelsberg states that some of the substances sold as ozonized water owe their action to the presence of chlorine. Behrens and Jacobsen, on the other hand, find that some ozonized water is only a dilute solution of hypochlorous acid.