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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

INCREASING THE NEW YORK WATER SUPPLY.

If the citizens of New York understood that the margin between the city's present consumption of water and the minimum flow of the Croton River as recorded in past seasons of drought was of a negative character, the consumption exceeding the supply, they would surely be less extravagant in the use of water, and would make a decided effort to stop the serious waste which daily occurs. Meanwhile the Aqueduct commissioners, pending the construction of the great system of storage reservoirs, which has recently been the subject of favorable action by the New York State Legislature, are rushing the preliminary work for the construction of a new reservoir in the Croton watershed, which will have a capacity of ten billion gallons of water. The new structure, which is to be known as the Cross River reservoir, will impound the waters of a tributary of the Croton River, the area of whose watershed is about thirty square miles. Another dam, to be known as the Croton Falls reservoir, with a capacity of twenty billion gallons, will be located below the Cross River reservoir, and at a point below the junction of the east and west tributaries of the Croton River. These two works will add, therefore, a total of thirty billion gallons to the present total capacity of the various Croton watershed reservoirs, which in the aggregate amounts to sixty-six billion gallons. Although this represents an increase of about 45 per cent, it is a fact that with the new reservoirs completed, the total capacity of the system, in dry years such as have been known, would merely give a safe margin over the present daily consumption of 300,000,000 gallons.

Of the two new reservoirs upon which New York city will have to depend to tide it over until the great reservoirs in the upper Hudson district are completed, the Cross River reservoir is ready for bids, and the Croton Falls reservoir will be in a similar condition during the autumn. The Cross River dam, which will have an extreme height of 150 feet and a length of about 900 feet, will be constructed of cyclopean masonry with a facing of large concrete blocks, the latter having been adopted because they will represent a saving of $250,000 in money, and probably a considerable amount of time; for the securing of cut facing stone in sufficient quantities is in such work always a possible source of delay. During construction the river will be taken care of by two five-foot steel pipes, which will extend through the dam. There will be 248,000 yards of excavation to be done before the rockwork is commenced. In the dam itself there will be 132,000 cubic yards of cyclopean masonry and 6,000 cubic yards of monolithic concrete facing blocks. Some 870 acres will have to be cleared in the bed of the reservoir itself.

Since the element of greatest importance in the construction of the dam, next to its security, is the question of time, the chief engineer, Mr. J. Waldo Smith, is applying to it those methods of construction which enabled him to complete the Croton dam so rapidly. In the first place, on both the upstream and downstream sides of the dam, broad timber trestles will be constructed, to accommodate the railroad tracks that will bring the material to any part of the site. Within the structure of the dam will be built up a series of steel derricks, of the same kind as those used in completing the Croton dam, which were illustrated in the SCIENTIFIC AMERICAN of September 24, 1904. These towers will be inclosed in the masonry of the dam, as the latter is carried up. Three of these towers, 50 feet in height and 25 by 50 feet in plan, will be erected at intervals along the axis of the dam, and each will be equipped with four derricks. When the structure has been built up to a height of 50 feet, five other towers of the same dimensions in plan, and from 20 to 30 feet in height, will be erected, so as to enable the whole length of the dam to be served by the thirty-two derricks which shall be thus available. When the dam has been carried up to the top of these towers, or say to a height of 80 feet, the remaining portion will be built from wooden towers, each carrying one or two derricks, which will be built on the big trestles referred to, which will extend parallel with the face of the dam. The great success which attended this system of construction in the work of completing the Croton dam, is a guarantee that the new Cross River reservoir will be built with unusual rapidity. It is probable that the additional storage of ten billion gallons of this reservoir will be available by the autumn of 1907, and that by the summer of 1908 the Croton Falls reservoir will also be in operation. The total storage capacity of the Croton watershed will then be nearly one hundred billion gallons. Were the rainfall in the Croton watershed uniform from year to year, there would be no cause for anxiety for years to come. It is the possibility of a repetition of certain periods of light rainfall that makes the rapid execution of these two dams an imperative necessity.

THE WARSHIPS OF THE FUTURE.

As the ally of Japan, Great Britain is probably in possession of the facts as to the behavior of the ships and general war *matériel* of the Japanese navy in the present war; and hence the naval programme for the present year, as far as it has been made known by the British government, may be accepted as embodying, in the distinctly novel features of the ships to be laid down, many of the lessons that have been learned. These changes are exactly those which the SCIENTIFIC AMERICAN has predicted would be brought about as the result of the war, namely, a great increase in gun power, and a corresponding increase in speed. Dealing first with the battleship (the foundation upon which a navy is built up, and around which its various elements are gathered) we note that the British Admiralty are to lay down a vessel which, if it proves to be satisfactory, will become the standard type of battleship for probably a decade to come. In the first place, the speed is to be that which only a few years ago was the standard speed for armored cruisers, namely, 21 knots an hour. This would be a remarkable battleship speed, even if sacrifices were made in the armor protection and the batteries; but as a matter of fact, in spite of the high speed adopted, the ship will be considerably larger and more powerfully armed than any battleship built or building to-day, exceeding even the "Lord Nelson" type of last year, which on a displacement of 16,500 tons is to carry four 12-inch and ten 9.2-inch guns.

The new ship will mount a battery of ten 12-inch guns, each of which will have a muzzle energy of about 50,000 foot-tons. All of these guns will be carried in turrets upon the main deck. There will be no intermediate battery; but for defense against torpedo-boat attack, the new ship will be fairly alive with high-velocity 3-inch guns, of which she will probably carry not less than two or three dozen. Steam will be supplied entirely by water-tube boilers, and she will be driven by Parsons steam turbines of 23,000 horse-power. The embodiment of such speed and gun power necessarily implies a great increase in the displacement, which in the new-type ship will be not less than 18,000 tons. The great powers of attack of this vessel can be best understood by a comparison with the two next most powerful battleships in the world, the British "Lord Nelson" and our own "Connecticut"; for while the total energy of a single broadside from the "Connecticut" is 297,000 foot-tons, and that of the "Lord Nelson" 312,000 foot-tons, the seven 12-inch guns of the new battleship which can be brought to bear on either broadside will have total muzzle energy of about 350,000 foot-tons. This is the energy at the muzzle; but since the big gun holds its energy longer than the smaller gun, it follows that at the long battle ranges at which the engagements of the present war have been fought, say three to six miles, a broadside from the new type of battleship, if every shot got home on the enemy, would have about 70 per cent more striking energy than the broadside of the "Connecticut," and about 30 per cent more than that of the "Lord Nelson." Furthermore, because of her excess of speed of about three knots an hour, she would have the "weather gage," and could choose the distance and the position that would be most favorable to herself.

A similar increase in speed and power is to be made in the new design of British armored cruisers, of which four are to be built. With their turbine engines, they are expected to realize a speed of 25 knots an hour. As in the battleships, the 6-inch gun will disappear, and with it the port or casemate method of mounting the gun; and a powerful armament of ten or twelve 9.2-inch guns will be carried on the main deck, all of them within turrets. Like the battleship, these vessels will have the weather gage of any armored cruisers afloat on the high seas; moreover, as the 9.2-inch gun is to be 50 calibers in length, its high velocity and great carrying power will render these armored cruisers a match for many of the smaller and older battleships, that are armed with short-caliber 12-inch guns. One of these 25-knot cruisers could, for instance, circle around the battleship "Iowa," at a range at which the chances of scoring a hit with the low-velocity 12-inch guns on that ship would be rather remote, and because of the flat trajectory of her own 50-caliber 9.2-inch guns, she would be capable, did she carry first-class gunners, of placing her shots with telling effect. Just here, as showing the rapid strides made by modern gunnery, we may mention that the 9.2-inch 50-caliber gun of this cruiser has about the same muzzle energy as the 35-caliber 12-inch gun of the "Iowa," and of course a much flatter trajectory. These four armored cruisers will constitute a squadron, whose 25-knot speed will enable them to refuse battle to the modern battleships; close with any battleships armed with 30 or 35-caliber pieces, and, by virtue of their long-range guns, have the battleships at a great disadvantage.

In the new British destroyers, an even greater relative increase in speed is proposed. Two classes are to be built, one for work off the coasts, and the other for duties on the high seas. As in the case of the battleship, a type vessel, to be followed by others if it proves satisfactory, will be built, and the estimated speed, with turbine engines, is 36 knots an hour. This speed is to be no mere racecourse achievement, run over a measured mile under favorable conditions; for the 36 knots an hour trial speed must be maintained over a distance of nearly 300 knots, or for a period of eight hours' continuous steaming. Five destroyers will also be built which must maintain a speed of 33 knots an hour for a period of eight hours. The coast destroyers, of which a dozen are to be constructed, are to have a speed of 26 knots an hour.

It is significant that in this programme there is no mention made of the building of cruisers of the unprotected class, and herein the SCIENTIFIC AMERICAN finds a further verification of its stated belief that the torpedo-boat destroyer will grow in size, until it has rendered the unprotected cruiser or scout a superfluous type. The new 33-knot ships will probably be of not less than 1,000 tons displacement, and will combine in themselves the qualities both of the scout and the destroyer.

EYE-STRAIN AND HOW IT CAN BE RELIEVED.

In a recent number of the Journal of the American Medical Association, Dr. Lewis S. Dixon, of Boston, makes some interesting observations in regard to the above-named topic. He calls attention to the fact that the eye has always been studied simply as a part of the body, under physiology, and contends that it needed to be studied as an optical instrument, under optics, a branch of science in which our knowledge is mathematically accurate. The usual explanation that eyes are naturally weak and may be rested by an avoidance of work is declared to be erroneous, and the conviction is expressed that no organ of the body should fail to perform its own particular function or show difficulty in its performance unless something is out of order. The proper thing to do, according to Dr. Dixon, is not to give up its use, but to find the trouble, to correct it if possible, and to restore the organ to usefulness.

The writer informs us that the eye varies as much as everything else in the human body. "Each person," he states, "is born with his own pair of eyes; sometimes they are correct, oftener not so. Often they are not alike and cannot work together properly." Vision is corrected by the ciliary muscles, which are made to work; but when they are overtaxed, they are liable to exhaustion and this, in turn, gives rise to serious consequences. It is found to be an actual fact that eye-strain is often the principal factor producing nervous debility, hysteria, melancholia, vertigo, nausea, insomnia, nervous dyspepsia, palpitation of the heart, general nervousness, irritability, faintness, weariness, headaches, constipation, and dozens of other annoying conditions.

Eye-strain, the author maintains, is a permanent waste of nervous energy in correcting the slight congenital and permanent errors in the shape of the eyes. This waste is not felt by a strong, healthy system, but is ready to become a decided tax whenever the system gets below par, and its effects are intensified immensely by continued close work.

When once the muscles have been taxed to the point of exhaustion, and nervous reflexes or disturbances set up elsewhere, then any effort to force the eyes to continue their work may cause actual physical damage requiring a long time to repair. It is like the breakdown that comes from overwork in any other way—repair is slow and sometimes never perfect.

Now that the cause of eye-strain is known, we have the choice of two methods of relief—we may remove the conditions that make it a burden, or we may correct, but not remove, the cause.

Theoretically, the doctor insists, glasses should be worn constantly since the errors are fixed, but if the eyes can once learn how to rest, they are usually able to bear their overwork a fair share of the time without bad results; but they must have rest, and at frequent intervals.

The dislike to wearing glasses is so great and universal, the reason for wearing them so little understood, and the temptation to the oculist to avoid forcing such an unpleasant remedy on his patients is so strong, that they have been worn generally for close