

**PROCEEDINGS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.**

We give, below, brief abstracts of the papers read at the meeting of the above named society, recently held at Buffalo, N. Y.

Professor Burt G. Wilder, in a paper entitled

**NOTES ON NORTH AMERICAN GANONIDS,**

called attention to two pairs of serrated cartilaginous appendages of skin on each side of the hyoid arch of the mud fish. These are too flexible to serve as offensive weapons; and as their function is not known, it was suggested that they be studied in the young fish. Dr. Newberry, in the discussion following the reading of the paper, considered that the parts were remnants of an armor fully developed in the progenitors of the species.

Professor Thomas Meehan took positive ground in an essay on the

**FERTILIZATION OF FLOWERS,**

against the theory that plants, as a general thing, abhor close breeding, and that all flowers with color, fragrance, and sweet odors can only be fertilized by insect agency. He stated that the flowers of the black cap and other raspberries, which have neither color nor fragrance, are remarkably attractive to insects: and yet the flowers produce raspberries just as well under gauze bags, when the insects are excluded. He summed up his conclusions in the following propositions: First. Cross fertilization by insect agency exists, but not nearly to the extent claimed for it. Second. Where it does exist, there is no evidence that it is of any material benefit to the race. Third. Difficulties in self-fertilization result from physiological disturbances that have no relation to the general welfare of plants as species.

Some interesting observations on the effects of temperature in changing the

**INDEX OF REFRACTION IN SPECTROSCOPE PRISMS**

were made by Professor T. C. Mendenhall. From experiments made with glass heated as high as 392° Fah., it was found that the change of the index of refraction in glass for 9° Fah. is 0.00003. This affords a new scale of comparison in cases where there are differences of temperature to be considered.

Professor C. A. Young described

**A NEW ARRANGEMENT OF THE SPECTROSCOPE**

for obtaining lines more conveniently separated, and thus facilitating observations of the velocity of the movements of heavenly bodies through the displacement of said lines. Having calculated the scale which this new arrangement required, he applied it to observations of the comparative speed of the sides of the sun, one of which is of course approaching us, while the other recedes, because of its revolution on its axis. These observations give an average for the motion of 123 miles per second. Calculation would give by mere theory this motion as 103; but the difference by spectroscopy is within the limits of error of observation.

Professor A. W. Wright added a note, giving the results of further investigation into the nature of the

**ZODIACAL LIGHT.**

Careful researches on his part had shown that the zodiacal spectrum varied but little, if at all, from the solar spectrum except in length, that difference being due to the fact that the former was a faint light. The line 577, which a previous observer had found in the zodiacal light, Professor Wright thought was due to an aurora present at the time of observation. The conclusion was that the zodiacal light must be that of the sun, probably reflected from numerous small meteoric bodies, revolving around that luminary.

**THE FLYING LIZARDS OF AMERICA**

was a brief essay by Professor O. C. Marsh, giving a description of the principal characteristics of American pterodactyls. The animal is only known through the labors of geologists.

It was found from the American specimens that there has been a misunderstanding about the pelvis of the animal. The ischia are found firmly coossified on the medial line, and the pelvis differs in other particulars from what had been supposed. The American specimens give a clear idea, such as was not previously attained, of the hind feet of the animal. The lower end of the tibia has a pulley-like articulation, similar to the bones of a bird. There are also at least two separate tarsal bones. There is also this remarkable circumstance. In the geological horizon where the pterodactyls are found in this country, all the birds discovered have teeth, and hence are unlike all other birds: while pterodactyls are found having no teeth, and hence unlike all other pterodactyls.

Professor S. W. Garman, of the Museum of Comparative Anatomy, at Cambridge, Mass., read a paper on the

**COLORS OF ANIMALS.**

Despite the popular notion that the chameleon and other animals can change their color at will, he says there is a want of scientific evidence in favor of the belief. Drawing up for consideration a schedule of animals in two groups of comparative brilliance and paleness, we find that light or darkness of habitat determine the colors as a whole. The amount of light in their surroundings is in inverse relation to the brilliance of color. The dark colors are found in forests and on dark soils; the light colors on plains and snow. The bleaching process applies to the lower surface, to the ventral portions of animals by reflection. In the water the same is true, the rivers with muddy bottoms being peopled by dark forms; the brilliant colors are found in hot and sunny waters or transparent lakes. This was shown in a great variety of instances.

**Naval Items.**

It is the intention of the navy department to put the steamers Alliance and Ranger in commission. The Alliance is of the same class as the Adams, which made such successful runs over the measured mile at League Island on August 14, the average speed for four runs being 11.3 knots, with 63.04 revolutions of the screw, developing 882 horse power. Better results would have been obtained had there been a greater depth of water on the course. On returning to her anchorage after completing the trial, she passed through 7 1/2 fathoms of water, when the revolutions, with the same pressure of steam and same cut-off, increased to 68 1/2, which would have given 11.6 knots.

**NAVAL ENGINEER CORPS GAZETTE.**

Passed Assistant Engineer L. R. Harvey detached from the United States steamer Pensacola, and to wait orders at San Francisco, Cal.

Passed Assistant Engineer J. F. Bingham detached from the Mare Island navy yard and ordered to the Pensacola.

Assistant Engineer W. H. Platt ordered to report for examination, preliminary to promotion.

**Better Times at Hand.**

On every side, evidences of a better state of business feeling prevails. Our merchants are confident of a good fall trade, and the fear that the coming winter will be an exceptionally severe one on our working people is being dispelled by many stable signs of brisk trade this autumn. Even in New England, where the business depression has been most disastrously felt, quite a number of large mills, silent for many months past, are starting into action and on full time, for the fall and winter. In our State, says the Philadelphia *Inquirer*, some of the furnaces, mills, and factories, shut up for over a year, have been reopened, and work has been or will be resumed very shortly. The reason of this is that prices have touched their lowest point and show signs of improvement. Stocks of goods have been reduced to the bare boards, or very near them; the products of the country have been unprecedented; and there is at last some encouragement to resume traffic with a prospect of profit, for that is the great business magnet. If our merchants and manufacturers can now resurrect the old-time commercial confidence, we may look for the dawn of better times very soon.

**Tasteful Steel Plate Engraving.**

We rarely seen more tasteful and novel designs for business cards, checks, letter headings, and similar work on steel than those produced by Messrs. John A. Lowell & Co., of Boston, Mass. By means of finely ruled lines, enclosed in simple yet handsome shields and like figures, effects of great beauty are produced at moderate cost. To manufacturers, bankers, merchants, and indeed all who take pride in handsome bill heads, checks, bonds, and stock and society certificates, we can recommend the artistic productions of the above firm.

**NEW BOOKS AND PUBLICATIONS.**

**THE COMPLETE PRACTICAL MACHINIST**, embracing Lathe Work, Vise Work, Drills and Drilling, Taps and Dies, Hardening and Tempering, the Making and Use of Tools, etc. Illustrated by 130 Engravings. By Joshua Rose. Sent free by mail on receipt of price, \$2.50. Philadelphia, Pa.: Henry Carey Baird & Co., 810 Walnut street.

We have given to our readers so much practical information, on all branches of the art of producing the finest mechanical work in the most economical manner, from the pen of the author of this book, that any commendation here bestowed by us on the work would seem like egotism. The tens of thousands of skilled operatives who read these pages look regularly for some fresh instruction in manipulating tools, some new method of working out a mechanical idea, in our chapters on "Practical Mechanism;" and they are, we know well, seldom disappointed in their search. Mr. Rose justly says in his preface that the education of the machinist has not received its proper share of attention at the hands of authors who have written on mechanical subjects; and he has labored faithfully and skillfully to remedy this defect, and has produced a volume of condensed instruction, extracted from long experience in many countries, which could only be written by an engineer and mechanic of the highest skill, endowed with unusual facility in explaining and illustrating his meaning.

**FILTH DISEASES AND THEIR PREVENTION.** By John Simon, M. D., F. R. C. S., Chief Medical Officer of the Privy Council and of the Local Government Board of Great Britain. Price \$1. Boston, Mass.: James Campbell, Publisher.

Mr. Simon's labors in the etiology of disease have been for many years regarded as the master work in sanitary science; and his reports are matters of worldwide importance, illustrating the causes and development of all the preventible diseases, which do not vary in different localities. His skill in investigation is worthily supplemented by a clear, concise, and methodical mode of explaining his views; and the thoroughness with which all his work is done gives it the highest value. The State Board of Health of Massachusetts has ordered this reprint of Mr. Simon's last essay to be published, and they state truly enough that, "if the practical suggestions made therein were acted on by all citizens, hundreds of lives now annually doomed to destruction would be saved, and the health and comfort of the people greatly increased." We shall shortly publish some extracts from this valuable document, which is one of the greatest importance to every government and people.

**WOOD CONVERSION BY MACHINERY.** By John Richards, M. E. London, England: J. & W. Rider, 14 Bartholomew Close.

The author of this book is a member of the firm of Richards, London, & Kelley, of Philadelphia, but has been for some time a resident of London. The essays which make up this volume have been published in the *Timber Trades Journal*; and they contain some valuable practical information on all branches of the subject. In the chapter on "patent monopoly in wood conversion," there is a boldly outspoken criticism on the action of the Patent Office in the notorious Woodbury planer case, which we commend to the attention of the woodworkers of this country. We shall probably recur to this volume again.

**THE INTERCOLONIAL: AN Historical Sketch of the Inception, Location, Construction, and Completion of the Line of Railway Uniting the Inland and Atlantic Provinces of the Dominion of Canada.** By Sandford Fleming, C. E., Engineer in Chief of the Newfoundland, Intercolonial, and Canadian Pacific Railways. Montreal, P. Q.: Dawson Brothers, 150 St. James street.

This volume affords an excellent idea of the formidable difficulties encountered in the construction of the railway through the "wilderness,"

which, as the author truly says, "separated the Maritime from the Inland Provinces." The natural obstacles in the way were enormous, and they were conquered only by great courage and untiring patience; and the result is a railway which, "in all the essentials, has no superior."

**Inventions Patented in England by Americans.**

(Compiled from the Commissioners of Patents' Journal.)

From August 1 to August 9, 1876, inclusive.

- BOILER.—A. D. Brock, Washington, D. C.
- BUFFING LEATHER, ETC.—J. E. Fisk, Salem, Mass.
- CHILD'S CARRIAGE, ETC.—C. F. Tenney et al., Baldwinville, Mass.
- COOKING UTENSIL.—J. H. Weare et al., Cincinnati, Ohio.
- ELEVATOR.—R. K. Terry, Jersey City, N. J.
- FISH JOINT, ETC.—R. Long, Pittsburgh, Pa.
- GAS GENERATOR.—W. Maynard, New York city.
- HYDRAULIC PROPELLER.—G. G. Caldwell, Baltimore, Md.
- INDICATOR.—J. W. Thompson, Salem, Ohio.
- MICROSCOPE.—J. Zentmayer, Philadelphia, Pa.
- PAPER BOX, ETC.—S. Wheeler et al., Albany, N. Y.
- PAVEMENT.—J. Shillinger, New York city.
- PIPE COUPLING.—H. Pennie, Brooklyn, N. Y.
- POSTAGE STAMP, ETC.—L. H. G. Ehrhardt, Philadelphia, Pa.
- PROPELLING POWER, ETC.—F. J. Bell (of Phila., Pa.), London, England
- SASH PULLEY CASE, ETC.—W. T. Doremus, New York city.
- SEPARATING LIQUIDS.—J. J. Thomas, Philadelphia, Pa.
- SMOKELESS FURNACE.—J. W. Bonta, New Brighton, Pa.
- TELEGRAPH CABLE, ETC.—W. Strickler, Lebanon, Pa.

**Recent American and Foreign Patents.**

**NEW MECHANICAL AND ENGINEERING INVENTIONS.**

**IMPROVED LOCOMOTIVE DRAFT PIPE.**

Thomas Diffenbaugh, Danville, Ill.—This is an improvement in the draft or lifting pipe of locomotive and other high pressure engines that exhaust into the chimney, which draft pipe is commonly known to locomotive engineers as a petticoat pipe; and it consists in making the draft pipe in sections, and adjustable by lever connection with the cabin of the locomotive. The common practice at present is to close up the exhaust nozzles, which, when the engine is working at full stroke, are not large enough to allow the exhaust steam to escape freely into the smoke stack, thereby cramping the engine, as the steam cannot be exhausted quick enough. By making the draft pipe variable in size, the nozzles may be made larger than at present, and the pipe then be adjusted to the volume of the exhaust steam—larger when the engine is working at full stroke and exhausting a whole cylinder of steam, and smaller when cutting off and exhausting only part of the quantity, thereby allowing the engine to work with more freedom, and maintaining a sharp draft when required.

**IMPROVED PISTON.**

John Wood, Jr., Conshohocken, Pa.—This invention is a universal expanding device for the pistons of steam engines, capable of expanding the packing rings equally with a positive motion, so that, while the piston can be adjusted when desirable, it acts, while working, like a solid piston; and it consists in the combination of followers sliding in suitable radial ways in the piston head, with a central sectional core or cylinder, which is bored out conically, and is provided with a conical plug, which, when forced into the sectional core, by means of a screw placed in the piston head for that purpose, expands, forcing the followers against the packing rings. The advantages claimed are that, while the piston can be adjusted to take up the usual wear, it will accommodate itself to the inequalities in the cylinder, and will not wear more in one place than in another, as is the case with packing which adjusts itself. Another important advantage is that it obviates the necessity of removing the follower to adjust the packing.

**IMPROVED PUMP VALVE.**

Mrs. Charlotte Thomas, executrix of William H. Thomas, deceased, Sacramento, Cal.—The object of this invention is to provide an improved substitute for frapper valves whose hinged flap, or movable piece, is composed of leather. To this end, the invention relates particularly to the valved seat composed of hard metal and having a beveled rim, the improved valve having an annulus of soft metal secured in a suitable cavity, and the vertical guides for causing the valve to seat itself accurately, these elements being conjoined under a particular arrangement whereby the valve seats itself in the soft metal at each stroke, and always in the same place.

**IMPROVED COMBINATION LOCK.**

George Winter, Jacksonville, Va.—In this invention, the bolt is locked by a series of sliding dogs or tumblers provided with semicircular grooves to receive rotating pins, having semicylindrical posts adapted to fit in said grooves. When the pins are adjusted in one position, the dogs may be raised simultaneously out of the notches in the bolt, thus allowing the latter to be withdrawn into the case; but when adjusted in another position, the dogs are held locked, the semicylindrical portion of the pins in such case entering the grooves in the dogs. The position of the pins is indicated by a series of fingers inserted in the dogs, and pointing to numerals inscribed on the face of the lock.

**IMPROVED HORSESHOE MACHINE.**

John W. Chewing, Jr., Shadwell Depot, Va.—This invention relates to a novel construction of horseshoe machine; and it consists in the construction and arrangement of the devices for operating the swaging die and bending jaws, in the combination with the pivoted jaws of bending and guide rollers, in the construction and arrangement of the ejector for the swaged horseshoe, in the construction and arrangement of the knife for cutting off the section of the bar forming the horseshoe, and in the means for adjusting the length of said section.

**IMPROVED SELF-DUMPING SCOW.**

Philetus L. Murphy, New York city, assignor to himself and John A. Squires, same place.—This consists in a scow made in two parts, having the plane of division passing longitudinally through its center, the deck being inclined from the outer sides to the line of division. The parts connect with each other at one end by hinges, and at the other end by a rope, so that when said rope is released the weight of the load may force the parts apart, and thus dump the load automatically.

**IMPROVED STONE-SAWING MACHINE.**

James Pepler, Green Point, N. Y.—This invention consists in the arrangement of roller guides for the saws, which make it possible to make diagonal or straight cuts through a block, or to make both diagonal or straight cuts at one time in a block of stone. The operation may be described as follows: The block of marble or other stone to be sawn is placed on the support; and if it is to be worked up into monument shafts, the saws are arranged so that the rollers will guide and deflect them so that they will saw diagonally through the block. On turning the blocks over, the saws are arranged two in one socket or holder at one end, to bring them as near together as possible, to cut out the wedge between the shafts. The saws may be arranged so that part only will saw diagonally, or all may be adjusted to saw in that way.