against 24 millions in the same months of last year, the average value per pound during the 10 months of 1906 being about three-fourths of 1 cent per pound below the average for the same months of 1905, thus accounting for the decrease in value of this one item of shipments from the noncontiguous territory to the United States. The figures for the 10 months indicate that the total commerce with the noncontiguous territories will amount to about 115 million dollars, exclusive of approximately 10 million dollars' worth of gold which will be received from Alaska during the full year, the gold figures for the 10 months ending with April having aggregated over 8½ millions.

Summarizing commercial probabilities for the fiscal year which ends with the present month, it may be said that both imports and exports will certainly exceed those of any preceding year, and that the aggregate of trade with the noncontiguous territories will also exceed that of any preceding year; that the increase in imports occurs in all the great groups except foodstuffs; and that the increase in exports occurs in all the great groups, but especially in agricultural products and in manufactures.

THE MUD-SKIPPER OR JUMPING FISH.

By RANDOLPH I. GEARE.

THIS queer-looking fish illustrates forcibly the power of Nature to adapt her products to their surroundings and requirements. She made them into a fish, but, having decided that they must eat land food, supplied them with the needed facilities for obtaining it. And thus, by the aid of their strong pectoral and neutral fins, and with the assistance of their tail, they can hop freely over the ground, and gather their food, which consists largely of little crabs. The eyes have

and seize one fish at the bottom of the burrow."

Dr. Francis Day, the eminent English authority on the fishes of India, gives the following account of their habits:

"It is most curious to see these little fishes along the side of the Burmese rivers. At a distance they at first appear stationary, contemplating all passing objects, or else snapping at flies or insects, or in the water they look like a flat stone or a piece of slate sent skimming by a schoolboy. They climb onto the trees and large pieces of grass, leaves, and sticks, holding on by their pectoral fins, exactly as if they were arms. Now and then they plant these firmly as an organ of support, the same as one places one's elbows on a table; then they raise their heads and take a deliberate survey of surrounding objects. They are not very timid; in fact, my interpreter captured several of them by means of quietly creeping up to them and knocking them over with a stick. Occasionally they crawled up to a boat's rope, when moored, and even onto its sides. Some looked light brown with dark bands, others darker, while a few were of a brilliant emerald green, probably due to the position of the body and the reflection of the light. One morning, when at anchor, I saw close to the side of my boat a snake in the water watching one of these fish, which was intently occupied capturing flies. With a stick I saved it from its reptilian foe, but its colors were so vivid I could not resist giving it a place in one of my collecting bottles.

"They are extensively used in Burma for live bait, a purpose for which they appear to be well adapted." Dr. Gunther says they are brought in considerable numbers into the Bombay markets.

These fishes, like many others, have several names, and the one by which they are most generally known

the Irishman, "Show me the building of to-day that has lasted as long as those of antiquity!" Surely a building material that has come down through more than four thousand years ought to be good enough for us dwellers in the twentieth century, who think a house that is a hundred years old a piece of antiquity, and calculate on replacing most of the buildings of to-day by others better (or at any rate different) within half a century.

If we go to the island of Crete—the inhabitants of which, according to the more or less lamented Bismarck, still deserve the reputation fastened on them by St. Paul, of being the prize liars of their time—we find the citadel of King Minos, to whom we assign a date "whereof the memory of man runneth not to the contrary," and this citadel is not only built with gypsum mortar but finished in colored gypsum plaster. Any one who has done much prowling around the ruins of North German "burgs" will note that the damp cold climate has had more deteriorating influence upon much of the building stone than on the gypsum mortar employed to bind the stones together.

There is a reason for most things; and for our low appreciation of the durable qualities of gypsum the principal reason is our own ignorance of the manner of preparing and applying the material in question.

As found in nature, gypsum is a hydrated lime sulphate, with the following chemical analysis (Seifer):

Lime	32.5 per cent
Sulphuric acid	46.5 per cent
Water of crystallization.....	21 per cent

By driving out the water by means of heat, the constituents are

Lime	41.2 per cent
Sulphuric acid	58.8 per cent

If we mix the anhydrous gypsum with water, the two combine with evolution of heat, reduction of volume, and resumption of hardness.

But there are two processes of dehydrating gypsum, and these yield two widely-differing products; and general ignorance of this fact is the principal cause of the popular impression concerning the instability of plaster of Paris as a building material.

The first process consists in heating the raw gypsum at a comparatively low temperature, with the intention of driving out only a portion of the chemically-contained water. The object of this process is to get a quick-setting plaster, one that will harden in half an hour at most, and that can be used for making casts where delicacy of outline and fidelity of reproduction are the main desiderata.

The other process, carried on at a red heat, has for its object the production of a hydraulic plaster, which shall possess high resistance to the disintegrating influences of moisture and general weathering. Such plaster is much slower setting and much harder than that for stucco and casts, and is purely constructive in its application. It furnishes mortar, flooring, beton mass, and even building-blocks.

A plaster that is dehydrated at a temperature lying between those necessary to produce the "stucco" and "hydraulic" plasters, is neither one thing nor the other, and will not even set when mixed with water.

The burned stucco plaster has in a loose condition a specific gravity of between 0.65 and 0.85; when well shaken down it reaches 1.2 or even 1.4. But in a fully compressed condition the specific gravity is about 2.6.

The hydraulic plaster weighs loosely about as much as water, or ten per cent more; shaken down in a measure, the figures are 1.5 to 1.6; and its proper specific gravity is about 2.85.

The non-hydraulic gypsum remains only a few minutes in a fluid condition, when mixed with the proper proportion of water, and develops considerable heat. The right proportions of water and plaster vary with the quality of the latter material, from say 10 per cent more weight of gypsum, to 60. The plaster is to be strewn in the water and not stirred until the proper quantity has been added; this avoids lumps. Long stirring is not advisable.

Hydraulic gypsum takes less water and is not to be mixed to a thick cream, but rather to a thin dough. The color should be rather yellowish than bluish—the latter color being a sign of over-burning.

Although the analysis of the uncalcined plaster shows only about one-fifth its weight of combined water, the mixture for stucco purposes contains from 90 down to at least 70 per cent. This extra quantity does not remain in the stiffened mass, but gradually evaporates, and in fact often is thrown out in part by sweating. The disappearance of the superfluous water naturally leaves the mass porous. But to get good sharp casts it is desirable to use as much water as possible; particularly because this retards the hardening process. In making molds for porcelain this porosity is desirable, as it facilitates the drying of the creamy mass which is poured in; ceramic work, however, which is molded under pressure, should be made on or in molds which have been made of a stiff mass, as this stands the pressure of molding better.

Plaster should be kept as dry as possible, and dirty water should never be used in mixing, as this reduces the binding property.

A great mistake is adding more water to the mass when it has once got stiff. The stiffness is not the result of lack of water, but is caused by the presence of exactly the right quantity to enter into chemical combination.

In working with hydraulic plaster the strength of the resulting structure depends more on the proper proportion of water than on any other one cause. The great danger is toward excess. The proper amount is

A PECULIAR SPECIES OF JUMPING FISH.

the appearance of being pushed forward out of their sockets. They can see on land as well as in the water. When drawn back into their natural position, the eyes are protected by a membranous covering.

During the ebb tide these fishes leave the water and hunt for crustaceans, sometimes climbing up on trees or old pieces of timber. The group here shown has been prepared from specimens captured on the mud flats at the mouth of the Sungei Bulu, on the Selangore seacoast in India, by Mr. William T. Hornaday, now director of the New York Zoological Society. He found them exceedingly hard to capture, and the difficulties he met are best described in his own words:

"Although apparently stranded they seemed to feel perfectly at home, and went jumping around over the mud. In reality they were feeding upon the tiny crustaceans left on the bank by the receding tide. . . . There were probably a dozen in sight, hopping spasmodically about, or lying at rest on the mud, but when we made for them they developed surprising energy and speed, and made straight for their burrows. They progressed by a series of short but rapidly repeated jumps, accomplished by bending the hinder third of the body sharply around to the left, then straightening it very suddenly, and at the same instant lifting the front half of the body clear of the ground by means of the arm-like pectoral fins which act like the front flippers of a sea-lion. These fins are almost like arms in their structure and use, the bones being of great length. They were so rapid, and the mud so very deep and our progress so slow, that the fish always succeeded in getting into their holes before we could reach them. By digging a big hole two feet deep, and standing on one's head in the bottom of it, we were able to reach an arm down two feet farther

by naturalists is the "goby." They belong to a group which is found in the seas and along the coasts and large rivers of India, Burma, the Andaman Islands, Malay Archipelago, and beyond. They do not occur on either the Pacific or Atlantic coasts of America. One species appears on the west coast of Africa. The body is usually olive brown, with white or blue dots, although, as already intimated, they sometimes appear to assume a bright green hue, which Dr. Day thinks may be due to the reflection of the light.

GYPSUM—A MUCH MISUNDERSTOOD MATERIAL.*

By ROBERT GRIMSHAW.

THERE are some materials, used in the arts, which are too little understood of men, and among these we may reckon gypsum, or plaster of Paris, which is not only too little understood, but in some connections exactly wrongly understood. In the line of building construction, for example, the word "gypsum" immediately suggests "staff" and temporary structures and decorations, designed and expected to last out at most two winters in a temperate climate. Now as a matter of fact some of the oldest buildings in the world owe their long preservation not merely to favorable climatic conditions and the fact that no great battles were fought about their bases, but to the use of gypsum in their construction. They have not come down to us through the centuries in spite of the fact that their builders used plaster of Paris in their construction, but because of that fact. As a tolerably well-known building of rather accurately attested age I may instance the pyramid of Cheops, built with gypsum mortar, and which may well recall the bull of

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