Correspondence.

Battleship Plans.

To the Editor of the SCIENTIFIC AMERICAN:

I have just read with much interest your last copy of the SCIENTIFIC AMERICAN, containing the Naval Supplement. To me this is usually the most interesting part of your paper, viz., the illustrating of our navy.

It would be still more interesting if you could show the large battleships, etc., in elevation, giving also a plan, and showing these on as large a plan as you could, say a page or half a page.

Why could you not try this in illustrating some of the later ships authorized? H. D. HANALE.

Boston, Mass., May 13, 1904.

[We hope to deal with the subject along these lines in an early issue.—ED.]

The Home-Made Wind Vane.

To the Editor of the SCIENTIFIC AMERICAN:

I beg to invite your attention to an erroneous statement made by Mr. H. W. Harmon in his article on "Electrically-Registering Wind Vane and Anemometer for School Use," in the SCIENTIFIC AMERICAN SUPPLEMENT of May 14, where he says that "the United States Weather Bureau instruments . . . record only once in ten minutes." The facts are that the automatic wind-registering instruments employed by this bureau for over twenty years past make continuous record of the actual wind movement by miles, whether this velocity is barely appreciable or up to and including winds of hurricane force, viz., over one hundred miles per hour; the wind direction being simultaneously recorded on the same sheet for each minute, and to the eight principal points of the compass.

Mr. Harmon has, however, displayed considerable ingenuity in the design of his "home-made" apparatus.

WILLIS L. MOORE,
Chief U. S. Weather Bureau.

Washington, D. C.

A Japanese Physician's Antidote for Snake Bite.

At a recent banquet of the Association of American Physicians, Dr. S. Weir Mitchell made the announcement that Dr. Noguchi, a well-known Japanese physician at present on the staff of the Serum Institution in Copenhagen, has discovered a positive antidote for rattlesnake venom. Dr. Noguchi's researches were carried on under a grant from the Carnegie Institution.

The fact that the announcement of the discovery was made by Dr. Mitchell is of particular interest, as more than forty years ago the latter worked long and unsuccessfully on the problem that has been solved by Dr. Noguchi.

The letter to Dr. Mitchell from the Japanese physician did not contain a great many details, but said that the serum had been obtained from the blood of goats and could probably be secured as well from horses as in the case of serums in use at present.

Dr. Noguchi found that guinea pigs that had received injections of rattlesnake poison up to twelve times the amount necessary to produce death and had then received injections of the anticrotalic serum experienced no evil effects from the poison.

The Current Supplement.

"The Elizabeth Suspension Bridge at Buda-Pest" is the title of an article that opens the current SUPPLEMENT, No. 1483. The bridge is a noteworthy engineering structure, inasmuch as it employs a form of eyebar that has been made the subject of considerable acrimonious discussion in the technical press of this country. At a recent meeting of the Manchester Geological Society, Mr. Alfred J. Tonge read a paper on "Coal Cutting by Electricity," in which he gave useful and very interesting details respecting the results obtained by the introduction of electrically-driven coal cutters at the Hulton collieries near Manchester. The paper is abstracted in the current SUPPLEMENT. Nikola Tesla discusses the transmission of electric energy without wires. "Curious Optical Illusions" is the title of an article that gives many a bit of singular information. Mr. Percy Collins writes instructively on the protective resemblance of insects. His article is elaborately illustrated. The life of a forest is discussed by Mr. Gifford Pinchot. The compressed-air power plant at the St. Louis Exposition is made the subject of an exhaustive discussion.

The Death of William Wallace.

William Wallace, one of America's most distinguished electrical inventors, died on May 21 at the ripe old age of eighty. His career was long, honorable, and varied. An Englishman by birth, Mr. Wallace emigrated to this country with his father, established himself at Ansonia, Conn., and founded the firm of Wallace & Sons, widely known as one of the leading makers of copper and brass alloys in the United States.

Mr. Wallace's electrical work was done partly in collaboration with Prof. Moses G. Farmer. The two began the manufacture of a compound telegraph wire, which consisted of a steel core upon which a copper covering was electrolytically deposited. The result was a wire of remarkable conductivity, strength, and lightness. At the Centennial Exposition of 1876, Mr. Wallace exhibited the Farmer-Wallace dynamo machine, by means of which the buildings were lighted. This is probably the earliest instance of electric lighting on a large scale in this country.

Not long after the close of the Philadelphia Exposition, Mr. Wallace introduced a plate arc lamp to be used in connection with his dynamo, the object being to place a number of arc lights in series circuit. In this manner originated the series method of arc lighting, which is now so generally employed.

Mr. Wallace's interest in the scientific questions of the day was such that he established in his home a laboratory, where he performed many an interesting experiment, and threw not a little light upon unsolved electrical problems. One of his electrical feats was the construction of an induction coil which at the time was of unprecedented size.

A Simple System of Photographic Exposures and Plate Speed Markings.

BY FRANK MORRIS STEADMAN.

In photographing any certain surface in nature, other things being equal, neither the size of that surface nor its distance from the camera alters in any degree the length of the exposure, or in other words, the intensity of the cone of light which impinges on the emulsion. This being true, it may be said that the intrinsic intensity of a surface, together with the value of the diaphragm employed, creates the intrinsic light intensity impinging upon the sensitized film.

If then the light which creates the intrinsic intensity at the brightest part of any subject that is to be photographed be made to do a certain fixed amount of work, the length of time required will fully account for the condition of that intensity and will annihilate at a stroke the necessity of considering all those factors of intensity that have clung to all the exposure tables, as the latitude from the equator, the season of the year, the hour of the day, etc.

But it still further accounts for and fully explains the very early and late hours of the day which the tables cannot fix, as well as the local conditions of the weather which are also impossible to control in tables.

In interior home portraiture also, by the common window, the light will be doubled by the movement of the subject a few feet nearer to the window or by letting down the top sash of the window. These are things that tables cannot fully cover and it would be childish to try to explain them by tables when a strip of Solio in a few seconds will give an exact (practically) numerical expression of the intensity in any possible complex condition of all these factors.

This fixed amount of work is the tinting of Solio paper to a just plainly visible tint when seen in contrast with the original color of the untinted Solio.

The tint is made at the position of the brightest part of the subject. To make it a strip of the Solio is placed behind the thin opaque cover of an ordinary pocket note book in which there is cut a small hole about a quarter of an inch square. The Solio strip is slipped in place under the hole and the latter covered with a coin, and when the book is placed in position and turned exactly facing the brightest source of light the coin is slipped off and the time counted until it is thought that a tint is secured. The time given should be one of the following scale of intervals (this may be adhered to in practice by reason of the great latitude of the photographic emulsions): $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8, 16, 32, etc., seconds.

Find the one interval that creates the first just plainly visible tint. That length of time will be the "Solio time" of that particular intensity where the Solio was held.

This Solio time is taken as a convenient basic exposure and the whole problem resolves itself into the following: When using the Solio time of the light as the exposure, what diaphragm with any certain emulsion and a certain class of subject, will create the normal effect in the sensitive emulsion?

This diaphragm once found is a fixed element for that plate or film and that same subject and it is called the "Solio diaphragm" of that subject for that plate or film.

With the Eastman film which I use in my private work, and with a subject of normal complexion, I find this Solio diaphragm to be number 16 and for a very light complexion, number 32, U. S.

If the subject be an ordinary exterior with average-colored objects in the middle distance the diaphragm which gives the correct effect in the emulsion with the Solio time as the exposure is number 64.

The following table divides conveniently the different subjects liable to be encountered in nature and the Solio diaphragm of each subject is seen after each. In using the system the Solio time of the light is the exposure with the Solio diaphragm mentioned after the particular subject that is being photographed.

This subject table with the Solio diaphragms follows (for Eastman film and emulsions of like speed):

	Diaphragms. U. S.	f.
Portraits:		
Very light complexion	32	22
Average complexion	16	16
Very dark complexion	8	11
Room Interiors:		
White walls	64	32
Average walls	32	22
Very dark walls	16	16
Dark machinery	8	11
Regular Exteriors:		
Bird's eye class	128	45
White objects in middle distance	128	45
Average objects in middle distance	64	32
White objects in foreground	64	32
Average objects in foreground	32	22
Green trees abounding	32	22
Marines and Snow Views:		
Bird's eye class	256	64
Objects in middle distance	128	45
Objects in foreground	64	32
Buildings:		
White	128	45
Average color	64	32
Very dark as red brick, etc.	32	22

U. S. is the universal system of marking diaphragms.
f is the equivalent focus system. The figures represent the fractional part of the equivalent focus of the lens.

Example: On photographing a regular exterior with average colored objects in the middle distance, the Solio time is found to be one-half second in the full light. On looking at the table, the "Solio diaphragm" of that subject is seen to be U. S. 64. Therefore, one-half second is the correct exposure with that diaphragm. If it is desired to use any other diaphragm, it remains necessary only to halve that exposure for each whole number that the diaphragm is opened, or double it for each number that it is closed beyond the one mentioned in the table.

If some other emulsion was found to be slower than Eastman film, the table could be corrected by placing a correspondingly larger diaphragm number opposite each subject, so that the exposure would still be normal while giving the Solio time. If another emulsion was faster, the diaphragms would be enough smaller to still retain the Solio time of the light as the correct exposure.

This system should be applied in practice as follows: The worker should become expert in the counting of time in exact seconds, and the fractions one-fourth and one-half of a second, and also in the act of taking the Solio time in any light. This only requires a little care to not turn the Solio toward the direct light until it is protected, and then holding at exactly right angles to the light source and giving the exposure with exactness, guessing the first time at the factor 1, 2, 4, 8, etc., that will create the standard or just plainly observable tint when the corner of the note-book is raised to look at it, and then give more or less exposure as may be necessary to obtain the correct tint.

Then the manufacturers of plates and films should place this subject table in each box of their products, corrected as to the diaphragms that follow the subjects, so that the one found opposite any subject will give the normal effect with the Solio time of the light as the exposure.

They should correct the table for each speed of emulsion that they make. By this method any box of plates could be used in any part of the world, and although the maker's name and the rapidity of the emulsion was unknown, the user could obtain normal results with the first plate exposed as well as if they had been constantly in use for months, regardless of the kind of subject to which the worker was accustomed.

The shutter manufacturers have their part to do in adjusting the automatic speeds given by their instruments to the same scale as the Solio intervals of time, as 1, 1-2, 1-4, etc., second.

The system can be substituted for exposure meters, and the expense is merely nominal, as the few strips of Solio paper that are used in taking the measurements are practically without value.

An ordinary notebook with a small hole cut in the cover is all the provision that the worker need make to prepare him to use the method.

If to understand how to use plates and films will tend to increase their use and to lessen the troubles of the users, then certainly the advantages of instituting the system will be shared alike by both makers and users.

Those who practice photography should be expert at the counting of time in seconds. To count any desired number of seconds say: "Naught-one-half-and-one, one-half-and-two, one-half-and-three, etc." For one second, say the first line only; for a half second say, "Naught-one-half," and for a quarter second say the word "quar-ter" at talking speed.

Practice the lingo with the second hand of a watch or count with a clock that ticks in quarter seconds.