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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.

JAPANESE DARING ON LAND AND CAUTION ON THE SEA.

During the past few months of the struggle in the Far East, there has been a marked difference in the spirit with which the land and sea operations have been carried on by the Japanese. On land they have consisted of a succession of fiery onslaughts and almost reckless sacrifices of men, which is in marked contrast to the extreme caution with which Admiral Togo has handled of late the vessels of his fleet—a caution which is very different from the recklessness with which he sent his ships in under the very guns of Port Arthur in the earlier stages of the war. From the first, the operations of the Japanese army have been distinguished by the daring with which officers and men have made operative the masterful strategy of Gen. Kuroki—a combination of skill and courage that has resulted in an unbroken chain of successes for the Japanese arms. The difference just now between army and naval methods is to be attributed to a change in the conduct of naval operations that dates from the day on which the Japanese lost one of their finest battleships, the "Hatsuse." As we pointed out at the time, the sinking of this vessel by contact with a mine reduced the battleship strength of the Japanese fleet by fully twenty per cent; and this irreparable loss seemed to have brought home most forcibly to Admiral Togo the truth already well known to him, no doubt, that while losses to the army could be made good, and the gaps filled up by willing and brave recruits, losses in the battle line of the Japanese navy were absolutely irreparable so long as the war lasted.

For the wide field of operations, and the extremely difficult character of the work to be accomplished, the navy of Japan was pitifully small. Not only was it necessary to contain the crippled but still powerful fleet of Russia within Port Arthur, but the swift and powerful cruisers at Vladivostock had to be watched, and adequate convoy provided for the troops and supply ships by which the great armies of Japan in Manchuria were to be supplied with recruits, ammunition, and food-stuffs. These duties would task the resources of a fleet much larger than that of Japan; and when back of this there loomed the possibility of a second Russian fleet, embodying five of the newest and most approved pattern of battleships, arriving in eastern waters, for co-operation with the Port Arthur squadron, the task might well have daunted a greater maritime nation than Japan. Not only must Admiral Togo sink or destroy the eastern fleet of Russia; but he must do so, if possible, without the loss of a single battleship or armored cruiser; for should the Japanese admiral have to face the freshly-arrived Baltic fleet with two or three of his battleships sunk and the rest of his fleet heavily crippled, the command of the sea, as far as human foresight could forecast events, would pass to Russia, and the capitulation of the Japanese armies in Manchuria, cut off from their base of supplies, would be but a matter of time. It is considerations such as these, no doubt, that have caused the Japanese admiral to conduct his operations at longer ranges than he did in the earlier stages of the war. He has been content to hold the Port Arthur fleet of Russia securely within the harbor. Even when sorties have been made, it has seemed as though he preferred to fight long-range engagements rather than place himself within reach of the submerged torpedo tube or the ram of Russian battleships. Admiral Togo has a double task to perform. He must not only sink the enemy's ships, but he must do so and come out of the fight with his own vessels afloat and, as far as may be, intact. Should he steam into close quarters and succeed in sinking the six battleships of Russia at the cost of the loss of three of his own, the ultimate failure of Japanese arms on land and sea would be rendered all but certain by that victory; for with but two battleships afloat, the command of the sea would pass immediately to the powerful Baltic fleet upon its arrival in the Far East. Admiral Togo does not forget that this reserve fleet will include, as we have said, five of the most effective battleships ever built for a naval power.

The question is frequently being asked as to why the Japanese, with their evident superiority in seamanship and gunnery, do not close in and finish the Russian fleet at the first opportunity. The answer is to be found in the considerations which we have discussed above. The destruction of the Russian fleet, if Japanese strategy and tactics can have their way, will be accomplished either by long-range gun fire, or by torpedo-boat destroyer attack. Exact details of the results of the recent sortie of the Russian fleet from Port Arthur are not available at the time we go to press; but it is likely that in spite of the general engagement which is reported to have occurred, few, if any, of the Russian ships have been sunk, and what damage they sustained has been entirely from Japanese gun fire. It is the same necessity of fighting with a view to as little disablement to his fleet as possible, that has caused Admiral Togo to leave the Vladivostock squadron to an unmolested raiding of the high seas. It would be futile and disastrous to send his protected cruisers against the armored ships from Vladivostock, and Togo can ill spare any of his own armored cruisers from the important work of containing the Russian fleet within Port Arthur and destroying it, should it come out.

RADIO-ACTIVITY INDUCED BY THE EMANATIONS OF INCANDESCENT METAL WIRES.

In a paper recently read before the French Academy of Sciences, Mr. T. Tommasina records some recent experiments made by himself on monopolar electric dispersion, produced by a metal wire heated to redness by the electric current and placed either in parallel with the vertical disk of an electroscope or between two plates of a condenser, one terminal of which is connected with the ground and the other with the electroscope.

The discharging effect, according to Tommasina, is not necessarily unilateral, as had hitherto been supposed. On the contrary, even with the lowest active temperatures any metal is found to act on both electricities, though there is a considerable difference between the two effects. This difference depends on the sign of the charge, increasing as the current continues to pass in the case of metals and producing a more rapid decay of negative charges, as for instance iron and copper. On the other hand, this difference is found to decrease with metals for which the maximum activity has an opposite sign, as for instance silver and zinc.

A zinc-plated iron wire, after producing for some time a more rapid decay of positive charges, will gradually show smaller differences, until both effects become equal, when a difference in the opposite direction begins to manifest itself, the decay becoming finally the same as that of pure iron, as the zinc has entirely disappeared.

The difference between the two decays as characteristic of the various metals will gradually decrease for augmenting current intensities. In fact, with a very strong incandescence or a partial melting of the wire, the two decays will become practically equivalent, while the radio-activity assumes the maximum value. If the wire be cut the explosive discharge passing at the rupture will result in the same decay, no matter whether the electroscope be charged positively or negatively, and regardless of the nature of the metal wire. Hence it is inferred that these results are not due to ultra-violet rays, which, as is well known, produce immediately only the discharge of polished negatively electrified metals.

The radio-activity of any metal wires heated to redness by the electric current will decrease according to an asymptotical curve. It is merely necessary to rub the wire slightly between two fingers, or else to leave it to itself for some time, to restore its maximum activity. In the case of platinum, the maximum decay of which is observed with negative charges, a similar fall of the radio-activity is observed, while only the positive decay seems to show a decrease with time.

If the radio-activity of the wire has become very small, the wire is found to remain radio-active for a long time when the circuit is broken. This phenomenon is made to disappear nearly completely by rubbing the wire, or else spontaneously after an interval varying according to the nature of the wire and the duration and intensity of the current used. If the wire be surrounded by a jacket of glass or aluminium (the latter being grounded) the cover will assume a radio-activity of its own.

These phenomena must necessarily be due to a radio-activity induced by the emanation of the incandescent wires. Tommasina has made further investigation in this direction, in the course of which he has stated the presence and studied the action of the typical alpha, beta, and gamma radiations.

The alpha radiation is arrested by any, even the thinnest, screen while seeming to diffuse in the open air with a very marked tendency to following the electric flux, and always bearing a positive charge.

The beta radiation will traverse very thin paper and aluminium screens, which absorb a large portion of it, and become negatively electrified.

The "pyro-rays" will produce a strong ionization of the air, resulting always in the same discharge, independently of the charge of the electroscope. Although capable of penetrating an hermetically closed pasteboard box, they will undergo a strong damping effect. On barium-platinum-cyanide screens they will induce a fluorescence, though of very low intensity. The gamma rays are given off in greatest amounts from incandescent platinum wires and from explosive discharges between any metal wires.

DEDUCTIONS FROM THE BALTIMORE FIRE.

In adjusting the losses made by the great Baltimore fire, the various insurance companies interested were enabled to analyze the efficiency of material used in the so-called fireproof buildings and the manner in which they were constructed. The disaster afforded the best opportunity which has yet been given to study the effect of a conflagration upon modern structures intended to resist the action of heat, and experts were employed who have made a very exhaustive investigation covering a period of several months. This investigation was in connection with the appraisal of damages, and, as a result, statistics are available which show percentages of loss that may be considered approximately accurate. In previous articles a description of the principal office buildings which were in the burned area has been given, and in articles published immediately after the conflagration statements were made to the effect that brick and terra cotta were far better for resisting heat than any kind of natural stone. These conclusions are borne out in the several reports of the experts referred to.

For the purpose of comparing the percentage of loss on different materials, three of the larger office buildings have been selected from the eight structures which were reported on—the Continental, the Equitable building, and the Maryland building. The Continental was considered the best constructed of the series, comprising sixteen stories and a basement. It was somewhat isolated from the others, and, owing to its height was more exposed to the action of the fire. The Equitable was but ten stories high and protected on two sides, including the direction from which the fire approached, by other structures. The Maryland, which was ten stories high, had practically no protection on one side and on the rear from the flames. The three buildings contained every kind of supposed fireproof material utilized in Baltimore, and in estimating the percentages of damage the experts calculated upon the value of the different substances as they were left in the burned structures, allowing for all which could be utilized in making repairs. The following table shows comparative percentages of loss:

	Equitable	Continental	Maryland
Masonry	51	49	58
Granite	61	58 total (cut stone)	
External marble..	64	—	—
Steel	43	9	6
Ornamental iron ..	62	77	21
Fireproofing	94	54	76
Internal marble ..	90	94	total
Terra cotta	69	73	76

In the above calculations the examiners considered all brickwork in the Equitable Building under the head of masonry. With the steelwork was included the cast-iron columns and other portions of the frame which are noted hereafter. The ironwork in all the buildings classed under the head of ornamental, refers to staircases, railings, etc. In the Continental Building, the brickwork is also classified under the head of masonry, while the marble was exclusively for interior decoration. The cut stone referred to in the Maryland Building was also for exterior use, while all of the marble work was utilized for interior finish.

In planning the Continental Building, the first three stories were veneered with granite and reinforced with brick. Above, they were of ordinary and pressed brick with terra-cotta trimmings, the pressed brick being anchored to the common brick with strips of galvanized iron. All of the steel was covered with fireproofing throughout, except a portion of the roof girders. The marble was used principally in wainscoting and in the halls, corridors and on the floors. The marble work cost $108,000, which will give an idea of the great loss which was sustained in this material alone. The galvanized-iron strips between the brickwork gave way, allowing much of the brickwork to fall out. Had it been set more firmly and reinforced with brick the terra cotta would have sustained less loss. The experts considered that the partitions and wall tiling in the building were too light for the purpose and poorly constructed, which accounted for their total loss. They attributed the small percentage of damage to the steelwork to the fireproof covering. The offices in this building were equipped with vaults built into the walls. In quite a number, the contents of the vaults were destroyed, and it was decided that nearly all of the doors must be replaced.