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THE NATIONAL CYCLE SHOW AT MADISON SQUARE GARDEN, NEW YORK.

During the week ending January 26, an extensive bicycle exhibition was in progress in Madison Square Garden in this city. It is the second exhibition of the kind which has been given here, and one which bids fair to become annual.

For years past man has striven to improve the rate of locomotion which he can maintain by his personal exertions. This led to the construction of various forms of velocipedes, until some years ago the conception arose that a two-wheeled cycle might be propelled by cranks on the forward wheel axle.

The safety came in, and ball bearings became a sine qua non on all good wheels. The tires used were of solid rubber and the tendency of the extremists was to make them very small. Then the pneumatic tire was invented, and the modern cycle saw the last step of its development.

The pneumatic tire, by equalizing strains, makes possible the use of a higher gear, so that a single revolution of the crank, involving one motion of each leg of the rider, in a modern road wheel may propel it twenty feet, or four times the distance which a corresponding movement of the legs would carry a pedestrian.

The exhibition, which closed on the 26th ult., was of great mechanical as well as popular interest. The demand of the public for light wheels has brought about the most careful construction and the adoption of every possible modification which can reduce weight.

Wooden and aluminum rims for the wheels, very thin tangent spokes, light tubing of large diameter for the frame re-enforced at the points of greatest strain, the use of saddle posts of thin tubing instead of solid steel, pedals of improved construction, aluminum and wire saddles, are all steps in the direction of lightness.

The majority of wheels now have wooden rims, aluminum rims being adopted by some very high grade wheels, and steel rims being used on the rest. Among the exhibits some most remarkable examples of wood bending are shown, the material under modern processes seeming to be as flexible as lead.

For a long time past all pedals have been of one type of construction, but not the least interesting feature of the exhibition was the variety of new pedals. Some are really elegant examples of mechanical construction, and are far lighter than the old ones.

Handle bars are made of much narrower span than hitherto, eighteen or twenty inches being an accepted dimension in place of the old span of two feet or more. Cork handles, or handles of cork and rubber combined, are generally used.

Brakes are generally dispensed with, back pedaling or pressure of one foot on the front tire being relied on to stop the wheel. Some very neatly constructed foot brakes were shown, which are attached to the crown of the front forks, and which act by being pressed by the foot.

The re-enforcing of the tubes of the frames near the joints is effected in various ways. A piece of tube may be brazed into the frame tube. In one make cross plates of steel, in another what is virtually an inner triangular tube is introduced.

The hubs of wheels are now, in many cases, turned out of solid tool steel, although very elegant drop forgings for hubs and other parts of the wheel were shown. The crank arms are made lighter, often round in section, instead of rectangular, and many new ways of attachment are shown. The almost universal type of frame is the Humber diamond. Several wheels with detachable sprockets for changing the gear were shown, and there were several examples of mechanism for changing the gear without dismounting.

Another very noticeable movement is in the direction of adjustable handle bars. Many wheels are now provided with mechanism enabling the rider, without dismounting, to raise or lower the handles.

Among the lanterns are two classes of electrical ones. One is supplied by a dynamo driven from a friction wheel bearing against one of the tires; the other is provided with a battery.

Several novelties appear, such as a bicycle with bamboo substituted for the steel tubes of the frame. Another is adapted to be driven by both hands and feet, the handle bars being attached to a lever that is pushed and pulled by the arms, and which connects by a clutch to the crank axle. The same wheel can

have the clutch attachments removed and be ridden by the usual foot propulsion. A motor cycle, driven by a gasoline explosion engine, and a duplex cycle, in which the two riders sit side by side, excited much attention.

The great interest taken in cycling was shown by the very large attendance, and under the improved auspices of modern construction, the cycle is becoming more and more widely used. The industry has attained such dimensions that it has led to new processes, to the invention of special machinery, and many other trades are now tributary to it.

ON THE CHOICE OF A CAREER.

The profession of a mechanical engineer, to the uninitiated, holds forth big inducements, and the young man who starts in college works his way along, graduates, and nine cases in ten is assigned a position over the drawing board. Draughting, in its higher forms, is one of the most interesting subjects in existence, especially when other conditions are such as to promote the interest.

One of the first conditions of good work is a comfortable place to work in. How many concerns in the country, manufacturing machinery, have even a decent place for their draughtsmen? The average is a dirty, badly ventilated, dimly lighted room without proper heat in the winter, frightfully hot in the summer; yet educated men are supposed to go there, use their brains, avoid mistakes, and rush through their work, turning out machine after machine; having a highly heated gas jet within two inches of the top of their heads; yet invariably if a man be taken ill, may be from standing in a draught strong enough to blow a tracing off a table, he is "docked" for the time he is away. It would be interesting to obtain a list of the firms that give their men a holiday without taking a day's pay from their already magnificent remuneration.

The draughting profession at present is a delusion and a snare, as regards the general machinery business, and the old plea that a man is "learning something" is no excuse for a firm paying their head draughtsman \$18 per week. A man can keep on "learning something" until he is ready to die of old age, living on small pay. So many people say, "It is so hard to find a good draughtsman." Why, most men who arrive at the age of 30 either get away from the board or out of the business, driven to desperation by the "learning something" basis of pay. Suppose, through nothing but competency, he secures a very remunerative position. Invariably he is obliged to isolate himself from civilization in some small country village, or in some swamp, where many concerns locate their works; and once there he stands a good chance of staying there, unless he is "fired." Some companies, heaven bless them! realize that draughtsmen are human beings, and a roll of honor should be framed for them. There should also be a list of firms that should be avoided by any man who has any regard for fair treatment and health. Long hours, rushing, driving work, contemptible pay, and hopeless prospects take away all interest in the profession, which is certainly on the decline.

"CONDENSATION."

A Trolley Telephone.

A writer in the N. Y. Sun states that passengers riding on the electric railway between West Farms and Mount Vernon have the privilege of listening to an acoustic manifestation that in a remarkable manner illustrates some of the earlier experiments in developing the telephone. The track is a single one and the potential of the current is high; its amperage is also considerable. As a result, when a car is waiting on a switch for one coming in an opposite direction, the approach of the latter is audible at the distance of a mile to the passengers in the waiting car. The sound vibrations are carried along the wire, through the trolley to the wooden roof of the car. This acts as a diaphragm, which faithfully reproduces the rumble of the approaching car. A mile away the noise of the wheels is distinctly audible, and at the distance of 1,000 feet the sound becomes a loud roar. Outside the car, however, practically nothing is heard until the moving car is within a few hundred feet of the switch.

Arc Light Dangers.

Over the street doors of one of our most extensively patronized dry goods stores arc lights are suspended for purposes of illumination. Throngs of ladies are constantly passing to and fro under these lights. We noticed a narrow escape for a lady the other evening. Fire fell from the arc lamp and just grazed her dress as she passed under the lamp. The inflammable nature of women's apparel is such as to render it dangerous for them to stand or pass under arc lights. There should be a law to prohibit the use of open arc lights. It would be easy to arrange a glass basin or plate under the lamp to catch and arrest any falling bits of the ignited carbon.

NEW YORK, SATURDAY, FEBRUARY 2, 1895.

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**The Permanence of Bromide Prints.**

AN IMPROVED DEVELOPER.

In a paper entitled "A New and Modified Method of Developing Photographic Prints on Paper with Coal Tar Products in Alkaline Solutions," read by President Henry J. Newton before the photographic section of the American Institute on January 15, the following observations were made. Mr. Newton said: I am satisfied from observation and the investigation I have made that prints made by development from bromide of silver are absolutely permanent. The bromide paper was first made in Europe, and the first prints we have are on imported paper. The keeping qualities of this paper before using, as well as after, is an important question. I have kept samples manufactured by one firm three years and a half without its exhibiting any signs of deterioration. The firm that made this brand assures me that they have it five years old, and it is as good now as when first made. Here is some testimony as to its keeping qualities after printing which it gives me pleasure to be able to present.

Mr. F. C. Beach, of the SCIENTIFIC AMERICAN, writes me as follows: "A bromide enlargement equivalent to a print on gelatino-bromide paper has been in a frame exposed to the light for the past ten years in the rooms of the Society of Amateur Photographers of New York, and the reduced silver image is as bright and brilliant to-day as when the print was first framed, though the white portions have changed slightly from white to a yellowish color, which is regarded as due entirely to the discoloration of the paper support itself, and not to any alteration or fading of the reduced gelatine silver salts. This print was developed with ferrous oxalate and fixed in plain hypo." The evidence is unquestionably in favor of the permanence of these prints.

The ferrous oxalate developer is still recommended by many manufacturers. The trouble I encountered in developing bromide paper by any of the ordinary processes was in controlling the developer, and my labor has mainly been how to construct a developer so that at all times it would be under perfect control, in other words go slow, so slow as at all times to make the danger of over-printing the minimum and no danger of its running away with you. I finally adopted the alkaline in place of the ferrous oxalate developer.

Different alkalies do not produce uniform effects on paper manufactured by different firms. The carbonates produce a browner black than the caustic alkalies. The beauty of the print after all will, to a certain extent, depend upon the bromide in the developer; particularly is the effect noticeable of the addition of bromide of soda to the developer. A variety of tones may be made by modifying the proportions of the ingredients in the formula I am about to give.

In the case of hydroquinone as the principal ingredient of a developer, bicarbonate of soda, borate of soda, and boracic acid act as restraining agents, but in using amidol none have that effect except boracic acid, and that but slightly. Therefore, in introducing these agents, you will understand what office I expect them to perform. The first formula is as follows:

Water.....	1 ounce.
Sodium sulphite (crystals).....	15 grains.
Sodium bromide.....	2 grains.
Sodium carbonate.....	5 grains.
Hydroquinone.....	3 grains.
Metol.....	1 grain.

If you wish this developer to work slower add either 10 grains bicarbonate of soda or 10 grains of borate of soda or 5 grains of boracic acid to the ounce of developer. This is the best I have yet found with the carbonate alkalies; some may prefer the effect of carbonate of potash; my advice is that you try it.

The caustic alkalies produce blacks which I think are deeper and richer. The simplest form for a developer with caustic alkali is lime water, instead of plain water. Substitute it for the carbonate of soda in the foregoing formula. Another modification is the addition of two grains to the ounce of water, of caustic soda, afterward treated the same as in the first instance. I have made some of my most beautiful prints with barium hydrate. In using this ingredient, use ten grains to an ounce of water, because in the first place only seventy or eighty per cent of the barium salt is soluble, and further when you add the sodium sulphite a percentage of the barium solution is converted into an insoluble barium sulphate which makes the barium developer resemble a cup of milk. It will settle clear however in a short time, but there is not the slightest use in waiting, as the milky appearance has no chemical action on the paper.

Strontium hydrate also will be approximate in its effect to barium in a developer, but I have discovered no special advantage over it.

The simplest of the caustic alkalies seems to me to be lime water, which is water saturated with calcium hydrate. This can be made a commercial article by evaporating it to dryness. To do this so that it will be in the most available form, add four ounces of granulated sugar to a gallon of lime water and then evaporate to dryness. The salt thus obtained can be redissolved to suit when a developer is to be prepared.

All of these developers keep indefinitely. Even if they stand in the graduate several days their developing power seems the same. They rarely change in color. They have harnessed within them sufficient potential energy to keep them at work as long as there is any exposed paper on which they can exert their power. Into any of these developers a dozen or so exposed prints can be put at a time and developed together, much as they are toned at present, so the printing and developing prints by this process will be much less troublesome and consume much less time than the old way. Besides, what is more important, they will be more beautiful and permanent.

An excellent fixing bath for bromide prints is made as follows, the chemicals being dissolved in the order given:

Water.....	10 grains.
Pulverized alum.....	100 grains.

When dissolved add—

Sulphate of ammonia.....	480 grains.
Hypo-sulphite of soda.....	2 ounces.

It will keep clear and can be used repeatedly until exhausted. The film is hardened and the whites are remarkably clear and pure.

**Some Exhibits at the National Cycle Show in Madison Square Garden.**

Any attempt to speak of the various exhibits must involve many sins of omission, on account of the number of things to be seen.

Among the exhibits of wheels, none attracted more attention than that of the Columbia bicycles, shown by the Pope Manufacturing Company, of Hartford, Conn. The Columbia wheel now has the single tube upper brace. Nickel steel tubing is used in all their frames, and a new design of hub, the barrel hub, is used. The crank arms and shaft are in only two parts, which screw by right and left hand screws into a transverse tube, which carries the cones. The two abutting ends of the shaft interlock in the center. The sprocket is detachable, so that the gear can be altered without trouble. The chain is particularly elegant, with alternate links finished in blue and yellow steel tempering colors. A number of weights of wheels are catalogued.

The Remington Arms Company, of this city, have a large exhibit. Their 1895 wheel is changed from the wheel of 1894 in many details. A barrelcrank hanger, giving a narrow tread, is substituted for the old type. The rake of the head has been changed and the weight of the machine decreased. The crank arm formerly introduced by this firm has been retained.

E. C. Stearns & Co., of Syracuse, N. Y., have won a reputation for their wheel in the record field, many racing men having chosen it as their mount. Their 1895 wheel has a new detachable sprocket, an adjustable handle bar, dust-proof bearings, and many other features. Among their exhibits are tandem, triplet, and quadruplet wheels of very elegant design.

The Warwick Cycle Manufacturing Company, of Springfield, Mass., have seven regular types of wheels. The parts are so proportioned in the diamond frame wheels as to bring the upper brace and rear lower braces horizontal. The diameter of the tubes of the frame has been increased. The front sprocket is detachable and the handle bars are adjustable. The pedal is particularly ingenious and simple in construction.

The Keating Wheel Company, of Holyoke, Mass., have introduced a number of improvements in their 1895 wheel. The frame tubes are re-enforced, the front sprockets are attached to the crank directly. The center brace of the frame where it joins the crank hanger is bent forward, the idea being to stiffen the frame at this critical point.

The Monarch Cycle Company, of Chicago, use Mannesmann steel tubing in their frames and have a remarkably attractive exhibit. As a matter of display they exhibit two of their wheels in large picture frames with black background and with electric lamps distributed over the machine. The wheels are kept in rotation by an electric motor, and as the colored lamps with which they are decorated blend into a circle of light, the effect is quite striking.

The Western Wheel Works, of Chicago and New York, show a large variety of wheels, varying in price and general specifications. The wheels are termed Crescents. The sprocket is of a new type, being made of boiler steel, stamped cold, and case-hardened. This firm shows some very high grade juvenile wheels also.

The Eagle Manufacturing Company, of Torrington, Conn., have one of the most striking exhibits. Their detachable sprocket is characterized by depending for its strength directly upon the metal, the ends of the sprocket arms dropping into recesses on the outer segments, the screws merely holding the parts together. The tubes of the frame are re-enforced at the ends by short inner tubes over which the ends of the outer tubes are cold-swaged. This gives a tube of reduced diameter at the ends, and results in a most graceful frame. Aluminum rims are used on the regular output, unless wooden rims are desired. The

lady's wheel with triple tube loop frame is one of the most distinctive novelties of the exhibition.

The Spalding wheels, made by A. G. Spalding & Bros., of this city and of Chicago, had a very fine exhibit, as had also Gormully & Jeffrey, of Chicago. No wheels stand higher than the product of these firms. The tandem wheels of the Rambler type made by Gormully & Jeffrey were particularly attractive.

The Sterling Works, of Chicago, had an interesting exhibit of their strong, fast, light wheels, said to be "built like a watch;" and the Ames & Frost Co., of Chicago, large and well known manufacturers, who make a wheel second to none in the market, were also well represented.

Among other wheels well known to all lovers of bicycle riding, some of them having a world-wide reputation, and which materially contributed to enhance the value of the exhibition, may be mentioned those shown by the Lovell Arms Co., Boston; the Waverley, of the Indiana Bicycle Co., Indianapolis, Ind.; the Tribune, of the Black Manufacturing Co., Erie, Pa.; and the New Mail, of William Read & Sons, Boston.

Many firms exhibited accessories of the wheel. Among tires may be particularly mentioned the Palmer. As now constructed, this tire is almost self-healing, and by a special repairing outfit can be repaired with the utmost ease if punctured, a mushroom shaped plug being forced into the puncture. The hose pipe tire used on the Columbia wheels was also shown, and for it a very simple and effectual repairing device is supplied, also involving the use of a mushroom patch.

The Cleveland Machine Screw Company showed their steel balls for ball bearings. Under one inch diameter their balls are turned from the solid bar, ground by the Richardson-Grant patent process and hardened.

Cyclometers are shown by the Bridgeport Gun Implement Company and the New York Standard Watch Company among others. The first named firm manufacture also the celebrated Search Light bicycle lamp, which burns kerosene oil. The Standard Company's cyclometer, weighing but 3¼ ounces, has the highest claims for accuracy and durability made for it by the makers.

**The Spectrum of Mars.**

Prof. W. W. Campbell has lately brought together all the observations of the spectrum of Mars, and discussed them in connection with the telluric spectrum and with his own observations made during the past summer. (Publications of the Astronomical Society of the Pacific, vol. vi., No. 37.) He concludes as follows:

(1) The spectra of Mars and the moon, observed under favorable and identical circumstances, seem to be identical in every respect. The atmospheric and aqueous vapor bands which were observed in both spectra appear to be produced wholly by the elements of the earth's atmosphere. The observations, therefore, furnish no evidence whatever of a Martian atmosphere containing aqueous vapor.

(2) The observations do not prove that Mars has no atmosphere similar to our own; but they set a superior limit to the extent of such an atmosphere. Sunlight coming to the earth via Mars passes twice either partially or completely through his atmosphere. If an increase of 25 to 50 per cent in the thickness of our own atmosphere produces an appreciable effect, a possible Martian atmosphere one-fourth as extensive as our own ought to be detected by the method employed.

(3) If Mars has an atmosphere of appreciable extent, its absorptive effect should be noticeable especially at the limb of the planet. Prof. Campbell's observations do not show an increased absorption at the limb. This portion of the investigation greatly strengthens the view that Mars has not an extensive atmosphere.

**Palace Trolley Cars.**

A palace trolley car which marks the height of luxury and convenience in street car construction has been introduced recently in Boston. The new cars are designed for the use of so-called "trolley parties," and will be run only when especially chartered. It is thought that they will prove very popular for carrying theater parties or parties for other entertainments. The bodies of the cars are 20 feet long by 7 feet 4 inches wide and the motors are 25 horse power each. The outside coloring is in black and gold, with crimson panels, and the trucks and running gear are painted a dark green. The woodwork of the interiors is of polished mahogany and the upholstery is of peacock blue brocade plush. Each car will be supplied with twenty chairs of an elegant pattern and these are to be supplied with wire hat holders beneath them. The brass finishings, the frescoing and the electrical apparatus are all in keeping with the general elegance of the other furnishings. These cars will also be equipped with electric headlights, which are also a new departure. Other palace cars similar in design to the ones described are in course of construction, and are to be run from the suburbs of Boston to the city on Sundays for the comfort and convenience of church-goers.