

THE HELIOGRAPH IN WARTIME.

THE heliograph is by no means a modern invention. Although it has been a good deal spoken of during the present South African campaign and is generally looked upon as one of the mechanical marvels of the nineteenth century, the fundamental idea of using the sun's rays for writing is as old as the Roman empire itself.

Every student of the classics will remember how the old Roman soldiers used their shields for flashing back information to the rear or from one wing of an army to another. The heliograph is practically the same system of sun flashing reduced to a scientific basis, so

ed the importance of signal fires in wartime and made use of a code of fire flashes; but it was not until 1822 that Colonel Colby of the British Royal Engineers devised a more adequate system for transmitting messages by sun flashes. His method of doing this was by nailing a certain number of pieces of bright tin on poles and exposing them to the sun's rays. Some time

us of such sun writing was well known when, in 1856, General Miles began his Indian campaign against Geronimo. If the truth were only known, it was the heliograph more than anything else that led to the rounding up and capture of the famous, blood drinking red man. One can imagine the surprise of the Indians when they found that they could not move without the fact being

pouch containing a sun mirror and a station mirror, a small screen or shutter, a sighting rod and two small tripod stands for the mirrors. The entire apparatus does not weigh over ten pounds and can easily be carried over the arm. When it is desired to send a message, the sun mirror is placed on one end of a thin rod three feet in length, with the station mirror at the other end, the bar being held by the tripod. When the sun is in front of the operator—that is to say, in front of a plane through his position and at right angles to the line joining the stations—the sun mirror only is required for dispatching.

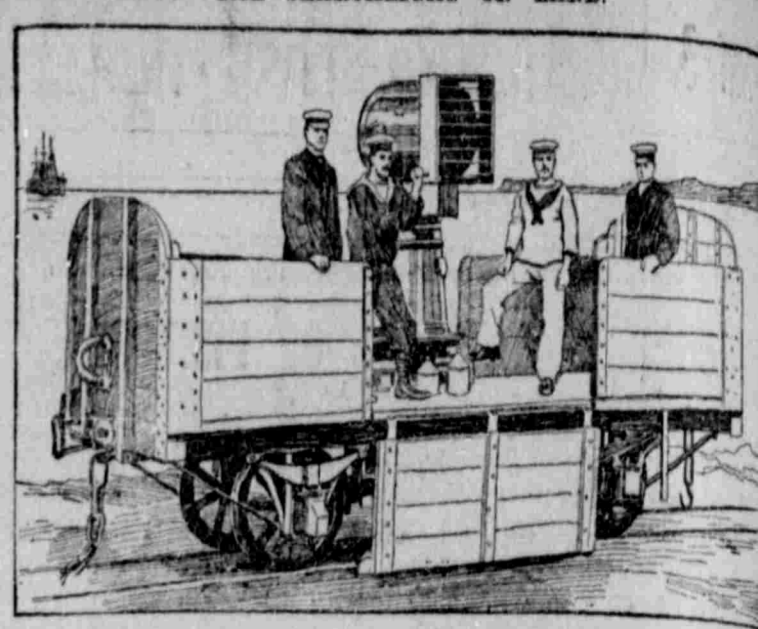
MOVING A LIGHTHOUSE.

Here is a lighthouse that has been picked up and moved about bodily as if it were a brickbat and not a huge structure many hundred tons in weight. It stands at Lowestoft, on the east coast of England, and, owing to the



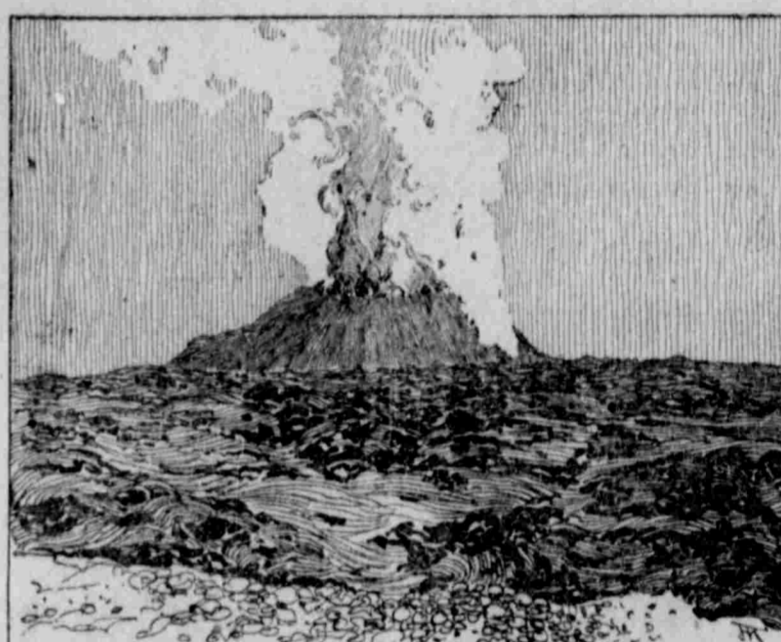
fact that the sea has been encroaching on the cliffs along this coast, it became necessary to move the lighthouse back a considerable distance. It was a difficult task, but one which modern engineering successfully overcame.

THE SEARCHLIGHT ON LAND.



It would be hard to overrate the service which the ingenious Captain Scott of the Terrible has rendered the British during the present South African war. Not only did he improvise for the heavy long range gun such field mountings as enabled them to be transported to the relief of Ladysmith, but he has also adapted the searchlight to make it a considerably more powerful and useful instrument for long distance signaling than is the military heliograph. For this purpose the masthead electric signal light has been occulted by sliding cylinders, or shutters like venetian blinds, and these lights have been placed on flat cars, where they have been operated with great success in connection with the armored train during several engagements. The accompanying illustration shows how Captain Scott's new signal light is placed on a car and operated, throwing a signal on a clear night that can be read for a distance of over 100 miles.

HAWAII'S GREAT VOLCANO IN ERUPTION.



One of the curiosities of that ever interesting island of Hawaii is the great volcano of Mauna Loa, a picture of which is herewith reproduced from a recent photograph. This picture represents the volcano in eruption, showing the dense columns of smoke drifting up from the crater and the immense beds of broken lava that surround this mountain of fire and desolation. In this connection it is interesting to note that all of the islands of the Hawaiian group are entirely of volcanic origin. The summit crater of the great volcano of Mauna Loa, which is called by the natives Mokuaweewe, is 13,600 feet above the sea, and it has been computed that the mass of the mountain is 1,300 times greater than Vesuvius. From this volcano eruptions of the greatest splendor break forth every few years, the outbreak of torrents of lava generally being preceded by more or less severe earthquakes. During some of these outbreaks the horizon is illuminated for a distance of 150 miles in every direction, and sometimes so intensely that by its light fine print can be easily read at a distance of 40 miles from the crater.

THE LONG AND THE SHORT OF IT.

One of the curious sights in the ranks of the Royal Niger constabulary is a sergeant major who is 6 feet 4 inches tall and a drummer boy who goes about with him and is just a little over half that height. They are both in the way excellent types of that institution.



peculiar to the British empire, the colonial soldier policeman. In fact, in almost every phase of British imperial existence the keynote of life in general is to be found in the capacity of the British colonial subject to look after his own affairs at home and even defend himself against aggression when necessary.



that the message may be transmitted a distance of from five to even 100 miles when the circumstances are favorable.

The military value of the heliographic method of transmitting information may be readily imagined. Its first advantage is its extreme simplicity. It does not necessitate the keeping open of lines of communication, there are no wires to protect, no batteries to look after and no burdensome apparatus to carry about.

The Indians of America, like the old warriors of the Scotch highlands, realized

later this was improved on by the adoption of a plain mirror. In 1833 an English officer at Gibraltar used an ordinary looking glass to reflect flashes across the strait to Tangier, thereby carrying on a long distance conversation with other English officers in Africa.

This mirror system was experimented with and improved upon until the year 1875, when the United States government purchased the latest models and began the instruction of a special signal corps in heliography. The military val-

known to the Americans and the movement mysteriously anticipated. Signal parties, in fact, were flashing hourly information from mountain peak to mountain peak, and the Indian warrior's headquarters were always known at Miles' camp. Through the use of the heliograph Geronimo was kept away from water by rapidly stationed and mobile bands of troops and was finally really parched into submission.

The English army had already been making use of the heliograph in Afghanistan, and during the Boer war of 20 years ago made effective use of the Mance heliographic apparatus. The great service this means of communication has been to the different British commanders besieged by the Boers in the present South African war is very well known.

The field heliograph apparatus, as used today, consists of a sole leather

But with the sun in the rear of this plane both mirrors must be used to produce satisfactory results.

When the sun mirror only is used, the light flash is sent directly to the receiving station, the mirror having a small hole in its center like the hole in the globe sight of a rifle for the purpose of aiming and adjusting the ray. The station mirror has a small disk at the center, and when the two mirrors are used they must be so adjusted that the shadow from the center of the sun mirror shall be reflected against the small disk on the face of the station mirror. In making signals long and short sun flashes take the place of the dots and dashes of the magnetic sounder, the same call being generally used for both instruments. When the air is clear, signals may be taken by the naked eye at a distance of 100 miles, and by an expert at the rate of 15 words a minute.

A PROMISING AMERICAN SINGER.



A young American singer who is winning musical honors abroad is Miss Estelle Liebling, who recently secured an engagement with the Royal Opera House at Dresden as coloratura soprano. Her first noteworthy hit was made not long ago at a concert in Berlin, where her singing in Leo Delibes' "Lakme" brought from the severest Teutonic musical critics of the capital the most enthusiastic comparisons with Sembrich, Melba and other famous prima donnas. Miss Liebling's great success is remarkable because of her extreme youth, for she is only an 18-year-old girl. She is to appear at different times during the season in Germany, and if she continues to improve during the next few years as she has done in the past she will become one of the great singers of the world.

A SHELLPROOF CELLAR AT MAFEKING.



One of the English officers now bottled up in Mafeking is going to write a thesis on how to be graceful though under shell fire. This officer is Colonel Hore of the police fort, who has his headquarters in an exposed portion of the beleaguered town. Whenever the shells begin to fall, the colonel, with considerable haste, but even more dignity, secretes himself in the bombproof shelter provided for his protection, and there he lies until the Boers grow tired of pounding away at him. When the cannonading stops, he crawls out of his hole and climbs the roof of a neighboring cottage to watch the course of events without the town and report on the same to headquarters. But it is impossible for an officer to look at his best when he has been hiding an hour or two in a grimy hole in the ground, though one can clearly see how discretion is the better part of valor in his case.

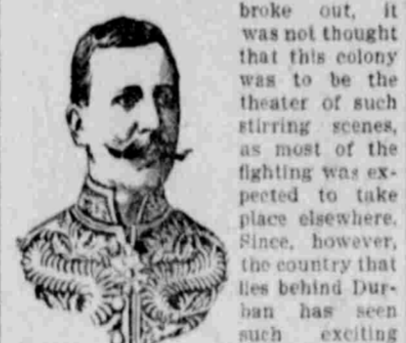
HOW REFUGEES ROUGH IT AT DURBAN.



One of the scenes depicting the occasional comedies of war may be witnessed any day in Victoria park, just outside of the city of Durban. Here a great many of the refugees from Johannesburg are encamped, men, women and children living huddled together in tents and straggled improvised cabins. Here persons who a few months ago were living luxuriously at home in the most comfortable of residences now dwell very much like gypsies and vagabonds, gathering wood, cooking their dinners over little open campfires, but all working together in a very light hearted and happy manner considering the circumstances. Victoria park is close to the seashore and has a pleasant outlook and a comparative immunity from war's alarms, so while these homeless refugees are not in the most comfortable of dwellings they consider themselves very much better off than those unhappy people who are shut up in the different towns being besieged and shelled by the Boers.

THE GOVERNOR OF NATAL.

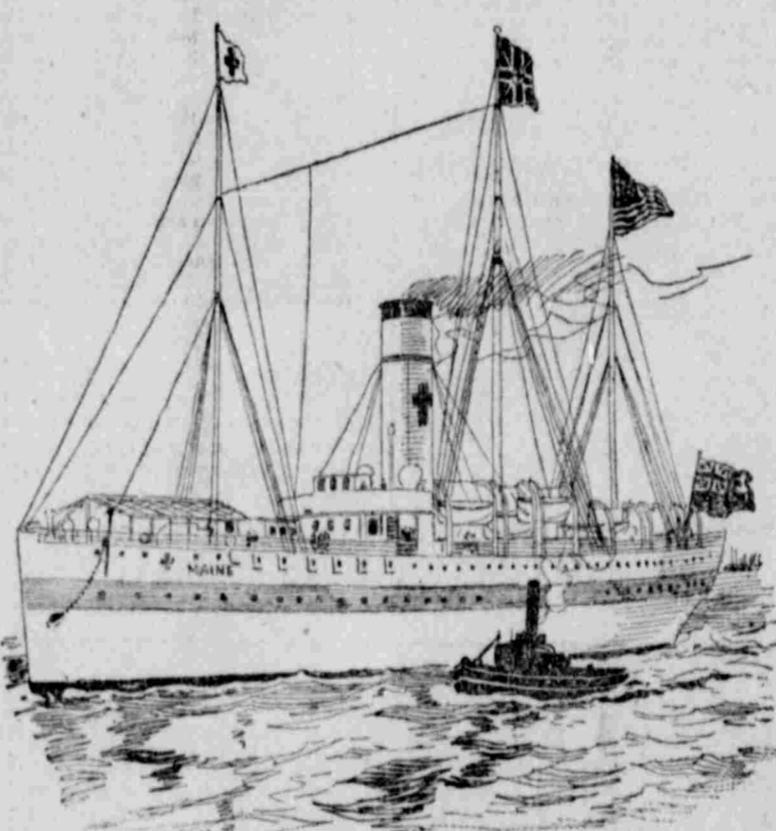
One of the important but little heard of officials in South Africa at the present time is Sir Hely Hutchinson, the governor of Natal. When the war first broke out, it was not thought that this colony was to be the theater of such stirring scenes, as most of the fighting was expected to take place elsewhere. Since, however, the country that lies behind Durban has been such exciting times, both the military and civil officials of Natal have had their hands full, and both Sir Hely Hutchinson and the premier of the colony, Lieutenant Colonel Hime, have found themselves very busy men since the opening of hostilities.



A STRANGE DRINKING FOUNTAIN.

One of the curiosities of a small Pennsylvania town is a drinking fountain that is shaped like a tiger's head, as shown in the accompanying small illustration. The most remarkable thing about this head, however, is the fact that at night the eyes of this tiger head become luminous. This is due to the presence of two small electric lights cunningly placed inside the head, and though they have often lighted sober citizens on the way to a refreshing drink they have had many unpleasant impressions on the individual who goes home late from his club.

THE AMERICAN HOSPITAL SHIP MAINE.



Perhaps nothing has done more to knit together the bonds of friendship between England and the United States than the fitting out and dispatching to South Africa of the American hospital ship Maine. This messenger of mercy was sent out by the American women in London, and among the trained staff on board were five specially selected American nurses. Such an enterprise could not, of course, receive the official sanction or assistance of the United States government without violating the principles of neutrality. But, although the movement has been an individual and unofficial one, the great consensus of popular opinion in America will favor such a move and wish the ship and its crew all success in alleviating the inevitable miseries and horrors of warfare. The accompanying picture shows the steamship Maine as she appeared at the time of her departure for the Cape, fitted up as a thoroughly up to date floating hospital.

respect compared with the carp. That remarkable fish moves no fewer than 4,336 bones and muscles every time it breathes. It has 4,329 veins, to say nothing of its 59 muscles.

The Almanach de Gotha is the most exclusive book of its kind, and perhaps of any kind, in the world, and to get one's name in its pages implies that one is either an exalted personage or something very much like it. And of those whose names appear very few are able to boast of having a portrait between its select and scarlet covers.

American shops turned out 2,473 locomotives the last year—the largest number they ever manufactured in one year, and 598 more than were made in 1898. More than 25 per cent of the number, or 524, were made for railway companies in other countries. Large as the output was—and it was fully equal to the capacity of the works—it was little more than sufficient to replace the engines which were worn out and discarded. There are about 37,000 locomotives in the United States.

Cloth can be rapidly cut by a newly patented implement which has an electric motor suspended from the ceiling

THE HOME OF TYROL'S HERO.



Hidden away in the fastnesses of the Passer-Thal, midway between Sterzing, on the north, and Meran, on the south, stands Hofer's inn, the birthplace of Andreas Hofer, the William Tell of Tyrol. But Andreas Hofer is less mythical and lived in more recent times than did the Swiss hero. During the Napoleonic wars of the final decade of the last and the first decade of the present century Tyrol was the scene of frequent conflicts between the French and the Austrians. At this time Hofer was living with his parents at his Passer inn, shown in the accompanying illustration as it stands today. This inn became the place of meeting of the Tyrol patriots who looked forward to the deliverance of their country from Bavarian bondage. Here Hofer was the chief organizer of the revolutionists, and it was in this house in the mountains that the real movement that led to the wresting of the Tyrol from French and Bavarian domination first started. It was during that struggle that Tyrolean men, women and even children took part in the war for their country.

THE POLICE OF BRITISH GUIANA.



Among the staunch upholders of the law in the remoter quarters of the British empire the native police of British Guiana constitute one of the most efficient bodies of trained men. The accompanying illustration shows a detachment of the dark skinned South American policemen in parade uniform. The stalwart natives of British Guiana are taken by the English officers and drilled and groomed and disciplined into the best of trained soldiers. When imbued with military traditions, they make most satisfactory defenders of the peace, and the service they render the colonial office in London is no insignificant one.

LITTLE BITS OF INFORMATION.

In Denmark there is an excellent law in aid of temperance. It is that drunken persons should be conveyed to their homes by the police in carriages provided by the publican who last supplied them with drink.

In every school in Paris there is a room where free meals are served to

the children who are too poor to pay for them.

There are certain lucky creatures which never feel the pangs of thirst, for they are so constituted that drink is unnecessary to them, and they never swallow a drop of water in their lives. Among these animals are certain ga-

zelles of the far east and llamas of Patagonia.

The first constitutional convention in Ohio contained as delegates five who afterward were elected governors of the state and four who became United States senators.

People marvel at the mechanism of the human body, with its 12 bones and 60 arteries. But man is simple in this

respect compared with the carp. That remarkable fish moves no fewer than 4,336 bones and muscles every time it breathes. It has 4,329 veins, to say nothing of its 59 muscles.

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by balanced cords, with a gear wheel at the lower end of the vertical shaft to connect with a horizontal shaft, which carries the cutting disk in proximity to a shoe, sliding under the cloth as it is cut.

There are five "lasters" in the saint's kitchen at Constantinople. They taste every dish before it is placed before their royal master.