

Scientific American.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN.

A. E. BEACH.

TERMS.

One copy, one year, postage included.....\$3 20
One copy, six months, postage included..... 1 60

Club Rates:

Ten copies, one year, each \$2 70, postage included.....\$27 00
Over ten copies, same rate each, postage included..... 2 70

By the new law, postage is payable in advance by the publishers, and the subscriber then receives the paper free of charge.

NOTE.—Persons subscribing will please to give their full names, and Post Office and State address, plainly written, and also state at which time they wish their subscriptions to commence, otherwise they will be entered from January 1st, 1875. In case of changing residence state former address, as well as give the new one. No changes can be made unless the former address is given.

VOLUME XXXI., No. 25. [NEW SERIES.] Twenty-ninth Year.

NEW YORK, SATURDAY, DECEMBER 19, 1874.

Contents.

(Illustrated articles are marked with an asterisk.)

Animals as motor powers.....	386	Mica mines in North Carolina.....	385
Answers to correspondents.....	395	Mining, deep.....	391
Apples, curious.....	386	Nitric acid, neutralizing (2).....	386
Architect's studies, an (6).....	385	Noon mark, making (13).....	387
Asphalt pavement (14).....	385	Normal college, N. Y. city.....	387
Barytes green.....	392	Patent decisions, recent.....	394
Blood coloring matter.....	389	Patent Office again, the.....	384
Boiler working pressure (14).....	395	Patent Office, reform needed.....	389
Business and personal.....	395	Patents, American and foreign.....	394
Carbon cells, battery.....	392	Patents, list of Canadian.....	386
Coal, damp air and.....	387	Patents, official list of.....	387
Crystallization of glass.....	386	Phosphoric acid, etc., estimating.....	388
Declination, the sun's (7).....	385	Photographing lace on silk.....	391
Diamond drill, the.....	391	Pole, a course to the (15).....	395
Dredging process, a new.....	387	Reaping by steam.....	388
Earth's sphericity, the (8).....	385	Shafting, how to line.....	388
Electrical countries.....	386	Singeing cloth, machine for.....	386
Electric circuits, open (5).....	385	Sound and moisture (10).....	386
Electricity, wood, charring by.....	393	Spectroscopic art.....	392
Electric railway sig. als.....	390	Spider, ingenuity of a.....	392
Electric shocks (11).....	395	Spike extractor, improved.....	390
Electro-deposition of metals, No. 1.....	383	Spiritualism, investigating.....	385
Electroplating iron (3).....	385	Spring, cars propelled by.....	388
Engines, compound.....	386	Steam and pressure (16).....	386
Experiments, two typical.....	384	Steam, condensation of (15).....	385
Fire engines, floating.....	386	Stucco, improved.....	383
Gastric juice, acid in the.....	392	Sun, constitution of the—No. 1.....	398
Governors, pendulum—No. 1.....	389	Torpedo, the Ericsson pneumatic.....	390
Hymenoclyx undulata, the.....	391	Transplanter, improved.....	380
Iron in stone, fixing.....	391	Typhoid on typhoid.....	388
Iron water pipes.....	388	Underground railway, N. Y.—No. 5.....	387
Laboratory at Oxford, new.....	388	Urine, new compound from.....	392
Lighthouses, our.....	388	Whitworth, Sir Joseph.....	388
Machinists in the navy.....	394	Yarn congress, the.....	391
Magnifying glasses (9).....	395	Yuccas, the.....	391

PUBLISHERS' CARD.

With the next issue, the time for which a large number of our subscribers have prepaid, will expire. In order that our readers may experience no stoppage in the receipt of the journal, and that we may not miscalculate the quantity of the paper to print at the commencement of a new volume, we hope our friends will signify their intention to continue the paper by early remittances.

The plan of discontinuing the paper when the time expires for which it is prepaid, we think preferable to the course, adopted by many publishers, of continuing their paper indefinitely and collecting afterwards. The latter course is too much like having a bill presented for a suit of clothes after it is worn out. We shall be gratified to have every old subscriber renew, and doubly grateful if each will send one or more new names with his own.

The safest way to send money is by postal orders, bank checks, express, or draft on New York, payable to the order of Munn & Co. Little risk is incurred in sending bank bills by mail, but the above methods are safe beyond any contingency.

BINDING.—Subscribers wishing their volumes of the SCIENTIFIC AMERICAN bound can have them neatly done at this office—Price \$1.50.

THE PATENT OFFICE AGAIN.

We last week reviewed some of the errors which had crept into the administration of the Patent Office. We shall now refer to others which are embodied in the statute. Both these classes of errors have sprung mainly from the same source, and are alike prejudicial to the inventor.

The act of July 8, 1870, which was a revision of all our patent laws, corrected or removed some of the defects which previously existed, but it introduced more mischiefs than it cured. Its chief changes interposed needless and unreasonable obstacles in the way of the inventor.

For instance, nothing is more important to him than the right to amend his patent through a reissue. Rarely does a patent, as first obtained, embody the invention in a fully available shape, and often is its real gist mistaken altogether. The common law authorized amendments by means of a surrender and reissue, and the statute regulated and rendered more definite the rights of the patentee in this respect. The great purpose, in both cases, was to limit the new patent to the real original invention, giving the full benefit thereof to the inventor, but nothing more.

To guard against abuse and to prevent a patentee from en-

larging the scope of his patent, or from wringing in a new subject matter through a reissue, the courts have—rather severely—held that oral proof of the full scope of the original invention was inadmissible, and that nothing could be claimed in the reissued patent unless either the model, the drawings, or the specification—as originally filed—showed the invention thereof.

The new law has taken a most indefensible step in farther limitation of a previously existing right, by rendering the most reliable of record evidence wholly incompetent in such cases. The model or drawings may still be called as witnesses, but not the specification. No matter how fully or how clearly the invention may be set forth in the latter, still, in cases where there are drawings, nothing can be claimed in a reissue which is not shown in those drawings or in the model. A credibility is thus given to a *sign* or a *mute device*, which is absurdly denied to a *written declaration*. Pantomime is regarded as more reliable than articulate language. This is all wrong.

Again, it has always been considered a sound and just rule of practice that an application for a patent should be wholly *ex parte*, that no outsider should be allowed in any manner to interfere in the proceeding, and that he should not even know of its existence. The reason for this rule is that, as inventors are generally poor, if wealthy companies were allowed to interpose, such expensive controversies and harassing delays would result as would often prevent the obtaining of a just patent. After having obtained his patent, the inventor will be in a better condition to face his antagonist by securing auxiliaries or otherwise.

The act of 1870 introduces the anomaly that, in all appeals from the Commissioner, he "shall notify all parties who appear to be interested therein." This would enable them to appear and oppose the grant of a patent. The applicant is also required in such cases to be at the extra expense of procuring certified copies of all the original papers and evidence in the case. Whether intentional or otherwise, these provisions would in many cases operate as the denial of undoubted justice. Quite as reprehensible is another provision connected with these appeals. When the act of 1870 was before the committee which framed it, the then Commissioner endeavored to so change the previously existing system as to render a decision by him final, by cutting off appeals to the court. This was, however, so strenuously opposed, by those who sought to protect the interests of inventors, that the committee refused to adopt it. They even went so far in the opposite direction as to determine that—in cases of interferences, where there are antagonist parties either of whom may appeal, and where cases of sufficient importance to be appealed to the Commissioner would generally be certain to be carried to the court—the unsuccessful party, before the Board of Examiners in Chief, might appeal at once to the court, without the useless necessity of an intermediate appeal to the Commissioner. But when the act came to be published, all was found to be so far most unaccountably changed, that in interference cases not only did an appeal still lie to the Commissioner, but his decision was made absolutely final. The appeal to the court was thus cut off in those cases which of all others it is best qualified to decide, while in questions of mere patentability, with which the Commissioner may be presumed to be most conversant, and therefore best qualified to judge, the appeal still lies to the court.

These are given as mere specimens of the mistakes and incongruities in the new law, not as an attempt at their enumeration. There are many others of no trivial importance, most of which equally militate against the interests of inventors. The only effectual remedy is to be sought for in a general change or codification of the statute. And in making this change, the spirit which dictated the provision in the Federal Constitution by which the statute is authorized should never be lost sight of. The law should be framed in aid of the inventor, and not as an instrumentality for circumscribing his rights within their narrowest limits, or for annihilating them altogether. This is a dictate of sound policy as well as of the plainest justice.

There are many unreflecting minds who honestly regard the whole patent system as being founded on error, and who look upon a patentee as the possessor of an odious monopoly. If their notions are correct, the institution of property of all kinds should be abolished, for every kind of property is a monopoly. A patent for an invention is no more so than is a patent for land. But who would build a house, or cultivate a field, or otherwise provide for the comforts or necessities of life, if he were denied all property in the fruits of his labor, in other words, if he were not to enjoy a monopoly in what he had thus created? Civilization could never have existed without the institution of property. It would soon take its departure from the earth if that institution should cease to exist.

These principles are as applicable to inventions as to tangible objects. The application of communist doctrines may sometimes seem enticing, but the general rule would operate as perniciously in the one case as in the other. Deny all property in inventions, and you paralyze the efforts of that class in the community which, more than any other, has contributed and is still contributing to human progress. The thousands of minds who are devoting their every energy to the promotion of human welfare would feel that their chief inducement to effort had ceased to exist.

Monopolies are justly odious when made applicable to what was before common property, but not when limited to the authors of new creations or even new discoveries. The government whose flag is first planted on an uninhabited island is, by common consent, the owner thereof. How much more complete would have been its title thereto had it created that island! Such is the title of the inventor. Under a proper ad-

ministration of a sound patent system, the patentee is only protected in his property to his own discovery, and, more generally, to his own creation. He would be allowed a limited monopoly in what, but for him, might never have existed, or, at all events, was previously unknown.

But we have heard it asserted that the inventor is only entitled to protection in the *machine* he builds, and that any mechanic ought to be equally protected in the work of his own hands, though identical in form and operation with that of the inventor. But in what does a real invention consist? It is not in the materials, nor in the contrivances out of which the machine is constructed. These are the mere instrumentalities which give expression to the thought that lies beyond. They bear the same relation to the real invention that the visible Universe does to its Creator, or that the material body does to the human soul. An invention is a soul or principle, which has found a material means of evincing its existence and character.

That many wrongs have resulted from the defects and abuses of our patent system no one will doubt, but these are certainly not greater than the frauds and crimes which have had their origin in the institution of property in material things. In both cases these evils are infinitely overbalanced by the advantages which result from that institution. Correction, and not annihilation, is the appropriate remedy for these mischiefs.

Our conclusion, therefore, is: *First*, that a well regulated patent system is of incalculable importance to the public welfare; *Secondly*, that the laws on this subject should aim primarily to encourage invention by facilitating the means of obtaining patents and protecting property therein, and: *Thirdly*, that in administering those laws the Office should be actuated by their spirit and purpose, and govern its conduct accordingly. To aid in bringing about these results has been the main purpose of these articles.

TWO TYPICAL EXPERIMENTS.

Dr. Bastian pursues his investigations touching the origin of life with praiseworthy energy. For every objection urged against the conclusiveness of his experiments, he straightway performs a new series to meet the difficulty, carrying the war into the very camp of the panspermists, and keeping them constantly on the defensive. Results formerly denied are now admitted; but they are met by raising the thermal death point of certain germs to 227° or 230° Fah., and alleging that the organisms developed in boiled solutions, hermetically sealed, came from invisible germs not killed by the heat to which the solution had been subjected.

For the benefit of those raising this objection, he now reports the following experiments, selected from several, in some of which, he says, even higher temperatures were resorted to:

Experiment I: To a strong infusion of turnip, made faintly alkaline by *liquor potassæ* a few separate muscular fibers of codfish were added. Some of this mixture was then introduced into a flask of nearly two ounces capacity, and the neck of the flask was drawn out and hermetically sealed by a blow-pipe flame while the fluid within was boiling. Thus closed, the flask was about half full of fluid. It was then placed in an iron digester, and gradually heated to a temperature from 270° to 275° Fah., at which it was kept for twenty minutes. For an entire hour the flask, heating and cooling, had a temperature exceeding 230° Fah., the alleged death point of bacteria germs. Withdrawn from the digester, the closed flask was kept at a temperature of 75° to 80° Fah., for eight weeks, a part of the time exposed to the influence of direct sunlight. After it had been ascertained that the flask was free from any crack or flaw, its neck was broken, and its contents examined. The fluid showed a decidedly acid reaction, and it had a sour though not fetid odor, as though fermentation had taken place. It was also slightly turbid, and there was a well marked sediment, consisting of reddish brown fragments and a light flocculent deposit. On microscopical examination, the fragments were found to be portions of altered muscular fiber; the flocculent deposit was composed for the most part of granular aggregations of *bacteria*. In the portions of fluid and of deposit which were examined, there were thousands of bacteria, of most diverse shapes and sizes, either separated or aggregated into flakes. There were also a large number of moribund chains of various lengths, of a kind very frequently met with in abscesses and other situations (where pyæmia or low typhoid states of the system exist) in the human subject. There were, in addition, a large number of *torula* corpuscles, besides brownish nucleated spore-like bodies, gradually increasing in size from mere specks, about one thirty-thousandth of an inch in diameter, up to one twenty-five-hundredth of an inch. Lastly, there was a small quantity of the mycelium of a fungus, bearing short lateral branches, most of which were capped by a single spore-like body.

Experiment II: A strong infusion of common cress, to which a few of the leaves and stalks of the plant were added, was enclosed in an hermetically closed flask, and treated in precisely the same manner, and at the same time, as the infusion of experiment I. The flask was opened the ninth week after heating. Before breaking the neck of the flask, the inbending of the glass under the blow-pipe flame showed that it was still hermetically sealed. The reaction of the fluid was found to be distinctly acid, though there was no notable odor. The fluid was tolerably clear and free from scum; but there was a dirty-looking flocculent sediment at the bottom of the flask, amongst the *débris* of the cress. On microscopical examination (with a $\frac{1}{2}$ th immersion objective), much altered chlorophyll existed, either dispersed or aggregated among the other granular matter of the sediment; and among some of this, three minute and delicate

protomaba were seen, varying in form, and creeping with moderately rapid, slug-like movements. They contained no nucleus, and presented only a few granules in their interior. In the same drop of fluid, and also in others subsequently examined, more than a dozen very active *monads*, one four-thousandth of an inch in diameter, were seen, each provided with a long rapidly moving lash by which neighboring granules were freely knocked about. There were many smaller motionless and tailless spherules of different sizes, whose body substance presented a similar appearance to that of the monads, of which, in Dr. Bastian's opinion, they were in all probability earlier developmental forms. There were also several unjointed bacteria, presenting most rapid progressive movements, accompanied by quick axial rotations. Many torula corpuscles and other fungus spores, also existed, as well as portions of a mycelial filament, containing equal segments of colorless protoplasm within its thin investing membrane.

Until the panspermists offset these experiments by an exhaustive series, showing that living forms do not originate under the conditions described by Dr. Bastian, there would seem to be but one escape for them, and that is to assert (contrary to all experience) that the temperature of 230° Fah., or even 275° Fah., is lower than the thermal death point of the invisible germs of these simple organisms.

MICA MINES IN NORTH CAROLINA.

Among the most interesting relics thus far discovered of the mysterious race of mound builders, who occupied the Mississippi valley previous to the advent of the more barbarous Indians, are numerous ornaments of mica. Like the weapons of hammered copper from Lake Superior, the shells from the Gulf of Mexico, the implements of Mexican stone and of iron ore from Missouri, these plates, of a mineral not found in the Great Valley, give a plain hint of the extensive commercial relations of those prehistoric people.

The mica was evidently mined in Western North Carolina where their long-abandoned workings have lately been reopened, and made the scene of a very modern enterprise.

Seven years or so ago, a prominent citizen of North Carolina set some laborers to work in one of the ancient mines, in search of silver, supposing that metal to have been the one sought for by the original miners. A considerable quantity of mica was thrown out, but its value was not recognized until a sample, which had been sent to Knoxville as a curiosity, was seen by a Mr. Clapp, who followed up the clue and leased the mine for its mica, and revived an industry which has added immensely to the wealth of the region. The mine is known as Blaylock's, about twelve miles from Bakersville, the county seat of Mitchell's county. Four or five other ancient mines have since been reopened in the same neighborhood, besides many new ones in the same and adjoining counties.

A correspondent of the *Tribune* reports that the mica trade has given general occupation to the population of Mitchell county, and has made money plentiful and thereby enabled the county to pay off its indebtedness, which it would otherwise have been unable to do. Mines have also been opened in Yancy, Heywood, Burcome, McDowell, and other counties. The business is still in its infancy, and the methods of mining are exceedingly primitive; yet the amount of mica produced is more than enough to supply the large and growing demand for the article. Dealers and manufacturers supply the mines with patterns ranging in size from two by three inches up to fifteen inches square, according to which the mica is prepared for market. The dark or brandy-colored mica brings the best price. Associated with the mica is an abundance of decomposed snow-white felspar, which will no doubt be utilized, in time, for the manufacture of porcelain.

TYNDALL ON TYPHOID.

Professor Tyndall has dropped for the nonce the role of physicist for that of physician, and deals, in a recent publication, with the subject of typhoid fever, discussing the important question as to whether that disease can ever have a spontaneous origin from fecal fermentation or must of necessity always spring from a germ, the last derived from a pre-existing case of fever. Following closely the data obtained by Dr. Budd, as well as those of other investigators in the same field, Professor Tyndall asserts positively that the weight of evidence is in favor of the view that the disease, like small pox, arises wholly from contagion. He holds that the body is the seat of the development of the germ, and that the latter is not originated from noxious effluvia, however foul; and in support of this, he cites the fact that, during the foul condition of the Thames in 1858, the community residing upon the banks enjoyed a singular immunity from fever. Even in rural districts, it is asserted that, where the air is purest, typhoid has been known to rage, and to be traceable directly to personal communication.

It would not be expected that so radical a denial of generally accepted views could be promulgated without arousing challenge from the medical profession, and already several of the most eminent English physicians have adduced strong evidence in contradiction of Professor Tyndall's assumptions. Dr. Alfred Carpenter states that typhoid is contagious only in a limited degree, and that by proper precautions its attack may be prevented. Dr. Murchison says that, during nine years, in the London Fever Hospital, 3,555 cases of enteric fever were treated in the same wards with 5,144 patients not suffering from any specific fever. Not one of the latter contracted enteric fever, although the use of disinfectants was exceptional, and they were brought in contact with the excreta of the former class. The same authority gives repeated instances, occurring in his own practice, confirming the opposite of Professor Tyndall's conclusions.

So many cases have occurred, where the existence of typhoid has been traced directly to sewers, foul drains, and similar receptacles of filth, that arguments far more cogent than those of Professor Tyndall will be required to convince us that no danger of pestilence lurks therein. Add to this that it has been repeatedly shown that hospital attendants in personal communication with typhoid patients are remarkably exempt from the disease, and without further review of the great mass of confirmatory evidence brought by medical writers against Tyndall's theory, we cannot but conclude with the *London Medical Journal* that the Professor has in this case, as was charged against him in his recent researches on sound, studied but one side of the question.

It may be well to remark in this connection that Professor Tyndall's most recent efforts are not wholly bearing out the reputation for scientific acuteness and philosophical caution so ably won by him in his earlier labors.

Dr. Lionel Beale—himself a scientist of no inconsiderable celebrity—makes a strong point against Tyndall in a recent communication to the *London Times*, in stating that, though he has followed Tyndall's track for years, he is unable to comprehend Tyndall's course of reasoning. Referring to the latter's Belfast speech, in which the speaker said that the material ideas were not his belief "in hours of clearness and vigor," Dr. Beale rather pertinently suggests the question of which Tyndall we are to believe, Tyndall whose brain, when weak and unhealthy, produces materialistic theories, or Tyndall, when clear and vigorous, repudiating the same ideas? Altogether the eminent Professor has latterly contrived to encircle himself in a kind of fog as to his doings and sayings, which prevents people of ordinary discernment from relying so implicitly on his conclusions as they otherwise might.

HOW TO INVESTIGATE SPIRITUALISM.

There has been lately an extraordinary revival of spiritualism, and it again challenges the general attention. Nearly all the newspapers, and some of the most respected of the literary magazines, without reservation or protest lend their columns to its advocates. The *Daily Graphic* for more than a month has made spiritualism its specialty, pursuing it with such pertinacious enterprise as it did the Atlantic balloon project of last year. And, most significant of all, many distinguished scholars and clergymen, to whom the *Graphic* had addressed a circular letter, inviting their cooperation in an investigation, signify their approval of the *Graphic's* plan and a profoundly respectful appreciation of the spiritualistic pretensions. This revival of spiritualism is probably due to the new phase which the spiritual manifestations have taken on: Materialization. In place of raps, tips, trumpet blowing, tying, levitations, ponderations, etc., performed by or through the medium, we now have the spirits appearing *in propria persona*, with bodies apparently of flesh and blood, and nicely dressed in such clothes as they wore when they dwelt in the mortal coil.

Now these things seem to justify us in recurring to the subject of spiritualism, and in improving the opportunity to point out some things which Science has to do with it. And to make the matter short, we will limit our remarks to the alleged physical phenomena, the movements or changes of matter. We leave out of view, of course, the religious aspects of spiritualism; and for its bearings on psychology and physiology, we refer to what Faraday, Carpenter, Tyndall, and others have written. We point out, however, the evident fact that spiritualism rests on the physical manifestations. Take them away, and its bottom is knocked out pretty clean.

In the first place, then, we can find no words wherewith to adequately express our sense of the magnitude of its importance to Science if it be true. Such words as profound, vast, stupendous, would need to be strengthened a thousandfold to be fitted for such a use. If true, it will become the one grand event of the world's history; it will give an imperishable luster of glory to the nineteenth century. Its discoverer will have no rival in renown, and his name will be written high above any other. For spiritualism involves a stultification of what are considered the most certain and fundamental conclusions of Science. It denies the conservation of matter and force; it demands a reconstruction of our chemistry and physics, and even our mathematics. It professes to create matter and force out of nothing, and to annihilate them when created. If the pretensions of spiritualism have a rational foundation, no more important work has been offered to men of Science than their verification. A realization of the dreams of the *châir vite*, the philosopher's stone, and the perpetual motion is of less importance to mankind than the verification of spiritualism.

But some may say that we exaggerate the pretensions of spiritualism, and that spiritualists, in the ratio of their intelligence, make claims which are modest and moderate; and perhaps the average man says that, although a great part of spiritualism is deception and imposture, yet there is something about it which is new and true. To such we say that if there is any truth in it, of interest to Science, however small, it is worth while to seek for it with great diligence and labor; its discovery will surely bring an abundant reward. If we positively knew that there was contained in spiritualism a scintilla of new fact about matter, though it were as the needle in all the haystacks or as the grain in all the sands of the sea, we would not discourage the ambitious man of Science in his search for it. Mr. Crookes, as the discoverer of thallium, has achieved a great eminence in Science, and he is now nobly employing his talent in the investigation of spiritualism, if he find in it, positively, something new to Science. He does not need to be told that, if he really discovers his psychic force or any other unknown force capable of acting on matter, all the future ages will name him with Galvani and Newton. Finally, say we emphatically, if there be truth in spiritualism, in whole or in any part, let it be investigated. But con-

cerning such investigations, in view of very serious harm which heretofore has often been caused by shallow and superficial dallyings with the subject, we thoughtfully and solemnly advise that no investigation is worthy of the name unless it is inspired by the passionless common sense of Science. Also remember this: The evidence required to establish a fact is proportioned to the improbability of the fact.

We come now to what with many readers will be reckoned the gist of the whole matter: How to investigate spiritualism. We name the plan which we are to propose, the scientific method of investigating spiritualism, and we thus name it, while feeling the most exalted respect for Science and knowing that some will discover in it only what they call horse sense.

These two theories, and these only, are tenable regarding most of the spiritual manifestations: They are real, and true, and honest, or they are a culpable fraud. The mediums in these cases are either the most worship-worthy of mortals, or they are cheats and liars. The raps and the materialization, the first and the last of the spirit exhibits, are surely of the sort in question. (And here we venture to suggest that if we take away from spiritualism all the alleged phenomena which belong to the same category, almost nothing is left.) Concerning raps and materializations, there is a question of fraud or no fraud; and this is a question of such a fundamental character that the answer to it is conclusive of the whole matter. It may seem to some that the case ought to be referred to the police detective rather than to the man of Science; and we are obliged to confess that a detective's advice may be as good as ours. The methods of Science are direct, logical, and on the shortest path to the truth; the man of Science always aims at the bull's eye. The method of the skilled and intelligent detective is, without doubt, identical with the scientific. Cases somewhat similar to that of the fraud or no fraud of raps and materializations have often come up for decision; an allusion to some of these throws a clear light on the present discussion. Our ancestors believed in ghosts, and they fired stones and bullets to test their faith. The proceeding was scientific, but suited only to an age ruder than ours. We warn the over-zealous scientist that, although a bullet could not harm a materialized spirit, no medium or his confederate is bullet-proof. An action for murder or manslaughter would probably lie in a case wherein any one was killed in a scientific investigation of materialization. The well known story of Fulton investigating the motive power of a perpetual motion by means of a hatchet is a fine illustration of the application of the principles of Science. Lamp-black, printer's ink, and green paint have been slyly smeared on the trumpets, ropes, etc., of the dark *séance*, and the truth was speedily declared in the unconscious ornamentation of the medium's lips or hands. And, best of all, strong lights have been turned on to the supposed spirits performing tomfooleries, and it was instantly manifest whether they were genuine or not. In all these cases it was a touch and a go, and the truth declared itself beyond any man's cavil. Devices which were so simple, and yet so sufficient, were surely scientific, and they indicate, and perhaps sufficiently describe, our notion of scientific investigation of one class of spiritual manifestations. But we add a few hints especially touching the investigation of materializations. Let the tests be applied directly, if possible, to the materialized spirit, with the intent to determine who or what it is. A dark lantern, or some other appliance for turning on light, is likely to be useful. A lasso would be very serviceable in the hands of one skilled in its use; it is said the Mexicans can lasso anything that runs or stands. A little squirt gun loaded with a few ounces of ink, or even the boy's blow-gun charged with Scotch snuff, might be available in eliciting truth where more pretentious instruments would fail. If the investigator, from doubts of his skill or other reasons, prefers to discard all the apparatus and appliances of art, let him, in the non-resisting spirit of a Quaker and in the name of Science, suddenly lay a strong and firm hand on the dress or the body of the spirit, and hang on like a Tartar till the whole truth comes to relieve him.

We repeat: Our scientific plan is simple, direct, conclusive. We commend it to Mr. Crookes and Colonel Olcott, and especially to all those who are in the road which leads to a faith which has lost its senses and is idiotic. To us, the Eddy materializations are supremely puerile and silly; they cannot appear differently until a scientific demonstration has shown that they are not the chicanes of the practised and disreputable Eddy family. But the peace of society is disturbed, and something must be done for quiet, or many good friends will get to Bedlam. We earnestly hope that a scientific investigation of materialization will be made speedily; the investigator will receive our most cordial thanks. We have no hope of any good to come out of the class of spiritual manifestations which we have been considering. It is a notable fact that investigations so far have elicited absolutely nothing which was of moment to physical Science. Spiritualism has furnished striking illustrations to the expounders of mental pathology, but to the humanitarian it has seemed a terrible epidemic. In future times, it will probably be considered the blot and the shame of the nineteenth century.

AMERICAN apples, says the *London Grocer*, are now selling at moderate rates in provincial towns, both in England and Ireland. The highly colored and well flavored Baldwin is the commonest kind as yet. As usual, they come in barrels, without any kind of packing materials, and come, as a rule, in excellent condition. That apples should be sent several thousand miles, and then be sold as cheaply as home-grown fruit, is a noteworthy fact. At this rate of progress, fruitless and cold regions will soon be supplied with the finest fruits at a cost that places them within the reach of all classes.