of the summer, one and all were humbled with the consciousness of the insignficance of manand the goodness of the Incomprehensible in granting us these glimpses of this wonderful glory!

State University of Iowa, April, 1894.

Highly Sensitive Collodion Emulsion.

The publication of Dr. Hill Norris' process for the production of a highly sensitive collodion emulsion induced Dr. David, of Paris, to test the three methods described in the patent. He could not obtain a satisfactory result, but by making some alterations he has succeeded in preparing a bromide of silver collodion emulsion, the sensitiveness of which increases gradually to 22 or 23 degrees Warnerke.

The method adopted is as follows: Upon a horizontally adjusted glass plate, size 18×24 cm., are poured 25 c.c. of collodion, which contains per liter 18 grammes of silver nitrate and 7 to 8 grammes of pyroxyline. After the film has coagulated sufficiently, it is changed to a bromide of silver film by treatment with the following bath:

Potassium bromide	80 to 120	grammes
Potassium iodide	0·01	gramme
Gelatine	2	grammes
Distilled water	1,000	c.c.

A completely opaque film must be obtained. It is sensitized by leaving the plate for a longer or shorter time in the following:

Potassium bromide	18 to 25 grammes
Gelatine	1 gramme
Distilled water	1,000 c.c.

The sensitiveness increases with the duration of action and the temperature of this bath. At a temperature of 70° to 75° Cent., the time of action must be about two hours; at 90° to 95°, about one hour.

Upon looking through the film, it will be observed that the grain becomes gradually larger until the granularity is distinctly visible to the eye. Accompanying this increase in the size of the grain is an increase in the sensitiveness of the film.

After the plate has reached the desired stage, it is washed and dried. Contrary to what might be expected, the collodion film does not exhibit the slightest tendency to leave the plate at a temperature of 100° Cent., provided that the surface of the plate has been thoroughly cleansed.

Plates prepared in this way can be developed very quickly, washed and fixed. The negative is ready for printing in ten minutes. Varnishing is unnecessary, as the collodion film is very hard.—*Photographisches Archiv.*

The United States Navy vs. the British Navy in 1812.

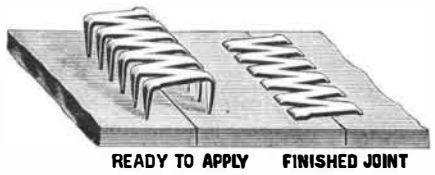
The following, from the New York *Sun*, occurs in the course of an able review of the first volume of "A History of the United States Navy from 1775 to 1893," recently published by the Appletons. The narrative is by Mr. Edgar Stanton Maclay, and the technical revisiou of the text by Lieut. Roy C. Smith, U.S.N. The book sets forth our naval annals from the outbreak of the revolutionary war up to the beginning of the last year of the war of 1812, the continuation of the history down to the present day being reserved for a second volume.

"It was pre-eminently in the war of 1812 that the pride of England in her navy was brought low. To appreciate the outcome of this contest, one must keep in view a comparison of the two navies, which will be found on page 319 of the book before us. At the outset of the war Great Britain had 1,048 ships, possessing an aggregate capacity of 860,990 tons, and carrying 27,800 guns, with 151,572 men and officers. At the same juncture the United States had but 17 ships, with a total tonnage of 15,300, and carrying only 442 guns, and but 5,025 officers and men. Yet, at the end of the struggle, which lasted but about two and a half years, the little American navy, assisted by privateers, had for the time practically swept the British mercantile marine from the high seas and captured over fifteen hundred vessels, on board of which were more than twenty thousand British seamen. It was not so much, however, the number of merchant vessels lost, great as this was, which affected the British public mind. It was the fact that in duels between warships of nearly equal force the English were generally beaten. In eighteen engagements with the Americans the British navy sustained fifteen defeats, and this just after England had successfully matched her sea power against the combined strength of all the other great maritime nations of the world. At the beginning of the war of 1812 the British navy had reached the apex of renown. Mr. Maclay points out that in two hundred actions between single ships it had been defeated but five times, and on those occasions the English ship was admitted to have been of inferior force. The complete reversal of results which followed a trial of strength and skill with the Americans produced in Englishmen a kind of stupor. The London *Times*, when it heard of the capture of the first English ship of war, said: 'The loss of a single frigate by us, it is true, is but a small one; when viewed as a part of the British navy it is almost nothing; yet under all the circumstances of the two countries to which the vessels belonged, we know not any calamity of twenty times its proportions that might have been attended with more serious consequences to the worsted party.' When the report of the loss of a second British frigate reached the *Times*, it exclaimed: 'In the name of God, what was done with this immense superiority of force? Oh, what a charm is hereby dissolved! The land spell of the French is broken [at Moscow], and so is our sea spell!' Mr. Maclay sums up the effect of the disasters suffered in the war of 1812 upon intelligent Englishmen in the well-founded assertion that in those defeats they foresaw the eventual subversion of their naval supremacy, and they well knew that, if that were lost, nothing could avert the reduction of Great Britain to one of the least important of European powers."

THE BRISTOL CO.'S PATENT STEEL BELT LACING.

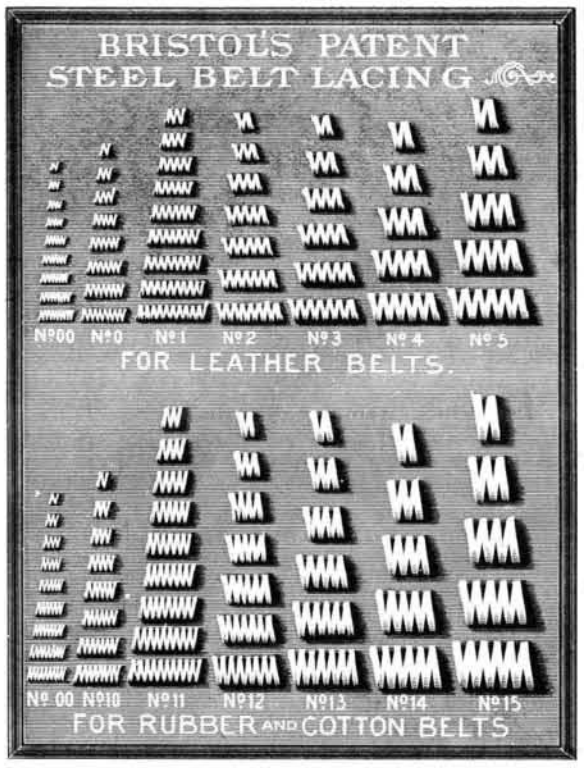
Five years ago the Bristol Company, of Waterbury, Conn., began the manufacture of their patent steel belt lacing, illustrated herewith.

At that time only one size, for ordinary single leather



READY TO APPLY FINISHED JOINT

belts, was produced, but encouraged by the success attained, which is principally attributed to the genuine merits of the steel lacing itself, the company have developed their machinery and improved their methods of manufacture, so that now they are able to announce



a complete line of one hundred different sizes (as shown in the larger view), suited to all kinds, widths and thicknesses of belting. As a result of improved processes of manufacture, prices have also been reduced. The lacing is made of the toughest cold-rolled steel, cut into a continuous zigzag form, and so proportioned as to give maximum strength with a minimum amount of material. The wedge-shaped points, when driven through the belt, force the fibers aside so as not to cut them; hence the ends of the belt are not weakened as when holes are punched. The lacing makes a smooth and elastic joint and is easily and quickly applied without any special tools, the spurs being driven through upon a piece of soft wood, after the ends of the belt to be joined have been brought evenly together. The belt is then turned over upon the pulley or any convenient piece of iron and the spurs clinched, bending them toward the joint. The lacings are furnished in lengths varying from one to three inches (No. 1 by quarter inches), it being always possible from a box of assorted lengths to find two or more pieces of lacing which, together, may be used for a belt wider than three inches. For rubber, cotton, and woven belts the space between the spurs is a trifle greater than in the corresponding sizes designed for leather belts. Thus a better grip is obtained on the fibrous ends of such belts. The lacing was exhibited at the World's Columbian Exhibition by the Bristol Company, and was awarded medal and diploma.

Effect of Yellow Light on Diamonds.

Some diamond merchants on Maiden Lane, New York, have complained to the owner of a building opposite to them because he has painted it bright yellow, and when the sun shines yellow is reflected into their store. They say the yellow light falling upon their show windows spoils their trade by making the diamonds look yellow, and therefore cheap; whereas the stones are in reality pure white, of the highest grade. The owner refuses to have the color of his building changed although the diamond merchants have offered to do it at their own expense. We suggest that the effect of the reflected yellow rays could be neutralized by placing the diamonds in glass cases slightly tinted with blue; or by a thin varnish of a blue tint, applied to the show windows.

Official Trial of H. M. S. Hornet.

On the 19th of March the official trial of H. M. S. torpedo catcher Hornet took place in the Estuary of the Thames, with the following admirable results. The propellers are 6 feet 4 inches in diameter. There was calm weather and high water. Steam is supplied by Yarrow water tube boilers; the power exerted was approximately 4,000 horse power. The Havock has locomotive boilers and gives 3,500 horse power; the difference in power is very nearly in direct proportion to the cubes of the speed of the two boats, but the air pressure for the Havock was 3 inches; for the Hornet, 1½ inches.

Time of day.	Revol. Star.	Revol. Port.	Time.	Speed.	Means.	2d Means.	
10·28	395·9	395·4	2m. 17·6s.	26·163	27·322		
10·34	394·4	396·8	2m. 6·4s.	28·481	27·418	27·370	27·313
10·43	394·7	392·2	2m. 16·6s.	26·355	27·373	27·395	
10·52	391·3	392·7	2m. 6·8s.	28·391	27·239	27·306	
11·02	390·0	391·7	2m. 18·0s.	26·087	27·128	27·183	
11·10	394·3	394·3	2m. 7·8s.	28·169			

Steam in boiler vacuum 26 inches.

The three hours' trial commenced at the "Chapman" lighthouse and ended below the "Sunk" lightship. The average speed for the whole time was found to be 27·628 knots per hour, or 31·8 miles an hour. After this circles at full speed were turned to starboard and port, and generally all the usual tests of machinery and ship, all of which were found to be perfectly satisfactory. At full speed and at slower speeds practically no vibration was felt. There was no heating of any parts of the engines, and the boilers made ample steam with a mean air pressure of 1·5 inch.

The Admiralty authorities expressed themselves as highly pleased with the result in every respect.

Embossing Wood.

Carving wood is too costly a process for this age and country. People like it and want it on their furniture and inside finish, but most of them are not willing to pay for it what it costs. It requires a natural turn and a long practice to make a skillful wood carver, and consequently many devices have been resorted to to secure the same appearance by cheaper methods. The most common of these is to press the figures into the grain of the wood with a hot metal die. One of the latest machines for doing this kind of embossed "carving" was on exhibition in Machinery Hall annex of the World's Fair, and is an ingenious machine and does rapid work. Patterns are cut on a hollow brass cylinder which is heated by gas jets from the inside and the wood passed under it under a pressure of several thousand pounds to the inch in width. At first the work appears very pretty, but it will not stand the test of time. In the course of time the part of wood pressed into the grain will rise to nearly or quite its original position and, in large figured patterns, unevenly, making a very rough and rotten looking figure, that is more of a blemish than a thing of beauty. Another plan is to dress the board down to a level with the embossed figure and then by steaming to raise the pressed parts to their original height to imitate relievo carving. None of these processes are "carving," nor will the work retain its form like hand carving. However, it may suit people who must have their furniture and house finish carved and are not able or willing to pay for the genuine article, but it would be better taste, perhaps, to take it plain rather than to have alleged carving that will not last long and look well all the time.—*Tradesman.*

The Fourth Dimension.

In an address before the New York Mathematical Society on "Modern Mathematical Thought," Professor Simon Newcomb is reported as saying: "As in space of two dimensions one line can be drawn perpendicular to another at a given point, and by adding another dimension to space a third line can be drawn perpendicular to these two; so in a fourth dimension we can draw a line which shall be perpendicular to all three. True, we cannot imagine how the line would look, or where it would be placed, but this merely because of the limitations of our faculties. As a surface describes a solid by continually leaving the space in which it lies at the moment, so a four-dimensional solid will be generated by a three-dimensional one by a continuous motion which shall constantly be directed outside of this three-dimensional space in which our universe appears to exist. As the man confined in a circle can evade it by stepping over it, so the mathematician, if placed inside a sphere, in four-dimensional space, would simply step over it as easily as we should over a circle drawn on the floor."

The Founder of the First Scientific Journal.

BY M. JACQUES BOYER.

When recently the statue of Theophrast Renaudot, the founder of French political journalism, was unveiled, the literary and scientific journals were alike full of praises of him and his work; but none of them recollected another pioneer in his field, the modest and profoundly erudite Denis de Sallo, the founder of the *Journal des Scavants*, who did for letters and science what Renaudot so successfully accomplished for politics.

Without undertaking a full sketch of the history of the French scientific press, I desire only to show here how new in 1665 was that idea, which seems so simple and natural now, of the creation of a scientific journal; how many impediments were raised against its creator by the commonplace authors whom the new tribunal condemned without appeal; what patience, what erudition, what a prodigious sum of labor were required from its founders to surmount all the obstacles, avoid all the perils they met every day, and give their work a vitality strong enough to permit it, rising repeatedly from its ashes, to perpetuate itself till our time.

Denis de Sallo, Seigneur de la Coudray, was born in Paris in 1626, of an old noble family of Poitou. His lessons in early childhood were not brilliant; but after he entered the courses of rhetoric at the College des Grassins he obtained all the prizes of his class; became in the next year a distinguished pupil in philosophy, and having sustained in public remarkable theses in Latin and Greek, gave himself up with ardor to the study of law. His advance was so rapid that he was able, in 1652, to succeed his father, Jacques de Sallo, in his office as counselor at the Parliament of Paris. Three years later he married Elizabeth Menardeau, daughter of a counselor in the Grand Chamber, by whom he had one son and four daughters. He died on the 14th of May, 1669, of apoplexy. His death, according to Vigneuil Marville, was caused by the loss of all his fortune in gambling in 1665; but, besides that this story has little probability in view of the character of De Sallo, who was industrious through all his life, it is controverted by a letter of Guy Patin's of the 13th of November, 1665, which proves that at that time De Sallo had no thought of dying, and by the testimony of Pere Honore de Sainte Marie, who agrees with Moreri in placing his death in 1669 and not in 1665.

Having given an outline of the principal events of De Sallo's life, which was otherwise quiet enough, we pass to the study of his character and work. "He read all sorts of books," says Moreri, "with incredible care, and kept secretaries continually employed to write down his reflections and the passages which he marked, so that by this plan of studying he fitted himself to compose treatises on every kind of subject, as he showed on several occasions."

It was probably the considerable quantity of material that he collected in this way that suggested to him the thought of giving the public those extracts the utility of which he had recognized in his experiences. He associated with himself in the execution of this work, which was colossal for that time, a number of men of science and letters: De Bourzeis, a distinguished theologian; De Gemberville, chaplain, the famous author of La Pucelle; and the Abbe Gaulois, who, according to Fontenelle, seemed "born for that work;" but De Sallo revised all the articles—not very numerous—which his colaborers furnished, and himself wrote the largest number.

The authorization having been obtained, the support of Colbert assured and the plan and periods of publication fixed, the *Journal des Scavants* appeared on Monday, January 3, 1665, in a sheet and a half quarto, under the pen signature of Hedouville;* and it continued to appear every Monday till the 30th of March of the same year, when the authorization was withdrawn. Although its criticisms were always moderate and just, it had made many enemies among men of letters, and among the Jesuits, then all-powerful, "who were not pleased to see a literary and philosophical tribunal that was not set up by them, and who, moreover, detested De Sallo and his friends as Parliamentarians and Gallicans suspected of Jansenism; these added their complaints to the cries of wounded self-love. They secured the aid of the papal nuncio, and he obtained a prohibition against De Sallo's continuing the publication." The pretext alleged for this act was a passage in the *Journal* in which De Sallo criticised a decree of the Inquisitors, "whose delicate ears required so great circumspection."

Colbert, however, still retained a friendship for his client, recompensed him for the suppression of his journal with an office in the treasury, and, realizing the full value of De Sallo's work, commissioned the Abbe Gaulois to continue it. The *Journal* reappeared on the 4th of January, 1666, and was henceforth illustrated ;† but Abbe Gaulois, who held the direction of the paper for nine years, published it very irregularly; thus there was only one number in 1670 and none in 1673.

In 1675 the *Journal* passed into the hands of Abbe La Roque, who exhibited in his work a punctuality worthy of praise, but was far from knowing as much of science as his predecessor; then in 1686 Chancellor Boucherat, who declared himself its protector, intrusted its direction to President Cousin. Finally in 1701 the *Journal* was acquired for the state by Chancellor De Pontchartrain, who gave the preparation of the numbers no longer to one man, but to a company of students, consisting of Dupin, Rassicad, Andry, Fontenelle, and Vertot, with Julien Pouchard as director. Thus renewed, supported by Abbe Bignon, nephew of the chancellor, the *Journal des Scavants* appeared again on the 2d day of January, 1702, and its history till 1792, when political events compelled its suspension again, offered the single noteworthy feature that its period of publication was changed in 1764, and from a weekly it became a monthly, with supplements every six months.*

Sylvestre de Sacy tried to resuscitate the *Journal* in 1796; but his attempt was abandoned after the publication of twelve numbers, from the 16th of nivose to the 30th of prairial of the year V. It was re-established September 1, 1816, on the proposition of Barbe Marbois, Keeper of the Seals, and Dambray, Chancellor, on a report of the historian Guizot, then general secretary to the Minister of Justice, and has not been suspended since. The presidency of the editorial committee appertained to the Keeper of the Seals from that time till the imperial decree of May 4, 1857, by which it was transferred to the Minister of Public Instruction, under whose auspices the *Journal* is still published.

Such has been the checkered career of the first French scientific journal—a career that demonstrates, better than any eulogy can, that the work of De Sallo possessed the qualities of merit and utility which make intellectual work fruitful and durable.

The detailed history of the *Journal des Scavants* may be found in Hatin, "Histoire politique et litteraire de la presse en France," 1859, vol. ii., p. 151, and those following; and in the "Memoire historique sur le Journal des Scavans," in the table of the *Journal*, by the Abbe de Claustre, 1764, vol. x., 595 and following pages.—*Popular Science Monthly; Revue Scientifique.*

* The name of one of his servants.

† As a specimen of the illustrations, we mention a superb engraving representing a louse as seen under the microscope; it measures not less than forty or fifty centimeters (year 1666, page 292 of the reprint of 1729). This reprint is a nearly textual reproduction of the original edition, which is now very rare. It is well to remark here that the *Journal des Scavants*, like all similar journals of the seventeenth and eighteenth centuries that were successful, was reprinted as the numbers were exhausted; thus in the set that I have consulted at the library of the Arsenal, the year 1665 is of 1733, and the year 1666 of 1729, while the year 1676 was reprinted in 1717. Hence it is almost impossible to find two collections of the sets exactly alike. If we add to this that the publisher has sometimes intercalated notes in the reprints without indicating that they were not in the original edition, and that some of the series have been counterfeited in Holland, one may have some idea of the difficulty of the investigation and of the lamentable differences of the editions.

* There were also supplementary volumes for each of the years 1707, 1708, and 1709, and in 1773 only the five numbers of the first five months were published.

Longevity of Life.

Longevity of life will always be an interesting subject upon which to think and write. When we read of a "hale, hearty old man" taking a European trip in his 89th year, there are very few of us who would not go far out of our way to learn the secret of living to such an age, and at the same time of retaining possession of every faculty. Who can but admire William E. Gladstone managing the political affairs of one of the greatest nations of the earth at his great age—over 80—and David Dudley Field, who is enjoying his tour in Italy with all the enthusiasm of a young traveler, in his 89th year? Of course these men are exceptions to the general rule, but we all are anxious to gain every idea pertaining to the lengthening of one's life. At a recent meeting of the New York Academy of Medicine, some of the specific and relative values of the important factors of longevity were discussed. In the last issue of the *Medical Review* are two paragraphs that are interesting and touch particularly on this point:

MANNER OF LIVING.

"The man who was careful, considerate, and moderate in the exercise of all his faculties, whether animal or intellectual, was one who would last longer than the man who over-indulged in any one of the numerous things which go to make up life. The men who broke down and died prematurely were usually those who had not lived temperately. It was often said that men worked themselves to death, yet the more he observed people, the more did he become convinced of the correctness of the Western editor's assertion that men do not die of overwork, but rather of what they take between work. He thought it would be found that what killed men was not work, but what they did outside of their work; yet he did not believe in total abstinence in any sense. There was no law, with regard to eating and drinking and manner of living, which could be laid down as applicable to all individuals. Each person must find out the law which applied to himself and obey it. Each person could usually discover what agreed and what disagreed with him, and if longevity was sought after, he would have to avoid the things which evidently disagreed with him and seek the things which did agree with him."

EXTERNAL INDICATIONS.

"There are certain external indications which would give a fair idea of long and short life. It was not in one trait, but in the entire make-up of the individual who stood before the examiner. There were the color, the motions, the measurements, including size of head, which was one of the most certain indications of long or short life, for in the brain lay the great center of power. A person with a head whose diameter at the thin portion of the temporal bones measured five and a half to six inches was almost sure to give a longevity on the father's side of seventy to ninety years or over. If the head measured in front from the external auditory canal to the naso-frontal suture as much as four and three-fourths or five inches, we might be almost sure of long life on the maternal side. A beard which was darker or redder than the hair indicated inheritance from the paternal side; if it were lighter than the hair, the inheritance was probably from the maternal side. The length of the chest, its proportion to the circumference, to the height of the individual, and other measurements, were important."

There is a common belief, when any organ of the human body becomes weakened or debilitated from any disturbance, that it required rest to regain its lost strength. In reading over an editorial in the New York *Medical Times* this popular idea is certainly overthrown in the present instance. It states that Sir Andrew Clark, that distinguished doctor, was given up to die from consumption, and yet, notwithstanding his hard work, his health became so firmly established that he outlived many of his contemporaries and gained a reputation exceeded by none in his profession. The *Times* states that the solution of this problem is simple, and should serve as an example to those who are constantly breaking down and have often to leave work for weeks or months to recuperate. In a clinical lecture in the London Hospital, Dr. Clark gives a very excellent prescription for health.

"Labor," he says, "is the life of life. And especially is it the life of life to the delicate. And when any organ is sick it is then truer than in health that even in sickness and delicacy it is better for the organ to do what work of its own it can, provided it can do it without injury. And from a considerable experience of tuberculous pulmonary disease, I can say with perfect confidence that those who have done the best have usually been those who have occupied themselves the most. I never knew my own parents. They both died of phthisis. At the age of twenty-one I myself went to Madeira to die of phthisis. But I did not die, and on coming back, I had the good luck to get into this great hospital, and in those days they were not very well pleased to have the Scotchmen coming to London to occupy such appointments. The members of the staff had heard that I had tubercle, and they wagered 100 to 1 that I would only have the appointment six months at most. The reason given for that was that I did not eat and worked too hard. I got the appointment. Thirty-eight or thirty-nine years have gone since that time, and all the other doctors are gone. Only I am left here on the staff—an old gentleman—not dead yet."

Labor is life, but "worry is killing. It is bad management that kills people. Nature will let no man overwork himself unless he plays her false—takes stimulants at irregular times, smokes too much, or takes opium. If he is regular and obeys the laws of health and walks in the way of physiological righteousness, nature will never allow him or any other person to work too much. I have never yet seen a case of breaking down from mere overwork alone; but I admit that it is necessary above all things to cultivate tranquillity of mind. Try to help your patients to exercise their wills in regard to this—for will counts for something in securing tranquillity—to accept things as they are, and not to bother about yesterday, which is gone forever; not to bother about to-morrow, which is not theirs; but to take the present day and make the best of it. Those affectionate women who will continually peer into what lies beyond never have any present life at all—they are always grizzling over the past or prying into the future, and this blessed to-day, which is all that we are sure of, they never have."—*Charlotte Medical Journal.*

Subterranean London.

It gives an impressive idea what subterranean London is fast becoming, says the *Daily News*, to learn that on emerging from the river the new City and Waterloo line will, in its passage up Queen Victoria Street, run for a part of the way underneath the low level main sewer, which in its turn runs along beneath the District Underground Railway. So that at this point in the City we shall have first a busy main thoroughfare, below that a steam railway, then a huge metropolitan sewer, then an electric railway, reaching its terminus at a depth of about 63 feet below the streets, and here it will communicate with another line—the Central London—which will lie at a depth of 80 feet.