

The engine commenced with an initial pressure of 1000 lb. on the square inch, and when the run was finished the gauge showed a remaining pressure of 300 lb. in the cylinders. The engine was perfectly under control throughout the trial, and was started and stopped with the greatest ease. Further experimental trials will be made on the Metropolitan line, but for the present the result is considered highly satisfactory.

Hudson's Bay as a Possible Outlet for the Northwest.

During the past summer the engineers of the Nelson River Railway Company have surveyed a railway route between Norway House at the outlet of Lake Winnipeg and Fort Churchill on the Hudson's Bay. The distance between these places is about three hundred and fifty miles. The surveyed route first follows the course of the Nelson River for a distance of nearly one hundred miles over a level country. The next part of the road is over a broken rocky country, where the Nelson River has a descent of nearly seven hundred feet to the lower plateau, where the country again becomes level, and continues so to Hudson's Bay. Upon entering this rocky range the surveyed route leaves the Nelson River, taking a more northerly course toward the valley of the Churchill River, which is reached at its entrance on the lower plateau, and continues to follow the course of the river to its outlet in Hudson's Bay. The estimated cost for building the road-bed is ten thousand dollars a mile on the plateau and seventeen thousand dollars a mile through the rocky portion of the route, or an average of twelve thousand dollars per mile along the whole route.

It is claimed that by this route it will be possible to transport grain from the Saskatchewan Valley to Liverpool for less than it will cost to carry it to Montreal by the proposed railway north of Lake Superior.

Professor Bell, of the Canadian Geological Survey, who sailed from Fort York, Hudson's Bay, and passed through Hudson's Straits in the latter part of last September, says that sailing vessels have sometimes considerable difficulty and delay in getting through, but steamships can make the voyage at any time between the first of May and November, as the straits are nearly one hundred miles wide in the narrowest part, and the channel is not obstructed by ice.

A Gigantic Electrical Battery.

An immense galvanic battery has been constructed for use in the lectures at the Royal Institution, London. It consists of 14,400 cells of chloride of silver and zinc elements. Each cell is composed of a glass tube about the size of a large test tube, stoppered with a paraffin wax stopper, through which the zinc rod and chloride of silver are inserted, a small hole being left to pour in the solution, which consists of a weak solution of chloride of ammonium (sal-ammoniac), the hole being fitted with a small paraffin stopper to make it air-tight. The tubes are mounted in trays, each containing 120 cells; eighteen trays are fitted in each cabinet. The battery, which is in the basement of the building, was begun in June, 1879, and finished in August, 1880. The charging of the battery occupied three persons a fortnight. A lightning flash a mile long could be produced by

243 such batteries, and yet Faraday has proved that the necessary amounts of electricity to produce a powerful flash of lightning would result from the decomposition of a single grain of water.

RUSSIAN BEER FLAGON.

The annexed engraving represents an example of Russian artistic metal-work. It is a massive silver flagon wrought in high relief, in a spirited design embodying an episode in



SILVER RUSSIAN BEER FLAGON.

the life of Peter the Great. With the exception of the waist of the vessel and knob of the cover the flagon is quite plain, but the relief portions are done in a style characteristic of Russian art.

SCALY-FINNED FISHES.

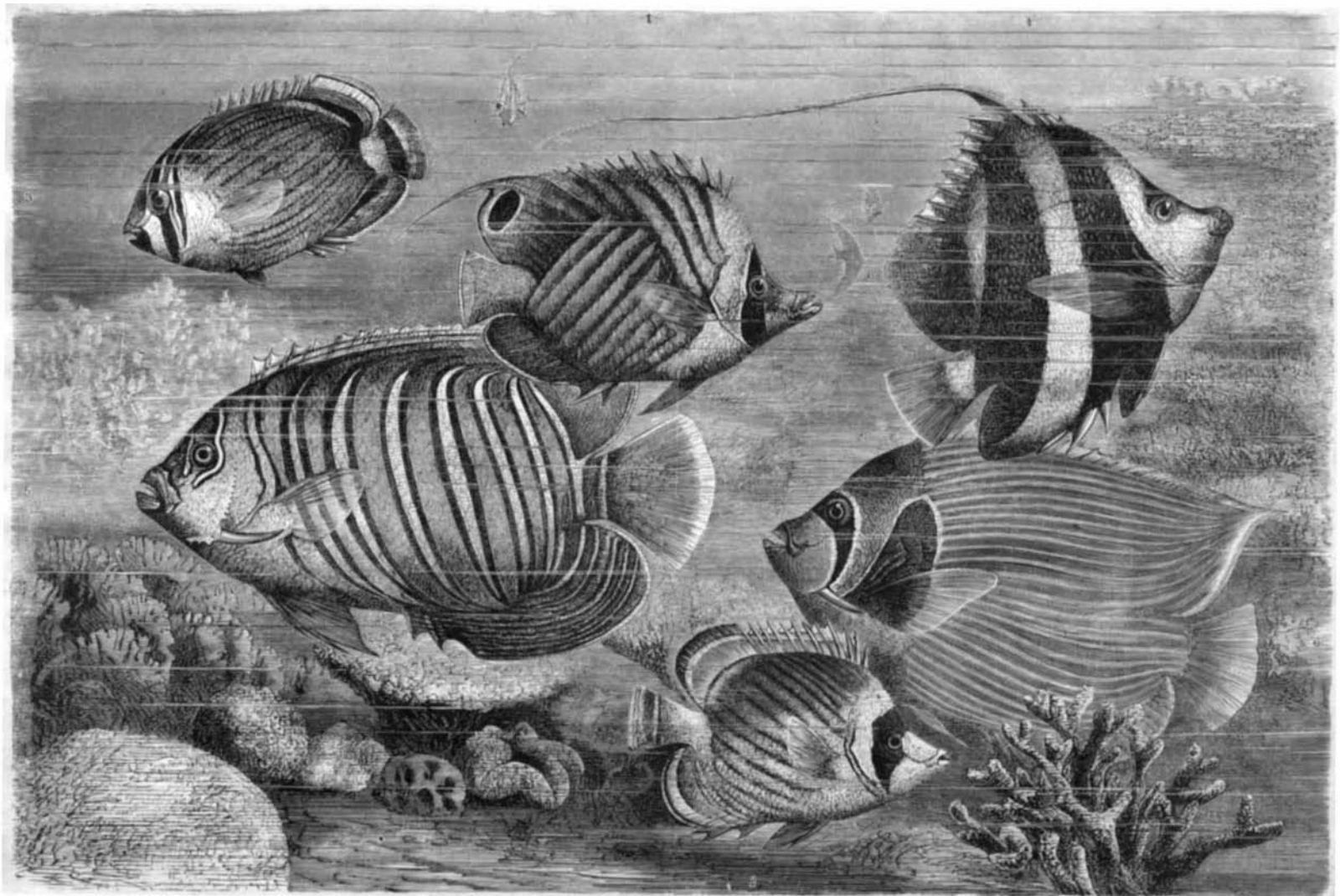
Our engraving represents members of a large family of fishes called by Dr. Günther *Squamipinnes* or scaly-finned fishes, because "the vertical fins are more or less densely covered with small scales;" but the spinous portions are not always scaly. These fishes are mostly carnivorous, and are inhabitants of the tropical seas and rivers. They are remarkable for their peculiar shape and their strange coloring. Their bodies are thin and very deep in proportion to their length, and their mouths are usually small.

The first group of this family have small mouths furnished with several rows of tiny, slender, and bristle-like teeth, which give them their scientific name *Chatodontina*, a term composed of two Greek words, the former signifying hair, and the latter a tooth. The colors of this group are brilliant and generally arranged in stripes or spots. Black and yellow are the prevailing colors, but blue and green are found in some species.

Fig. 1 in our engraving represents a fish which is found in the Indian Ocean and the western part of the Pacific Ocean, and is called by the Arabian fishermen of the Red Sea the flag fish (*Chatodon setifer*), on account of the considerable lengthening of the fourteenth ray of the dorsal fin. Dark bands run in different directions upon the whitish ground of the body. A black band edged with white extends from the neck through the eye to the throat; it is widened on the underside. Five or six blackish bands run obliquely from the front upward toward the dorsal fin, and from these lines eight or ten bands issue nearly at right angles, take a slight sweep downward, and then converge toward the tail. The region over the eye is also ornamented with four orange-yellow diagonal lines. The back part of the dorsal fin is lemon color, and has a black spot surrounded with an edge of white; above this the fin is a fiery red edged with black. The caudal fin is lemon yellow, ornamented on the back side with a crescent-shaped pale yellow and white-edged girdle, then with a cylindrical dark brown, black-edged girdle. The anal fin is orange color edged with black and seamed with white. The pectoral and abdominal fins are reddish-white. The dorsal fin has thirteen spinous and twenty-five soft rays, the anal fin three spinous and twenty soft rays; the pectoral fin has sixteen, the abdominal fin six, and the caudal fin seventeen rays. The length of the fish is about eight inches.

The coral fish (*Chatodon fasciatus*), Fig. 2, is about six and a half inches long. The main color of the head is white, with a broad black band extending from the crown of the head to the "præ-operculum," or front gill cover. The body is a bright yellow, ornamented with from nine to twelve brownish-black bands running obliquely from the front upward and back, reaching to the yellow fins. The lips are rosy red. The soft dorsal and anal fins have a black border. The caudal fin has near the end a lentiform black diagonal marking and a whitish edge. The dorsal fin has twelve hard and twenty-five soft rays, and the anal fin three hard and nineteen soft rays. This fish inhabits the waters extending from the Red Sea to China.

A third species of this group is the cliff fish (*Chatodon villosus*), Fig. 3. It is about four and a quarter inches long. The ground color of the body is lemon yellow, and has about thirteen longitudinal stripes. The head is ornamented with a broad black curved eye band, with a narrower band behind it running in the same direction. The brow has three or four diagonal lines, which, with the bands and the surroundings of the mouth, are black. The soft part of the yellow dorsal fin has a black edged band and an orange colored border. The anal fin has a bright yellow stripe extending the whole length with an orange colored border, and the black caudal fin has a broad rosy-red border. The dor-



1. FLAG FISH.—2. CORAL FISH.—3. CLIFF FISH.—4. CHARIOTEER.—5. DUKE FISH.—6. EMPEROR FISH.