interesting as I could have wished it to be; but I have had to confine myself to facts; and my reason for bringing it before this Society, is to have the little information I have collected about the Pictou Coal Field preserved among your archives for future reference; and also with the hope that others may also be stimulated to collect facts in this and other fields of enquiry, and make this Society the source from whence any useful knowledge in reference to Nova Scotia may be disseminated.

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## Art. V. — *Contributions to the Icthyology of Nova Scotia.* By J. Matthew Jones, F. L. S.

[*Read April* 6, 1863.]

Icthyology has unfortunately been a much neglected branch of zoology, and while we have many works treating upon mammalogy, ornithology, and entomology, there are comparatively few authors who have touched upon the natural history of fish. Perhaps this may in some measure be accounted for by the difficulties attending their study, it falling to the lot of few to be situate in the vicinity of a fishing station; a matter of necessity, when not only the habits, but the forms of fishes, are to be carefully observed; as a naturalist, even if placed in the most eligible locality for procuring specimens, can never expect to complete a perfect list of the several species frequenting that locality, without the assistance of fishermen and others, who, from daily experience can add so much valuable information, which it would be almost impossible for one individual, by his own exertions, to become possessed of. At the present day, however, the value of fish considered as an article of food for the human race, attaches an importance to this branch of science which is growing every year, and it is to be hoped that ere long the investigations of naturalists will afford some clue to the occurrence or absence at particular seasons, of those great annual gatherings of fish, which appear on the coasts of north-east America and Europe, and which I would venture to suggest are more particularly influenced by the paucity or abundance of the peculiar food preferred by each genus, and the instinctive habit of searching for suitable positions for spawning.

An interesting fact in connection with the habits of fish is that of the extremely local range of some species, shoals being observed in one particular bay or inlet, while in those contiguous, and only distant a short space,

not a specimen of that species can be taken. On our own shores here, this local habit in a more distant degree is well known; the shad, so abundant in the Bay of Fundy, is almost unknown on our eastern coast from Cape Sable to Cape Breton, while looking farther north we find the mackerel, which is common on this coast during the season, absent, in a great measure, from the waters of Newfoundland and Labrador. At the Cape of Good Hope, M. Pappe, an observant naturalist, resident at Cape Town, states that several South African fishes are possessed of similar habits, but more strictly confined, even to bays merely divided by a small promontory; and in the Bermudas, where you would imagine, from the small size of the group, that the waters of the shores would be common to all, I find that some species are only taken on the south side of the islands, and others on the north, although these two positions are only divided from each other by a narrow strip of land, in places not much more than a quarter of a mile in width.

Now, the solution of this apparent mystery is not so difficult as some persons would imagine. We are all aware that each animal has a partiality for some particular kind of food, and wherever that food is to be found in the greatest abundance, there will be found the animal that feeds upon it. Indeed, so well known is this habit to English entomologists, that, when in search of insects, the sight of a field of thistles, or a patch of nettles at a particular season, proclaims the habitat of certain species which frequent those plants. The buffalo of the west prefers the open prairie, clothed with rich succulent grass; the moose, as Capt. Hardy informs us in his widely-known "Sporting Adventures," loves to dwell in forest solitudes and browse on the leaves and tender branches of deciduous trees; while the tiny mole scoops its tortuous way through the rich mould of the alluvial valley, where it finds an abundant supply of its favourite earthworm. And so it is with the various fishes: the halibut, whose ponderous form we so often see in the market, resides, as it were, on the sandy slopes of the deep, where it feeds upon the smaller flat fish, mollusks, and crustaceans. The cod seeks it preys on the well known "banks," while the shad delights in the muddy waters of estuaries, where it fattens, according to Perley, on the shrimp and shad worm. In each position these fish find the food they are partial to. But, although I imagine food to be the great inducement for fish inhabiting particular localities, there is yet another reason to be advanced,—search for a suitable position for spawning. These two circumstances, I firmly believe, have more to do with the appearance of vast shoals of fish, visiting, or residing in particular districts, periodically or otherwise, than aught else. In no

other way can we account for the vast annual or continual gatherings of certain fishes in the waters of Europe and north-east America, than by presuming that this search for food and suitable positions for spawning are the main motives. Take the cod fishery of the Grand Bank of Newfoundland, that wonder of icthyology, where, throughout an extent of submarine formation measuring no less than six hundred miles from north to south, and in places, two hundred miles from east to west, countless myriads of gadoid fishes have afforded for more than three centuries and a half, profitable employment to the fisherman, and wholesome food for tens of thousands of the human race. To account for this, we have in the first place to consider the formation of this vast submarine bank, and the peculiar inducements it presents to the innumerable company congregated there. The bank lies as it were at the point where the Gulf Stream and Arctic Current meet each other, and struggling for the mastery deposit the foreign matter they contain on this spot of contention. The Arctic Current it is which has formed and is still forming the bank itself by bringing down annually, through the medium of icebergs, thousands of tons of earth, rocks, and gravelly matter from the frozen north. These icebergs ground upon the bank, and thawing in that position, deposit their geological burdens, thus year by year adding to the mass. To render this conclusion more satisfactory, it will be well to refer to the hydrographer's chart, by which we ascertain that the ocean bed above the bank is shelving, while after passing it, the depth suddenly increases by a precipitous descent of some three thousand feet, thus showing that it is formed from the north, while the current of the Gulf presents a barrier to this deposit, which would otherwise be washed away to the southward, and the great cod fishery of Newfoundland be diminished to a considerable extent.

Now, what an area is here presented for mollusks and crustaceans to inhabit—gravelly beds, sandy slopes, rocky masses large and small to give them shelter, while those thousands of tons of earthy matter filled with minute organisms are continually being brought down from the northward to afford them food. And as it is such a promising pasture for these smaller residents, which, congregating there in myriads to feed and propagate their species, we may readily conclude that these creatures, which form the principal part of the food of the cod, attract those fishes to the position, and finding there an abundance of prey at all seasons, remain to spawn, and as codfish reproduce by millions annually, we can in a measure account for the immense stock which for hundreds of years has filled every part of that immense icthyological storehouse, and proved such a blessing to mankind.

These currents have also a great effect upon the migration of fishes, and to prove the same I have only to call your attention to the following facts. In summer time, when the Gulf Stream extends its northern boundary, which commencing at Cape Cod runs close to our coast, and thence to Newfoundland, several kinds of southern fishes are observed in our waters, one of these I have the pleasure of exhibiting, a species of *Monocanthus*, which is so truly a southern genus that only one species has been recorded as having been captured so far north as Massachusetts. Another, the albicore, so well known in warmer latitudes, is abundant here during the months of July and August, the Rev. John Ambrose having observed twelve at one time off French Village, St. Margaret's Bay. Then as to northern fishes, when in winter time, particularly during the later months of that season and those of spring, when the great Arctic current comes pouring down from the north, forcing the waters of the Gulf to the southward, and washing the banks of Newfoundland, exerts a cooling influence even to the latitude of 40°, brings with it many fishes to our shores whose presence during that particular season I have just mentioned could in no other way be satisfactorily accounted for—for we have the occurrence of the Greenland Shark (*Scymnus borealis*) recently brought to our notice, an inhabitant of the seas of the far north; the Norway Haddock (*Sebastes Norvegicus*), a fine specimen of which I have here before me, an extreme northern fish—and the Cusk (*Brosmius vulgaris*), another strictly northern form, having its proper habitat between the parallels of 60° and 73° north latitude, is also found in our waters. I could add other instances in support of my views, but those I have given, will, I trust, be sufficient to enable you to form some idea of their correctness.

A great question with naturalists has been, as to whether certain fishes inhabiting the seas of Europe and North East America are identical in regard to species, and if identical, how they managed to traverse two or three thousand miles of ocean from their original home. Now, if we can prove the arrival at our shores of fishes from distant latitudes, by means of the great ocean currents which as highways, or I should say, *seaways*, pass as it were our own doors, may we not conclude that these very currents or seaways are the means of affording a communication from or to either side of the Atlantic. And while some of the Carribean types may be carried by the Gulf Stream to our shores, and on to Europe, the Europeon types can be carried to our shores by the Arctic current, which setting from North Europe to Spitzbergen, washes the east coast of Greenland, and passing Iceland arrives at our position.

Some species are more adapted than others from their *peculiar forma-*

*tion* to wander about the broad expanse of ocean, and like the hawks among birds cleaving the air, propel themselves at a prodigious rate through their watery element. Naturalists are therefore prepared in some measure for the occurrence of such forms in situations where no currents prevail. The most violent storms at sea cannot affect the migration of fishes, even if they blow from a direction contrary to that of the fish's course, for observations prove that the gale which agitates the surface to so great an extent, is not perceptible at a comparatively small depth, and on the principle that migratory birds are generally known to take their course at a great elevation, in order to escape the agitation of the air near the earth's surface, so we may presume that these wandering fishes, gifted with similar instinct, avoid the currents and counter currents of thc ocean surface by stemming their way at a depth free from such circumstances. But in case of species known more particularly as inhabitants of the littoral zone, and not endowed with a formation favorable for extensive migration,—I may instance the Blennies or *Gobioidæ*, which are chiefly found in shore waters, rock pools, and among sea weed—we must look to some other agency than the mere motive power of the fish itself. Now, during my investigations in the Bermudian waters, I found that the gulf weed *(Fucus natans)* which is brought to that latitude from the Bahamas, on the eastern edge of the current, and being thrown aside as it were, drifts along from and to all points of the compass as the winds blow, is a perfect preserve for the naturalist, being tenanted by various species of crustaceans, and affording shelter and food to several kinds of fishes. To give you an idea of the vast extent of the fields of this gulf weed which float upon the ocean about the latitude of the Bermudas, I may state, that when a southerly gale blows for some days, the whole coast line of the Islands facing that quarter, becomes choked up with this sea weed, and on gaining an elevated position on land, vast fields are observed still setting in from the ocean. Have we not here again an excellent conveyance for many kinds of fishes, (particularly those unable to take long journeys without assistance) which keeping within the covert of these masses of *fucus* are carried along hundreds of miles, and obtain, the whole voyage, good shelter and abundance of food, which is all a fish requires to bring it safe to other positions, where the temperature of the ocean will not interfere with its constitution. And although the constitutions of fish are in some cases influenced by the temperature of the element they inhabit, and a few degrees above or below a certain temperature will drive them to seek other positions, yet, in many cases, they are not so influenced ; and the fact is well authenticated that certain species can bear the test of being frozen in

solid ice, and on being gradually thawed, will regain their former signs of vitality, while others have been observed swimming about in hot springs at Manilla and in Barbary, in water of a temperature of from $172_o$ to $185_o$, and a species of *Silurus*, according to Humboldt, was observed by him thrown up alive with the heated waters of a South American volcano, which were proved to be of a temperature of 210°, *or within two degrees of the boiling point.*

Some marine fish, and certain species of fish-like mammals, appear in some instances to live in fresh water as well as salt. As to the mammals, my friend Capt. Blakiston, the celebrated explorer of the Yangste, states in his recent work that porpoises were seen rolling about in the upper waters of that river, 1,000 miles from the sea, and in reply to a question of mine, he states that the water was perfectly fresh far below this point; so that we have here marine mammals, generally supposed to be unable to exist long in fresh water, disporting themselves hundreds of miles from their briny home, in an element very different in its component parts from that to which they are usually accustomed. Again, I have myself observed in the Bermudas a species of *Gobius* existing in a lively and healthy state in rock pools above the highest tidal mark in which the water, chiefly rain, but partially salt, had become perfectly putrid and offensive.

With these preliminary remarks, I will proceed to describe four specimens which I have recently examined.

The generic characteristics are those of DeKay.

Fam.—GOBIDÆ.

Gen.—GUNNELLUS.

Sp.—GUNNELLUS ——————?

GENERIC CHARACTERISTICS.—Body elongate, much compressed. Head, oblong. Mouth, small. Teeth velvet-like, or in cards. Dorsal rays, spinous throughout. Ventrals excessively small, and reduced often to a single spine.

DESCRIPTION.—Body elongate, strongly compressed, tapering, covered with minute scales, the whole coated with a slimy secretion. Extent, 5 in. 2 lines. Depth, at deepest part, $13\frac{1}{2}$ lines; from lower jaw tip, $5\frac{3}{4}$ lines; at commencement of anal, $5\frac{1}{4}$ lines; at caudal extreme, $1\frac{3}{4}$ lines. Head, small, elevated; occipital ridge, arched; breadth over opercles, 3 lines. Mouth, vertical gape, $1\frac{1}{2}$ lines; horizontal gape, $1\frac{1}{2}$ lines. Teeth, borne of two rows in under jaw, conical, the largest one-fifth of a line in length; upper jaw armed of several rows extending over vomer. Eyes, partially ovate; vertical diam. $\frac{3}{4}$ line; horizontal diam. 1 line; opercles and branchiostegous rays entire, joined beneath by membrane, free of thorax. Vent, nearly equidistant between either extreme, 1 line in advance of first spinose ray of anal.

The dorsal fin, having its rays spinous, and being highest posteriorly, commences immediately over base of pectorals, and is continuous to caudal extreme,

where it unites with the caudal fin. Pectorals commence $\frac{3}{4}$ of a line behind posterior edge of opercles; extent, $3\frac{1}{2}$ lines; basal width, 1 line. Ventrals consist of two bony spinose processes, $1\frac{1}{4}$ line in extent, sheathed at base, and situate immediately beneath the pectorals. Anal, commences nearly in a line with the thirty-first dorsal ray, and is continuous to caudal, joining that fin similar to the dorsal. The first two rays are spinose. It presents an almost uniform depth of $1\frac{1}{4}$ line throughout. Caudal partially rounded, small, extent $3\frac{3}{4}$ lines.

COLOR.—Upper parts, dark purplish brown, changing to a dark yellow beneath; beneath the head, lighter still. Dorsal and anal spotted with dark spots at regular intervals.

D. 74,—P. 9,—V. 1 ⁄ 1,—C. 16,—Br. rays, 5.

[The anal rays, from their being so branched, I found it impossible to count correctly, even with a powerful lens.]

I am indebted to my kind friend, the Rev. J. AMBROSE, for this specimen. It was taken by himself while using the dredge between Shutting-in Island and the main land on the east side of St. Margaret's Bay, in August, 1860. The depth of water was from 12 to 14 fathoms. From a careful examination, I have every reason to suppose that this specimen will prove to be identical with the spotted Gunnel, or Butter-fish of Yarrell; the *Gunnellus vulgaris* of Richardson; the *Murœnoides guttata* of Storer, and the *G. mucronatus* of DeKay—and that like many other marine fishes found on our coast, it is common to the seas of northern Europe and America.

## Fam.—PLANIDÆ.

## Gen.—PLATESSA.

### SP.—PLATESSA ———— ?

GENERIC CHARACTERISTICS.—Body rhomboidal. Eyes and color usually on the right side. A row of cutting obtuse teeth in the jaws, and frequently paved teeth in the pharyngeals. The dorsal advances over the upper eye, and leaves a naked interval between it and the caudal.

DESCRIPTION.—Body, elliptical, depressed, covered with scales, largest along the region of the lateral line. Extent, 20 inches; posterior edge of opercle to caudal extreme, $15\frac{1}{2}$ inches. Depth, from a line drawn across body, 7 inches from chin point, 7 in. 3 lines; at caudal base, 2 in. Breadth, at broadest part on shoulder, 6 in. from chin point, $10\frac{1}{2}$ lines. Head, 4 in. $2\frac{1}{2}$ lines in extent from chin point to posterior extreme of opercles. Eyes, one above the other; superior eye cup much the largest. Mouth, small, vertical gape, 16 lines; horizontal gape, $5\frac{1}{2}$ lines; under jaw longest, both fully armed with acute teeth of 1 line in length in front. Lateral line very distinct, commences at upper angle of posterior opercle, bends gradually over pectorals down to a position $4\frac{1}{2}$ inches from its commencement, and then proceeds very nearly in a straight line, losing itself in the base of the 9th caudal ray. Cheeks, opercles, and orbital ridges, scaled.

The dorsal fin commences a little in advance of the pupil of the upper eye, and is continuous to within 13 lines of caudal extreme, gradually rising to the 44th ray, which is longest, and as gradually falling to its termination. Pectorals, small, having their third and fourth rays longest, about $19\frac{1}{2}$ lines in extent. The ventrals were absent. The anal fin rises nearly in a line with the pectorals, but slightly behind it, and has at its commencement a partially concealed short but strong spine.

The fin in character equals the dorsal, and has its 22nd ray longest, with an extent of $20\frac{1}{4}$ lines. Caudal, slightly pointed; width at base, 2 inches; spread of rays at termination, 4 inches $3\frac{3}{4}$ lines.

COLOR.—A uniform pale brown throughout, the head of a darker shade.

D. 88,—A. 68,—P. 12,—C. 18.

I am also indebted to Mr. AMBROSE for this specimen, who procured it at St. Margaret's Bay. It will, I believe, prove to be the *Platessa plana* of DeKay—a species, according to Perley, common on this coast. If it does prove that species, DeKay must have taken his description from a damaged specimen, for he states that the half of the jaws next the colored side is destitute of teeth, whereas in this specimen that condition does not occur.

## Fam.—ANGUILLIDÆ.

### Gen.—AMMODYTES.

SP.—AMMODYTES ———— ?

GENERIC CHARACTERISTICS.—Body and head elongated. Dorsal fin extending nearly the whole length of the back. Anal fin long, and both separated from the caudal. Caudal forked. Lower jaw, longest. Branchial aperture, large. No cœca nor air-bladder.

DESCRIPTION.—Body, elongate, slightly compressed. Extent, $6\frac{3}{4}$ inches. Depth at base of pectorals, 4 lines; at anterior base of anal, $3\frac{1}{2}$ lines; at posterior base of anal and dorsal, $1\frac{3}{4}$ line. Lateral line commences at upper posterior angle of opercle, gradually descending to about the middle of pectorals when closed to the body, and thence in a straight line to caudal base. Head, extent from chin point to posterior angle of opercle, $12\frac{1}{2}$ lines; depth, from capital ridge to lower edge of opercle, $4\frac{1}{2}$ lines; width, between eyes, $1\frac{1}{4}$ lines; at juncture with body, $2\frac{3}{4}$ lines. Gill aperture very large; opercle $7\frac{1}{4}$ lines in extent, opening its whole length. Lower jaw projecting 1 line beyond the upper. Teeth absent. Vertical gape, $2\frac{3}{4}$ lines; horizontal gape $\frac{3}{4}$ line. Eyes large, ovate; vertical diam., $1\frac{1}{2}$ line; horizontal diam., $2\frac{1}{4}$ lines.

The dorsal fin commences $15\frac{3}{4}$ lines from chin point, attains its greatest height of $1\frac{3}{4}$ lines about its centre, gradually reduced to $1\frac{1}{2}$ lines at its termination, which takes place $2\frac{1}{2}$ lines from caudal extreme. An indented line, more strongly marked than the lateral line, runs on either side of the dorsal ridge, commencing above the operculum and running the whole extent to the caudal base. Under the microscope the line presents a series of oval depressions. Pectorals, partially pointed, originate immediately behind the posterior edge of opercle; extent, $5\frac{3}{4}$ lines, width at base, $1\frac{1}{4}$ lines. Anal fin commences about 4 lines behind the centre of the dorsal, and is coterminal with that fin. Caudal fin, partially forked; extent of forks, 5 lines; middle rays, $3\frac{1}{2}$ lines; basal width, $1\frac{3}{4}$ lines.

COLOR.—Above lateral line, olive brown; beneath, silvery white; whole upper parts, including shafts of dorsal and caudal rays, spotted with minute black spots, which are larger in the vicinity of the lateral line. These spots extend a little below the lateral line, but are only observable under the microscope. Fins, transparent. Irides, silvery white, metallic lustre, dotted above with minute black spots; pupils, dark.

D. 63,—P, 13,—A. 33,—C. 16.

The specimen from which my description is taken was kindly presented to me by Mr. J. R. WILLIS. It was taken from the stomach of a codfish.

I have little doubt that this is the American Sand Launce (*A. Americanus*), of DeKay, which appears to be identical with *A. tobianus* or the Sand-eel of the British coast.

Fam.—BALISTIDÆ.

Gen.—MONOCANTHUS.

Sp.—MONOCANTHUS ——————— ?

GENERIC CHARACTERISTICS.—Body covered with very minute scales, assuming the form of prickles. Extremity of the pelvis, salient and spinous. A single large dentated spine, in place of the first dorsal; occasionally a small and almost imperceptible spine.

DESCRIPTION.—Body, greatly compressed, partially ovate, extended at caudal extreme, and bearing a granulate surface covered with minute irregular spines, in centres of six or eight. Extent, 4 inches 4 lines. Depth, $2\frac{1}{4}$ lines from commencement of dorsal to vent. From base of dorsal spine across pectorals to outer margin of pelvic bone, 1 inch $9\frac{1}{2}$ lines. Breadth, at broadest part, nearly midway between base of dorsal spine and pectorals, $5\frac{1}{2}$ lines. Caudal extension, $4\frac{1}{2}$ lines; depth at caudal base, 5 lines. Facial outline from dorsal spine to mouth, declivous. Mouth prominent; armed with six cutting teeth in upper, and four similarly formed, in lower jaw, protruding from fleshy lips; the two centre ones in lower jaw longer on their inner sides, raising them to a sharp angle in the centre; horizontal gape of mouth, $1\frac{1}{2}$ lines. Eyes, somewhat oval horizontally; horizontal diameter, $2\frac{1}{6}$ lines; vertical diameter, $2\frac{1}{2}$ lines; irides golden, pupils black. Nostrils, double, the posterior smallest, and situate immediately behind the anterior. Extent from anterior nostril to frontal extreme, $7\frac{1}{4}$ lines. Branchial orifices lying obliquely above and close to pectorals, extent, $2\frac{3}{4}$ lines; distant from frontal extreme, 10 lines.

The dorsal spine is situate $9\frac{1}{2}$ lines in advance of the dorsal fin, and is distant from frontal extreme, 1 inch $2\frac{3}{4}$ lines; extent, 5 lines; armed on its dexter side with five, and on its sinister side with four, claw-like spines, bent downwards, and its whole surface covered with minute spines, as the body; when upright it exhibits a connecting membrane posteriorly. The dorsal fin commences slightly in advance of the vertical line of the anal, and is continuous to base of caudal extension; higher anteriorly, greatest height, 5 lines; rays armed basally with minute spines. Pectorals, small, somewhat pointed; rays basally armed with minute spines, distant from frontal extreme, 11 lines; extent, 5 lines; width at base, $2\frac{1}{4}$ lines. Pelvic spine commences two inches from frontal extreme, and is connected by a cuticular dewlap, covered at its extremtty with interstitial spines, and of a width of 4 lines. Anal, commences at about $1\frac{1}{2}$ line behind the outer margin of the pelvic dewlap; deepest anteriorly, greatest depth $4\frac{1}{2}$ lines; rays armed basally with minute spines. Caudal, partially rounded; extent, $8\frac{3}{4}$ lines; rays branched, armed basally with minute spines.

COLOR.—Light brown, streaked and dotted with dark blue blotches throughout, extending over the caudal fin; beneath, light yellow. Dorsal and anal fins transparent. Pelvic dewlap, opaque.

D. 31,—P. 13,—A. 29,—C. 12.

This fish was also kindly presented to me by my friend Mr. AMBROSE, who procured it at St. Margaret's Bay in the autumn of 1861. It was, I believe, taken in a fisherman's net. It was very similar in many respects, and will, I have no doubt, prove to be the *Monocanthus Massachusettensis* of DeKay. As a Nova Scotian fish, this specimen is most probably

an unique example, and although a very minute creature, may prove valuable addition to the Cabinet of this Institute in which it will be placed.

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## Art. VI.—*Gold and its separation from other Minerals.* By Abraham Gesner, M. D., F. G. S.

[*Read May 4th,* 1863.]

Gold has long been known and esteemed as the most precious of all the metals. From the earliest ages of antiquity, it has been employed to decorate the human person, ornament temples, and cast into coins. It now forms the true standard by which other substances and property of all kinds are valued. The history of gold is one of peculiar interest. This metal formed the chief adornments of Solomon's Temple. The sacred vessels that "pertained to the House of the Lord," the altar, the table, the candlesticks, the lamps, the censers, and even the hinges of the doors of the temple, were of pure gold. The walls of the New Jerusalem, as described by the Apostle St. John, were of twelve precious stones, "and the building of the wall of it was of jasper, and the city was of pure gold, like unto clear glass."

Some of the Israelites and the nations around them, had their idols of gold and silver; and up to the present day the images worshipped by idolatrous nations are made of gold, whenever that metal can be obtained; and it is to be feared that gold is the god of many, after it has been stamped into coin.

It is not, as some have supposed, that the scarcity of the precious metal imparts to it its great value. Gold is the most malleable of all metals. It is easily worked by the smith, and will not oxidate or rust under ordinary circumstances. Whether buried in the earth, or in the sea, it remains unchanged. In ancient times Ophir was celebrated for its gold. It occurs in the East, and Africa has its golden sands, the continent yielding to the amount of 5,000 pounds avordupois annually. It is now found along the slopes of almost all the mountain ranges of the earth. It occurs in the mica slates of the Tyrol. In Siberia it appears in alluvial sand; and in the country eastward of the Ural Mountains, masses of gold have been found weighing from ten to twenty pounds. The mines of Hungary, Transylvania, and those of the Alps, are worked for their gold. Scotland and Ireland have deposits of the precious metal. It has also