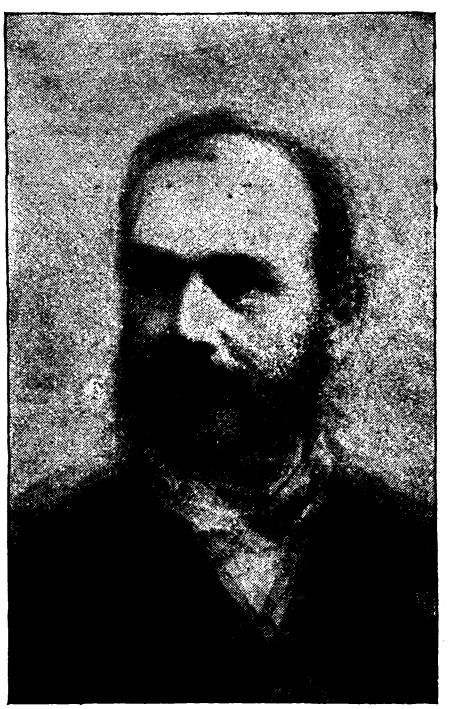
of the individual. The combination of a photograph of a person at one age, with that of the same person at a different age, is very much like what the person looked at an intermediate age. The effect of hair, costume, etc., often spoils the result.[1]

While the combination with an ordinary stereoscope is very satisfactory, there are a few advantages in using the original form of the instrument as it was invented by Wheatstone. This consists of two mirrors set at right angles, and two bars running out perpendicularly to the faces of the mirror. Along these bars uprights, holding the photographs, can be moved. One eye looks into each mirror, and the combination of the two images takes place. Diferences in size of the photographs can be accounted for by moving the larger one farther off, and the smaller one nearer. As soon as the two images, as seen side by side, are of the same size and position, the bars are moved on their common axis until the images coalesce. The composite thus formed is even better than the Brewster stereoscope, and the arrangement lends itself to a greater variation in the experiment. Two cautions may be useful: 1°. The head must not be moved. A prong of wood attached to the instrument, and held between the teeth, will be an aid. 2°. The illumination of the two pictures must be alike, or else the more strongly illuminated will give the character to the composite.



While composite photography has always made use of photographs, there is no impossibility in making a composite directly from the original sitters. A Philadelphia photographer has been successful in producing a composite of two sisters from actual life. The method is, doubtless, more troublesome than the usual one. With the Wheatstone stereoscope, one can combine living faces by having two persons assume appropriate positions; and, as before, by guiding the movements of their heads, uniting the images in the mirrors. Both the full face and the profile give a peculiar and lifelike effect.

The most common difference in the position of photographs, as ordinarily taken, is the direction of the head; i.e., whether more of the left or the right side of the face is shown. Two photographs, looking in opposite directions, cannot be combined by any of the above methods. A simple device overcomes the difficulty. A piece of mirror is held directly in front of the face between the two eyes. The two pictures are set side by side; one is looked at directly with one eye, while the other is seen reflected, and, of course, reversed in the mirror. By moving the photograph until its reflection coincides with the other, a perfect blending takes place.

I have tried combination by means of the zöetrope. Simple figures can be satisfactorily combined; but so complicated a design as the human face, is accompanied by a vagueness of outline and detail which render the process useless. By using five or six of each of the two photographs to be combined a distinct face is seen. Even then the result is not nearly so good as in the stereoscopic combination. Besides, there is no way of accounting for small differences in the photographs. In combining several pictures, one gets nothing but a jumble of faces.

The fatal objection to all these hand-processes is, that but two photographs can be combined at once. To unite the resultant composite of two or more stereoscopes, is, perhaps, possible, but would certainly prove very troublesome. An apparatus, that, by a system of mirrors, would superimpose a series of images, suggests one method of extending the processes above described. JOSEPH JASTROW.

[1] I would suggest that this method offers a means of studying the nature of the expression of the emotions.

A COMPOSITE PORTRAIT OF THE OFFICERS OF THE ASSOCIATION.

THE accompanying photo-engraving is a composite of the photographs of the higher officers present at last year's meeting of the

American association for the advancement of science: these were, Messrs. Newton, Lesley, Newcomb, Asa Gray, Cope, Hilgard, Putnam, James Hall, J. W. Langley, Morse, Eaton, N. H. Winchell, Wormley, Thurston, Eddy, Springer, and John Trowbridge.

It was prepared by Mr. W. Curtis Taylor of Philadelphia,[1] who had never seen a composite before preparing it; and it is therefore less successful than might otherwise be expected. As in the previous composites published by us, it makes a younger and handsomer man than the average of those whose faces enter into it. The average age of these seventeen gentlemen can hardly be less than fifty.

THE YACHT PURITAN.

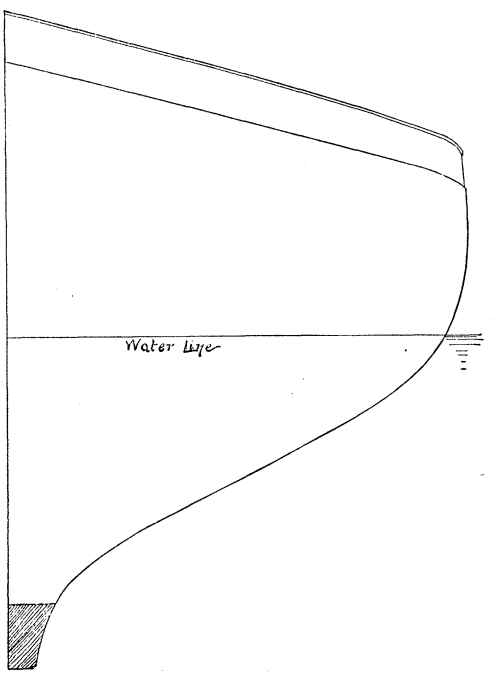
THE yacht Puritan, which has just raced so successfully with the New-York sloop Priscilla, was designed by Mr. Edward Burgess of Boston with a view to combine the speed of the ordinary type of American sloop with the weatherliness of the English cutter. The race for the Goelet cup at Newport, Aug. 3, seems to show that we have, at last, a successful compromise. Puritan measures 93 feet on deck from the fore side of stern to the aft side of her long and slender taffrail. Extreme beam, 22 feet 7 inches. Draught, 8 feet 4 inches. Displacement, 105 gross tons. The lead keel weighs 25 tons; and 20 tons of lead are stowed inside, four or five tons of which are run into the garboards. The centre-board is 21 feet long and 10 feet deep. The spar measurements are: mainmast, 78 feet; topmast, 44 feet; boom, 76 feet; gaff, 47 feet; bowsprit, 38 feet (outboard). Lower-sail area, 5,500 square feet.

Many yachting critics predicted that Puritan would not carry her sail; that her lead keel, combined with so much beam, would make her very uneasy in a seaway; and that, like other compromises, she would be slow. Her record so far has, however, been entirely satisfactory. In the Newport race, while the fastest cutter yet built in America — Bedouin — plunged into every sea, finally losing her bowsprit, Puritan never put her bowsprit under, and beat the cutter *one hour* in the twenty-mile thrash to windward.

Puritan's rival, Priscilla, is undoubtedly a very fast craft; and with her rig reduced, she may yet prove a troublesome antagonist, with her five feet extra length.

The success of both boats, which a new book on the America's cup calls 'experiments,' points to a brave defence of the cup, and holds out good hope that it may still remain on this side of the Atlantic.

The midship section of Puritan, given herewith, is published for the first time. Her longitudinal section shows a rather deep forefoot with a rocker keel and raking stern-post. Both fore and after bodies are unusually fine.



The load water-line shows about five inches hollow.

The picture, showing Puritan under lower-sails and club-gaff topsail, is reproduced from a photograph taken by N. L. Stebbins in the Eastern yacht race, June 30, when she beat the next boat in her class nearly half an hour over a short course.

[1] We are indebted to the courtesy of this gentleman for the opportunity of reproducing it.

THE PRESIDENT'S ADDRESS.[1]

MY FRIENDS: I have the honor to address you this evening as an association of representatives of American science in all its branches, — as students of the sky and all its elemental forces, of the earth and all its mineral constituents, of the animal and vegetable kingdoms in their past and present ages, of the history and constitution of the human race, — and I may be easily pardoned for some trepidation in view of the draughts you may have drawn in advance on my

[1] Address to the American association for the advancement of science at Ann Arbor, Aug. 26, 1885, by Prof. J. P. LESLEY of Philadelphia, the retiring president of the association.