THE NORTHEAST COAST OF NEW GUINEA.

The expected occupation of the great island of New Guinea, the near neighbor of Australia, by the British, lends interest to the following, which we find in the *Town and Country Journal:*

Travelers, such as Wallace, D'Albertis, and Moresby, the missionaries stationed for many years in the southeast part of New Guinea, and recent explorers from Europe as well as from Australia, have given descriptions of the more accessible portions of that island, but for some reason or other the opportunities which offered themselves for making drawings on the spot of the scenery and of the natives seem to have been but seldom taken advantage of, judging by the few sketches which have been published. Yet a sketch, even if it cannot claim the perfection of detail which distinguishes a photograph, will convey at a glance a better idea of the appearance of a country, its inhabitants, their dwellings, notions of dress, boats, and implements of war, than the most ample description from the pen. Talok Lindju, or Humboldt Bay, is situated nearly midway between the eastern and western extremities of the island, distant from each other about 1,600 English miles. The broadest part of New Guinea, more than 400 miles wide, abuts on Torres Straits in the south, and terminates on the shores of Humboldt Bay in the north. Hence, from its geographical position, its facilities of approach, good shelter, and more than sufficient space and depth for an anchorage, this bay will yet no doubt play an important part in the future colonization of New Guinea, which covers an area of over 300,000 square miles, equal to the total combined areas of the British Islands and France.

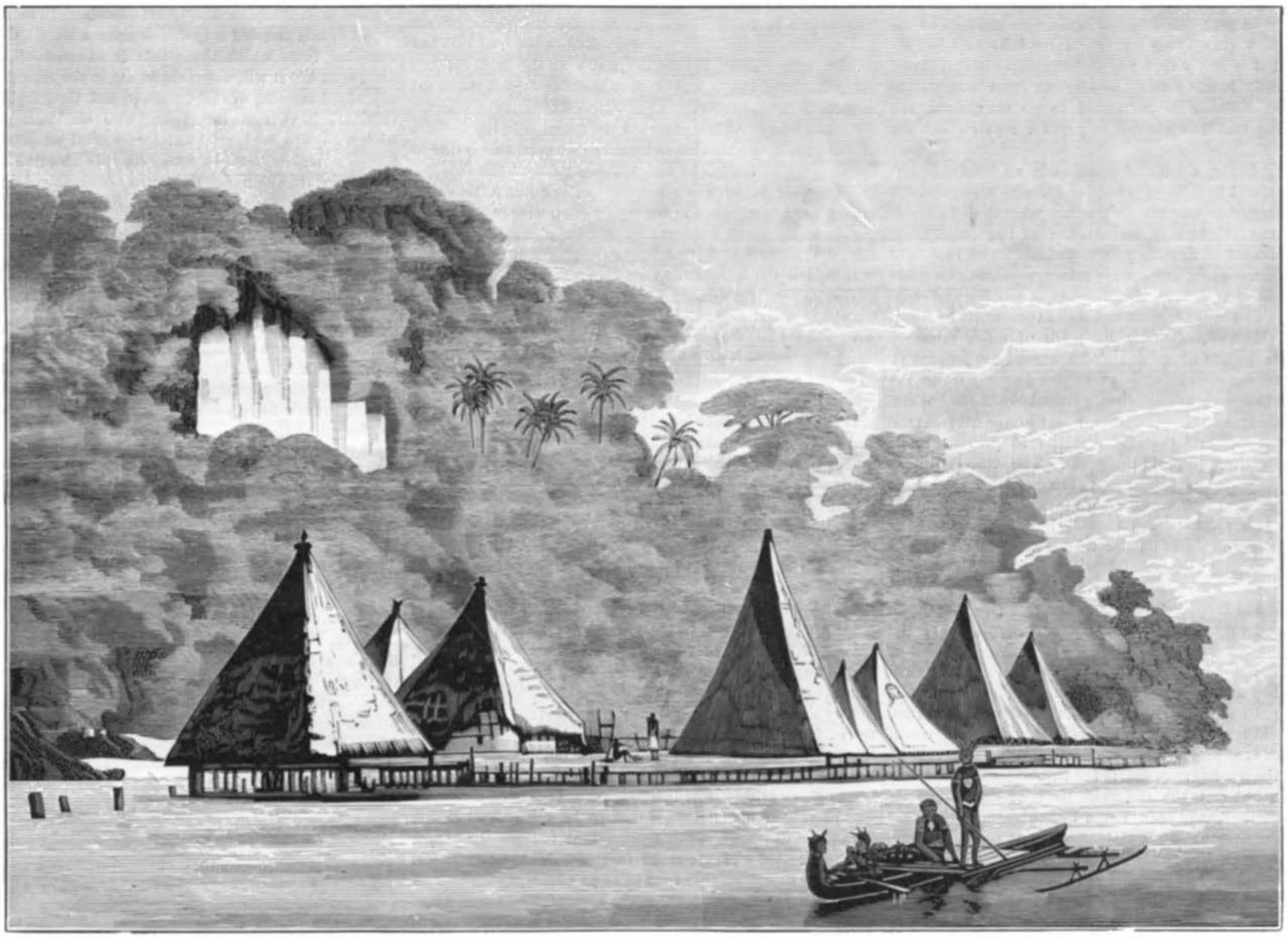
We may, perhaps, give a more vivid impression of the large extent of New Guinea by stating that a mail steamer, at its average rate of progress, will take from five to six days to steam from end to end of the island, that is to say, about the distance from Albany to Cape Otway, while its greatest breadth between Torres Straits and Humboldt Bay is nearly equal to the distance between Melbourne and Sydney, measured as the crow flies.

We present to our readers one of the sketches obtained in Humboldt Bay by a member of the Challenger expedition on the occasion of a visit, a few years back, to the northeastern coast of New Guinea, from whom the following account was obtained:

It was shortly after noon on a cloudy day of February that we first sighted the bold, rugged headlands which form the entrance to Humboldt Bay—Point Boupland to the east and Point Caille to the west. Owing to the great elevation of this part of the coast, the land appeared to be only five miles off, while in fact our distance was still twenty-five miles. On nearer approach, and as the weather cleared up, the lofty range and serrated peaks of Mount Cyclops, over 6,000 feet high, emerged from the clouds stretching westward as far as Point Dimonka, while eastward or to our left we could make out Mount Bougainville, both mountains covered with dense vegetation up to their summits. By placing these gigantic pillars on each side of Humboldt Bay, nature seems to have indicated the latter as the great gateway of New Guinea. Night had come on by the time we passed the entrance between the heads, here about a mile and a half apart, and anchored in 20 fathoms. New Guinea was discovered as early as the year 1537 by the Spanish navigator Grijalva. He describes the natives as men "with woolly hair; they eat human flesh, are great rascals, and given to such wickedness that the devils walk with them by way of companions."

In the year 1545 Tuigo Ostez de Hatez sailed along the greater portion of the north coast, landing at several places, and discovering a lot of new islands. It was during this expedition that the Spaniards gave to this great island the name of New Guinea, from the likeness of the natives to those of Guinea in Africa. In 1616 the Dutchman Schouten discovered Vulcan Island and the group of islands which still bear his name, situated on the northeast coast. He also visited the mainland, and according to his own account, "the natives had short and woolly hair; they wore rings in their nostrils and ears, feathers on the head, boars' tusks in their noses, and a large ornament on the chest. They chewed betel, and were subject to several diseases and deformities; they had plenty of cocoanuts, and asked one yard of cloth for four of these fruits; they owned pigs, but would not part with any." This description, although more than 250 years old, tallies word for word with the present condition of the natives.

In 1643 Tasman appeared on these coasts; Dampier visited the island in 1700, and his name remains attached to several localities. In 1705 the Dutch ship Geelvink explored the large bay in the northwest still called after it. In the year 1768 Bougainville discovered the land near Humboldt Bay, and in 1770 the celebrated navigator Cook surveyed part of the southern coast. After this date New Guinea was more frequently visited. In 1827 the subject of our illustration was discovered by Dumont d'Urville in command of the Astrolabe. He named Mount Bougainville, Humboldt Bay, and its two headlands, Point Caille and Point Boupland; but the loss of his anchors prevented him from completing his survey. Since his time the Dutch surveying ship the Etna in 1858, and H.M.S. Challenger in February, 1875, were the only vessels of note that anchored in Humboldt Bay. This will account for the little knowledge which the natives we met seemed to have of the ways and doings of white men, and the almost total absence of any traces, such as iron tools, of any previous interviews with the civilized world. An exploring party from Australia has for some time past been at work in New Guinea.



THE NORTHEAST COAST OF NEW GUINEA, NEAR HUMBOLDT BAY.

M. ANDRIES (*Ciel et Terre*) contends that hail is formed during ascending whirlwinds.

A Remarkable Surgical Operation.

Thomas Colt has recently been discharged from Bellevue Hospital, this city, with a restored nose. He was deprived of his nose a number of years ago by a cancerous affection technically called lupus, which destroyed the nasal bone as well as the fleshy covering, and even the lower eyelids. His treatment was undertaken over ten years ago by Dr. Thomas Sabine, the Professor of Anatomy of the College of Physicians and Surgeons, and has been successfully pursued up to the present time. Dr. Sabine first addressed himself to the task of arresting the disease, and when that was accomplished he restored the lost eyelids by grafting thereon healthy skin taken from the cheeks and forehead of the patient. The more difficult operation of restoring the nose followed. This was done by making use of the third finger of the left hand, from which the nail was first removed by nitric acid. Then the end of the finger was fixed against the forehead between the eyes, the epidermis at the points of contact having been previously removed to bring about adhesion. At the same time the finger up to the second joint was split open on the under side, the flesh stripped off, and the flaps thereby produced were connected with the flesh of the cheek on either side. The hand was fixed in the proper position by plaster of Paris, and held so until the adhesion was complete. Then the finger was amputated at the second joint, and the free edges of the part adhering to the face were arranged so as to form the wings of the nostrils. During all this time the nasal orifice was kept open by a hard rubber tube. The treatment necessarily occupied much time, and involved a number of painful operations, but was completely successful, and it is almost impossible now to distinguish the nose thus fashioned by surgical skill from one cast in Nature's own mould.

Tired Eyes.

People speak about their eyes being fatigued, meaning that the retina, or seeing portion of the brain, is fatigued, but such is not the case, as the retina hardly ever gets tired. The fatigue is in the inner and outer muscles attached to the eyeball and the muscle of accommodation, which surrounds the lens of the eye. When a near object is to be looked at, this muscle relaxes and allows the lens to thicken, increasing its refractive power. The inner and outer muscle to which I referred are used in covering the eye on the object to be looked at, the inner one being especially used when a near object is to be looked at. It is in the three muscles mentioned that the fatigue is felt, and relief is secured temporarily by closing the eyes or gazing at far distant objects. The usual indication of strain is a redness of the rim of the eyelid, betokening a congested state of the inner surface, accompanied with some pain. Rest is not the proper remedy for a fatigued eye, but the use of glasses of sufficient power to render unnecessary so much effort to accommodate the eye to vision.

Engines of the Elevated Railroads.

Although there are 220 boilers used by the elevated railroad companies of New York, which, through a peculiarity of law, are never officially inspected, there has never been a boiler explosion during the years the elevated railroad system has been in operation. During the same period there have been many disastrous explosions in and about the city of boilers which had been inspected and pronounced safe.

The reason why there have been no boiler explosions and few accidents to the machinery is that a rigorous system of inspection and repairs is kept up. The work is chiefly done in the big repair shop of the company, which covers two city blocks. It is one of the largest machine shops in the city, and employs 350 men. The master mechanic is T. W. Peeples, and the shop foreman J. D. Campbell. The shop is organized on the principle of an intelligent division of labor, thus securing for each portion of the work a body of well trained mechanics and a constant supply of duplicate parts of all machinery used. There are, for instance, three men constantly making and repairing connecting rods. If a connecting rod of an engine breaks, it is not necessary to wait to mend the broken rod or to make a new one. There is always one ready to be fitted in the place of the broken rod.

These shops are largely used for car and engine sheds. There is room for about 60 engines at a time. Every engine is not only carefully inspected by the engineer having it in charge, but there are two skilled mechanics employed to carefully inspect the engines upon the completion of every day's work. These inspectors are held to strict account, and it is rarely that any defect escapes them. They are constantly looking over the engines from one end to the other. Nothing is permitted to go unrepaired, the theory being that it is cheaper to pay for repairs than for accidents.

Anything in the nature of a defect in an engine is immediately noted in a book, and the foreman's attention is at once directed to it. He determines what shall be done. In knotty cases there is a consultation of the authorities, like that of a lot of doctors over a patient. The rule is to take no risks. There are always minor repairs to be made to engines in use. The strain of frequent starting and stopping keeps loosening screws and bolts that must be tightened. In this way, often by the work of a few minutes, serious detentions and accidents on the road are prevented.

Once a month each locomotive engine in use goes to the shop for a thorough overhauling, particularly of the boilers. At this time special inspection is made of the ashpan, the spark arresters, and the arrangements to prevent water or coal from dropping into the street. The wheels are examined carefully, and if they are worn rough by the brakes are taken off, and new surfaces are turned on them in big lathes. There are two men constantly attending these big lathes, and new surfaces on the wheels are made over and over again as long as the metal will warrant. All the car wheels are lined with paper and rimmed with steel. Great care is taken to keep the brakes in thorough repair, as upon them depend very much the safety and regularity of the trains.

After an engine has been in use two years it is taken into the shop and stripped for thorough overhauling, each part being attended to by experts in that particular line, who are held responsible for the efficiency of their work. The system is so perfect that any unskillful work is at once traced to the persons responsible for it. There are men who do nothing but put the different parts of the engine together after they have been made by others, and they are bound to see that the work given to them to use is properly done. They are not permitted to shift the responsibility upon their predecessors, but are held accountable as if they had done all the work themselves.

There are several patterns of engines in use on the road, and certain men in the shop are always kept at work on certain patterns. In this way each man becomes very expert in his special branch, and the various parts of the engines are constructed with great nicety. Each boiler, before it leaves the shop, is subjected to a hydrostatic pressure of 220 pounds to the square inch. All the boilers are made with extra plugs or manholes, so that they can be inspected much more easily and thoroughly than the boilers ordinarily in use on surface railroads. The iron used is the very best in the market, and often repairs are made when dictated only by extra precaution.

A very considerable expense of the big shop is the cost of water, of which immense quantities are used to fill the boilers, wash the cars, etc. The company has been engaged for months in sinking a big artesian well on the premises, which, it is hoped, will supply all the water needed.

Out of 220 engines belonging to the company there are generally about 15 in the shops in various stages of repair. One engine was built entirely in the shop, chiefly as an experiment. She is considered the best on the line, although made between times when repairs were not pressing.

Besides the constant inspection and repairs, the steam gauges are regularly tested and corrected once a month. The slightest variation is at once detected. It is only by such rigid and untiring watching of each screw and bolt and rivet that accidents are prevented. The tendency on all railroads is to "put a life" upon an engine—that is, to lay it up when its record shows that it has performed a fair average mileage. A record is kept of the mileage of each engine.

At the water stations there are hugh tanks, which are kept constantly filled by steam pumps. All this machinery is kept in order by the hands of the repair shop. All the tinware used on the road is made in the repair shop. The repairing of the cars requires a large force, and the supplies include a great variety of things. The breakage of glass chimneys to the lamps is a considerable item. The supply shop contains everything that can be imagined of the thousand and one odds and ends required to keep the cars and stations in repair.

In the principal offices of the shops there are curious records kept of the cars and engines belonging to the company. Each car or engine is represented by a button, which is dropped into one or another of a series of sections of holes in a neat board hanging on the wall. The sections are respectively labeled "good," "bad," "fair," "reserve," "repairing," so that at one glance at the board the foreman can tell the precise condition of the rolling stock and know where to concentrate his forces.

Not the least onerous part of the work of the master mechanic is the disposal of the swarm of inventors who are constantly applying to be heard. About one in a thousand has a good thing, and he finds a market at once. The railroad in the air has need for many appurtenances that are not used on other roads, and some of them are of entirely new construction. The gate on the car platforms is an instance. It grew out of the necessity for keeping passengers from jumping on the train when it is in motion. The twists in the road made it necessary to build a gate with free motion in every direction, extending for outer curves and contracting for inner curves. A train of four cars has sixteen iron gates. When the gates at the stations are taken into account, it will be seen that the capital invested in gates is considerable.

Almost every one has observed the decrease in the amount of noise made by the elevated trains. Part of this is due to the wearing of the tracks and moving parts of the engines, so that they move more noiselessly; but much time and money have been spent in the repair shop with noise subduing devices. Chief among these are the plans for suppressing the disagreeable "swish, swish," "chuck, chuck," with which the locomotive starts. The result is that many of the locomotives are fitted with a contrivance that arrests the noise, and distributes it into a sort of breathing that cannot be heard 100 feet away.—*New York Sun.*

How to Determine the Distance of an Object on the Sea.

It is amusing to note how ignorant many ordinary seamen and nearly all sea travelers are of such matters as the distance of the sea horizon, the way in which a ship's place at sea is determined, and other such matters—which all seamen might be expected to understand, and most persons of decent education might be expected to have learned something about at school. Ask a sailor how far off a ship may be, which is hull down, and he will give you an opinion based entirely on his knowledge of the ship's probable size, and on the distinctness with which he sees her. This opinion is often pretty near the truth; but it may be preposterously wrong if his idea of the ship's real size is very incorrect, and is sometimes quite wrong even when he knows her size somewhat accurately.

Any notion that the distance may be very precisely inferred from the relative position of the hull and the horizon line seems not to enter the average sailor's head. During my last journey across the Atlantic we had several curious illustrations of this. For instance, on one occasion a steamer was passing at such a distance as to be nearly hull down. From her character it was known that the portion of her hull concealed was about 12 feet in height, while it was equally well known that the eye of an observer standing on the saloon passenger's deck on the City of Rome was about 30 feet above the water level. A sailor, asked (by way of experiment) how far off the steamer was, answered, "Six or seven miles." "But she is nearly hull down," some one said to him. "I didn't say she warn't, as I knows on," was the quaint but stupid reply. Now, it might be supposed to be a generally known fact, that even as seen from the deck of one of the ordinary Atlantic steamers, the horizon is fully six miles away, the height of the eye being about 18 or 20 feet, and that for the concealed portion of the other ship's hull a distance of four or five miles more must be allowed; so that the man's mistake was a gross one. And several other cases of a similar kind occurred during my seven days' journey from Queenstown to New York.

The rules for determining the distances of objects at sea, when the height of the observer's eye and the height of the concealed part of the remote object above the sea level are both known, are exceedingly simple, and should be well known to all. Geometrically, the dip of the sea surface is eight inches for a mile, four times this for two miles, nine times this for three miles, and so forth; the amount being obtained by squaring the number of miles and taking so many times eight inches. But, in reality, we are concerned only with the optical depression, which is somewhat less, because the line of sight to the horizon is slightly curved (the concavity of the curve being turned downward). Instead of eight inches for a mile, the optical depression is about six inches at sea, where the real horizon can be observed. But, substituting six inches for eight, the rule is as above given.

Six inches being half a foot, we obtain the number of six inch lengths in the height of an observer's eye by doubling the number of feet in that height; the square root of this number of six inch lengths gives the number of miles in the distance of the sea horizon. Thus, suppose the eye of the observer 18 feet above the sea level; then we double 18, getting 36, the square root of which is 6; hence the horizon lies at a distance of six miles as seen from an elevation of 18 feet. For a height of 30 feet, which is about that of the eye of an observer on the best deck of the City of Rome, we double 30, getting 60, the square root of which is 7·7; hence, as seen from that deck the horizon lies at a distance of $7\frac{7}{10}$ miles. If the depth of the part of a distant ship's hull below the horizon is known, the distance of that ship *beyond the horizon* is obtained in the same way. Thus, suppose the depth of the part concealed to be 12 feet, then we take the square root of twice 12, or 24, giving 4·9, showing that that ship's distance beyond the horizon is $4\frac{9}{10}$ miles. Hence, if a ship is seen so far hull down, from the hull of the City of Rome, we infer that its distance is $4\frac{9}{10}$ miles beyond the distance of the horizon, which we have seen to be $7\frac{7}{10}$ miles—giving for that ship's distance $12\frac{3}{5}$ miles. And with like ease may all such cases be dealt with.—*R. A. Proctor, in Newcastle Weekly Chronicle.*

Metric vs. Anglo-Saxon Weights and Measures.

The International Institute for Preserving Anglo-Saxon Weights and Measures has addressed a memorial to President Arthur, asking him to appoint representatives favoring this side of the question to the International Convention to meet in Washington the 1st of October. The ostensible object of this meeting is to decide upon a standard or prime meridian, from which the world is to estimate longitude, time, etc., but it will assemble rather in the character of an adjourned meeting of the International Geographical Convention held at Rome last year. The meridian of Greenwich was then recommended for general adoption, but it was also resolved that, in return for this adoption of an Anglo-Saxon meridian by the Latin races, the Anglo-Saxon world, and particularly the United States, should adopt the French metric system. This, it is claimed by the Institute, is entirely uncalled for by the people, who have shown no discontent with their ancient system of weights and measures, but is mainly desired by a few thousand scientific gentlemen in this country, not engaged in practical affairs, although standing high in the several professions. The commerce of the world, however, its industry and its wealth, is predominantly Anglo-Saxon, and the business thereof is transacted proportionately in pints, pounds, and inches. If it took France forty years under an arbitrary government to cause the general use of the metric system, and overcome the confusion incident thereto, how much longer would it take, and how much greater the task, to transform all modern reckoning into this standard? The Sellers establishment adopted the metric system in their extensive machine works, and then abandoned it for the old system, after it had cost them an extensive plant. The American Society of Mechanical Engineers has also pronounced against this system by an overwhelming majority.

It is pointed out by the Institute that the metric system is based on erroneous calculations, the standards being essentially as arbitrary as those of the old system; and it is urged that a decimal arrangement can be easily effected with our Anglo-Saxon system, if that is desirable, without causing any serious disarrangement of present methods of reckoning. It is also claimed that the representatives already appointed by the President to the Convention are favorers of the metric system, President Barnard, a pronounced advocate thereof, being chairman of the delegation. From this fact, as also because it is supposed twenty of the thirty nations sending delegates will be favorers of the metric system, President Arthur is asked to appoint additional delegates who are pronounced advocates of the preservation of our ancient system of Anglo-Saxon weights and measures.

Production of Hydrogen Gas.

The *Revue Industrielle* describes an apparatus designed by M. Egasse for the generation, in large quantities, of hydrogen for industrial uses. For this purpose zinc scraps are placed in a copper cylinder closed by a hemispherical cover. Tubes connect the cylinders with the reservoirs of acid, and also with the gas washing appliance. Every cylinder is capable of producing 10 cubic meters of gas hourly, and what is called a "battery" of ten cylinders is mounted in a wagon for easy transport by two horses. The gas is produced in the classic manner, by the reaction of zinc and hydrochloric acid; and the acid is blown into the cylinders by compressed air, a special pedal blower being used for the purpose. The production of hydrogen by this method is very costly, for every cubic meter of gas requires 9 kilos. of acid and 3 kilos. of zinc, costing together 1·08 frs. Thus the price of hydrogen is from four to six times higher than that of coal gas; while even for ballooning purposes, for which it is specially suitable, its ascension value is scarcely double. The residual product of the manufacture of hydrogen by zinc and acid is crude chloride of zinc, which after concentration is marketable as a disinfectant or, in a purified form, as a mordant in dyeing. For this purpose, however, it requires so much preparation as to raise it into the rank of a primary manufacture, and the value of the finished product has very little bearing upon the first cost of its recovery as a residual of hydrogen gas production. It is not claimed by M. Egasse that the principle of manufacture here described is new, but that his apparatus is very compact and convenient.