CIA. CRIADORA DE CONCHA Y PERLA
DE LA BAJA CALIFORNIA, S. A.

LA PAZ, B. C. & MEXICO, D. F.

COMPAÑIA CRIADORA DE CONCHA Y PERLA

DE LA BAJA CALIFORNIA

S. A.

TECNOLOGIA E

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B R I E F R E P O R T

of the

COMPAÑIA CRIADORA DE CONCHA PERLA, S.A.

La Paz, L. C.

ANTECEDENTS.

The Cía. Criadora de Concha Perla, S.A. was founded in La Paz, L.C., in the year 1904. Mr. Gaston J. Vives, who formerly had dedicated himself to the diving business, was able to appreciate the great injuries which certain kinds of fishes, such as the sun fish, crabs, star fish, etc., inflicted on the pearl oyster, injuries so serious that zones which were formerly very rich in these mollusks are now completely exhausted.

Mr. Vives therefore set himself the task of solving the problem of repopulating the marine bottoms with the precious mollusk. For this purpose it was necessary first to discover the manner in which, by adequate means, large quantities of young oysters could be obtained; and, second, provide for the protection of these young oysters against all their enemies in the sea, thus securing their development and the gathering of the precious product.

In all undertakings which have in view the discovery of something advantageous to science and humanity favorable results alternate with difficulties and failures.

This was no exception; the experiments lasted several years, with alternatives of partial successes and no small losses of time, effort and money.

During its first years the Company did not busy

itself with anything but studies, observations, investigations, practical experiments, etc., in order to discover a method of obtaining young pearl oysters in unlimited quantities and take care of them until they reached maturity and could be gathered.

The initial capital with which the work commenced was $300,000, and in spite of not a few failures, the Company was able to spend over $600,000 on constructive work in a period of eight years, and after ten years to have planted over 5,000,000 shell, which at the outbreak of the revolutionary furies were pulled up and carried away, entailing a loss of over $1,000,000 on the Company, for according to trustworthy information, nearly $300,000 worth of pearls thus stolen were sold.

Mr. Vives had already in 1904 obtained his first patent from the Mexican Government for his invention relative to the artificial cultivation of the pearl shell.

Through his own special methods he was successful in achieving his first object, that of obtaining by means of apparatus of his invention all the spat or young oysters which he wanted, and which he did. Each apparatus, called "Incubadora"(incubator) by the inventor, contained from 10 to 12,000 pearl oysters when hauled up on the beach after having been submerged in the sea for a certain length of time. These young oysters were collected by skilled workmen, transferred to the hatcheries (viveros), where they were protected against their voracious enemies and could grow.

Mr. Vives constructed these hatcheries (viveros) in a lagoon communicating with the sea by the daily tides.

To serve this purpose he constructed a masonry wall over 600 yards long by 10 yards high and 11 wide, which separates the Bay of San Rafael from the lagoon. In this lagoon the hatcheries were constructed in such a manner that they communicated with the sea on two sides, but the communications or entrances were arranged in such a way that dangerous fishes and other sea animals which do harm to the young oysters (spat) cannot penetrate to the canals or hatcheries. Through the action of the tides there is a constant flow of water, either rising or falling, a condition absolutely necessary for the life and growth of the mollusk. In stagnant water the mollusk would perish.

After the mollusk arrived at a certain stage in its development it became necessary to remove it from the hatcheries because a great many of them died through lack of sufficient air and food(marine infusoria) owing to the crowded condition. It therefore became necessary to take them back to the open sea, but although many did not fall an easy prey to their enemies on account of their size and development, a great proportion of them disappeared through the voracity of fishes and especially of the sea star.

In order to remedy this serious difficulty, as more than 50% of the young oysters were lost, Mr. Vives invented the "Pabellones Protectoras"(Protective Crates), covered by patent No. 15604.

This "Protective Crate" consists of an apparatus protected by wire cloth which is made to contain a certain number of oysters, permitting the free circulation of the water and preventing the passage of fishes and other injurious sea animals.

But these protective crates became covered with seaweed, slime,etc.,in certain locations after remaining in the sea for some time, and the water could therefore not circulate and the oysters died from asphyxia.

Nevertheless, thanks to this protective apparatus, the losses were reduced to less than 30%.

It was not until 1914 that Mr. Vives solved this problem entirely with the invention of his "Coraza Protectora"(Protective Cuirass or covering), also patented.

This "cuirass" has the bivalve shape of the shell but is constructed in such a manner that no injurious animal ventures to molest the mollusk contained within the protective covering.

PRACTICAL RESULTS OF THE INVENTION.

Through the studies of Mr. Vives, shallow bottoms of water, properly prepared so that the mollusk may grow until its full development is reached, can harbour as large a quantity of oysters as may be desired, inasmuch as the larger the number of incubators, the greater the yield of young, and, consequently, the larger the number of shells, and, proportionately, of pearls.

The supply cannot be exhausted. If an incubating apparatus collects 10,000 young, for instance, 100 apparatus would collect 100 times as much, and so on successively.

What is needed, therefore, is only sufficient capital to construct these apparatus, prepare the marine bottoms, have a sufficient number of workmen to collect the young oysters, place them in the hatcheries and from there transfer them to the sea in their protective coverings.

As can be seen, much delicate work has to be done before the divers can extract the mature shell and the mother-of-pearl and pearls be obtained.

However, the expense of all these operations does not come up to 25% of the value of the pearl shell.

L O S S E S .

Before the pillage consumated by the revolutionists occurred, the cultivation station possessed in addition to the necessary constructions, which were respected, over thirty complete diving equipments with the necessary diving machinery; over five hundred incubators worth $60,000; canoes, boats, four gasoline motor boats and a small steamer. Furthermore, there were pearls worth over $40,000 in the safes of the Company, and in the Company's warehouses 85 tons of pearl shell ready for shipment to Hamburg which represented a value of over $60,000.

All of this was destroyed or stolen. In addition there were over 5,000,000 pearl oysters planted in the hatcheries and in the San Gabriel Bay, most of which were pulled up.

The losses and damages suffered by the Company through the revolution therefore amount to over $2,000.000.

PRESENT STATUS OF THE ENTERPRISE.

The Company is at present in the same situation as the sugar cane industry which, although in possession of fine lands, cannot plant any cane because the plantation machinery has been destroyed, and without this machinery the cane cannot be ground and sugar extracted.

In like manner the Company has marine bottoms in the proper condition for the development of the pearl oyster; its masonry wall and hatcheries are intact; the sea

has an inexhaustible supply of spawn for the production of as many millions of young oysters as may be necessary for obtaining an equal number of shells and a proportionately abundant harvest of pearls, but the working elements are lacking, i.e. canoes, boats, a small steamer, diving machinery, in short, the whole mechanism necessary for setting in motion this extraordinary industry, the only one of its kind in the world.

1. The Company has all of its concessions in proper order for a period of 28 years, with a preferential option for another period of equal or greater length.

2. All of its inventions are duly patented and in the near future patents will be applied for in all of the countries where mother-of-pearl cultivation can be developed.

3. The value and importance of the business has been recognized not only by the Mexican authorities, from the Government of General Díaz down to the present one of President Carranza, but also by a multitude of learned naturalists, even attracting the attention of foreign governments.

The French Government sent a commission headed by the naturalist Leon Diguet, member of the Institute of Natural History of Paris, and the reports which this distinguished naturalist gave to his Government could not have been more flattering to Mr. Vives.

Mr. Reginald Tower, Chargé d'Affaires of Great Britain also made a report to the English Government on this enterprise in highly encomiastic terms after having visited the Island of Espiritu Santo.

Lately, in the year 1914, Dr. Charles H.Townsend was there. Dr. Townsend is the Director of the Aquarium of New York and made a tour of inspection to Lower California under the direction of the American Government on board the American warship "Albatross". After having visited the station established by Mr. Vives and seen the results of his operations he published flattering report on this enterprise, illustrated with photographs, which appeared in the Bulletin of the Museum of Natural History of New York, August 2, 1916.

This undertaking is better and more favorably known in the scientific than in the financial world.

The European war on the one hand, and the Mexican revolution on the other, were important causes which prevented capital from fixing its attention on this enterprise, which stands first of its kind in the world because of the importance and magnitude which it may attain and is unparalleled in the world for the value of its inventions.

COMPLEMENTARY NOTE.

Each thousand adult pearl shells produces approximately 400 pounds of mother-of-pearl which is quoted at from 18 to 20 cents American gold per pound.

The production of pearls is variable; at times much shell is harvested and relatively few pearls; but from statistical data compiled through a period of ten years by the Director of the Company, it has been found that on an average the production of pearls equals in value double that of the mother-of-pearl; that is to say: $100,000 worth of mother-of-pearl gives an average of $200,000 worth of pearls.

On the basis of a 5,000,000 plantation of shells, the expenses will not come up to 25% of the value of the harvest.

In proportion as the production is increased, the percentage of the expenses will naturally decrease until a limit is reached where the expenses will not be over 15% of the value of the production.

DAMAGES AND LOSSES SUFFERED BY THE ENTERPRISE ON ACCOUNT OF THE REVOLUTION.

About the middle of the year 1914, the properties "Compañía Criadora de Concha y Perla de la Baja California, S.A., comprised the following as enumerated in the Inventories submitted in the legal proceedings which were instituted in the Primary Court of Claims (Juzgado de Primera Instancia) of this District, and in the General Court (Segundo) of the Territorial District, on account of the violations suffered by said Company.

CONSTRUCTION WORKS OF WHICH THE GREATER PORTION STILL EXISTS:

1 Masonry wall, 500 meters long by 10 meters wide at the base which was constructed in a cove of the San Gabriel Bay in order to form an artificial lagoon to be used in the operations of the artificial cultivation of mother-of-pearl, whose value is estimated at.....$150,000.00

36 Hatcheries (viveros) of rough stone work constructed in the sea to contain three million young pearl oysters(spat) valued at..... 180,000.00

120 Hectares artificial marine bottoms con-

	structed in accordance with the agreement between the Company and the Government at $1000 per hectare.....	$120,000.00
1	Canal for conducting the water from the sea to the hatcheries; 8 cement grades; 10 levels; 4 bases with stone walls for the wooden constructions.....	24,000.00
	Preparatory works for the establishment of new pearl cultivation stations in the coves of "La Gallina", "El Cardonal" and "La Isla Partida".....	12,000.00
6	Wells of drinking water, perforated in different places on the Island of"Espiritu Santo" and iron piping for conducting the water to the beach of the cove at "El Candelero".....	2,740.00
	WOODEN CONSTRUCTIONS.	
1	Shed or shelter, 86 meters long by 10 meters wide; 800 meeters roofing over the 36 hatcheries; 1 large warehouse; carpenter and blacksmith shops; 12 houses for offices and dwellings.....	31,600.00
613	Pearl oyster incubators of various sizes, with all accessories and implements necessary for the artificial cultivation of the mother-of-pearl.....	171,520.00
1900	meters rail tracks with rolling stock and accessories.....	12,000.00
64	large and small craft; sail, motor and steam.....	30,100.00

SUNDRIES.

Implements, securities, assets, provisions, materials; carpenter and blacksmith tools; diving accessories; scientific instruments; furniture; goods in warehouse; cash; pearls and divers assets..... $143,876.72

LIVE STOCK.

Pigs; goats; sheep; cattle; domesticated deer; in all 6,958 head, all of which were raised for the feeding of the workmen..... 62,600.00

PEARL SHELL.

Planted in the open sea around the island of Espiritu Santo, duly protected against attacks of injurious sea animals:

1,345,000 shells about three years old; deducting a loss of 20%, at $200.00 per thousand..... 269,040.00

1,199,200 shells about two years old; deducting a loss of 20%, at $150.00 per thousand..... 179,880.00

1,178,000 shells one year old at $100.00 per thousand..... 117,840.00

3,600,000 shells or spat in the hatcheries obtained at the last harvest, less 10%, at $50.00 per thousand..... 180,000.00

Total $ 1,687,196.72

As you know, the initial capital of the Company was only $150,000.00 in cash, a much smaller quantity than was needed for the establishment of an enterprise of this

kind and size where at least one million pesos was required for the originating of the mother-of-pearl cultivation. It is true that the artificial cultivation of the pearl oyster is an industry yielding fabulous returns; but it needs for its development special and expensive establishments, numerous and different kinds of apparatus; large and small vessels; warehouses; different kinds of shops; materials of all kinds. It is necessary to provide for the feeding of hundreds of workmen; supply them with drinking water; with dwellings; to have a complete management. In short, in order to engage in the artificial cultivation of the pearl oyster it is necessary to establish a plant, complete in all its details, similar to that of a mining or other similar enterprise, because a pearl cultivating business of this kind has larger ramifications than any other business and is consequently of more importance relatively.

The $150,000 cash capital which the Company had when it began its work was therefore far from enough to satisfy the necessities of the enterprise. But as the proposition was to establish an entirely new business heretofore unknown in the whole world with absolutely no practical experience, it was not wise to risk a large capital at once. It was advisable first to find by practical experiments the rules and methods which had to be followed and the manner of applying them before a large and definite business could be established. For this reason the original capital of the Company should only be considered as the initiative element of the enterprise. But the fact is that the cultivation of the pearl shell according to the methods ap-

plied by the "Compañia Criadora" is, as is well known, a business so profitable and yielding such an ample production that the small capital at hand was sufficient to develop the business little by little until it reached the stage in which it was at the middle of 1914, at which time the assets of the enterprise were as enumerated above. Attention must also be called to the fact that during several years the greater portion of the young oysters planted in the open sea were eaten or destroyed by the noxious animals which abound at the bottom of the sea, and this lessened the production very much.

Fortunately this difficulty was overcome. By means of a protective system invented by the manager of the Company this damage was eliminated during the latter period of the Company's operations, and each young oyster planted was enabled to reach maturity without accidents, that is to say, arrive at the time when it had acquired the necessary mercantile requirements for its extraction.

Such were the conditions of the Company's oysterbeds at the middle of the year 1914 with millions of young oysters planted. Over a million of them had reached the marketable size and had commenced to be harvested, and estimating their value at $300.00 per thousand, including the pearls and mother-of-pearl, the value would not be less than $300,000.oo; the quantity ready for extraction during the next two years would be more or less the same, without taking into consideration that in the hatcheries were four million young oysters which had been collected from the incubators and were getting ready to be transplanted to the open sea.

But immediately after the entrance into this Port of the armed force commanded by Col. Miguel L. Cornejo on the 18th of July, 1914, the "Compañía Criadora de Concha y Perla de la Baja California, S.A.", was dispossessed without cause and by force of all its properties. Fifteen days had scarcely passed when the majority of the rebel officers and their friends, some with their own diving apparatus, others using the very apparatus of the Company, invaded the oyster beds and commenced a wanton exploitation. They pulled up not only the adult shells but also the medium sized and the small; fifty divers, like a flock of vultures, were destroying a labor which it had taken years of work and study to consummate, and the cessation of the Company's operations has not taken place without being felt by the poor people of this vicinity.

One band pulled up half a million oysters, another less, but all secured many, until the marine bottom around the island of Espiritu Santo was completely cleaned out of mother-of-pearl shells.

The four million young oysters (spat) in the hatcheries were also destroyed.

But this was not all: by order of the local authorities which at that time had the power in this place, the motorboats "Maria Christina" and"Raltic" were making trips to the island where they seized by force all the implements, fixtures, working tools, materials, diving suits, motors, machinery, furniture, provisions of all kinds, securities, products, packed and in bulk; in short, all that could be moved and transferred.

The 64 boats and craft of various kinds and sizes which the Company owned met the same fate, and everything was taken to the Port of La Paz where the greater part was placed in the patios of the "Resguardo Maritimo"(Marine or Coast Guard) and in the building which the Secretaría de Fomento owns at this place.

Several hundred incubators which were laid out on the levels of the cultivation station at San Gabriel were destroyed; the wood structures, houses, warehouses, shelters, shops, 800 meters roofing over the hatcheries, etc., were all torn down and stolen.

The Company was raising various kinds of cattle and domestic animals for the feeding of hundreds of workmen; all these animals were killed. Slaughterhouses were established for the service of these same invading fleets and for other uses, and goats, sheep, pigs and cattle were made away with until nothing remained.

The numerous tamed deer, which had been introduced into the Island of Espiritu Santofor food purposes, served as hunting diversion for the chiefs of the sham diving squadrons and their cronies.

But all has not been told yet: The houses, offices and warehouses of the Company in the Port of La Paz were invaded by force and converted into barracks. The Company's files, bookkeeping books and minute books, titles and documents; its library and everything relating to the management of the enterprise was totally destroyed. All of its fixtures, woorking tools, scientific instruments, accessories, machinery, implements, provisions, furniture, products already packed or in bulk, materials,

fuel for steamers and gasoline launches, etc., stored in the warehouses, offices and patios of the Company, was taken by force. The safe was forced open and the valuables which it contained in cash, bank notes,and pearls valued at $40,000, were stolen.

R E P O R T

COMPAÑIA CRIADORA DE CONCHA Y PERLA DE LA BAJA CALIFORNIA

In 1904 Mr. Gaston Vives of the City of La Paz, Lower California, together with other friends of his, organized the Compañia Criadora de Concha y Perla de la Baja California, S.A., Mr. Vives putting into the company the concession he had obtained from the Mexican Government for the exploitation and cultivation of the pearl oyster at the Island of Espiritu Santo, Lower California. Mr. Vives also put into the Company the use of a patent that had been obtained from the Mexican Government, covering the discovery of a method for the cultivation, artificially, of the mother-of-pearl shell. The nominal capital of the company was $500,000.00, represented by $150,000.00 in cash and the balance figurative. The real object of the company was to assist Mr. Vives in experimental work, but always with a view to possible business resulting. At the end of a few years the result was that the company had made a profit of a million and a half pesos, and that Mr. Vives had completed his studies to the extent of being absolutely certain that he could breed and cultivate mother-of-pearl without any other limitation than the amount of capital invested in the business.

The persons who formed the original development company and who suscribed the capital are as follows:

Antonio Rufo, 4,500 bonus, and 1,500 paid shares.

Edmon Vives, 2,000 paid shares.

Sanchez Laurel, 200 paid shares.

Francisco Gonzalez, 100 paid shares.

Manuel M. Hidalgo, 400 paid shares.

The shares of Mr. Edmon Vives, brother of Gaston Vives, are in the possession of this latter on account of the death of Mr. Edmon Vives, Gaston being his executor named to administer the intestate estate.

The shares of Mr. Sanchez Laurel have been returned to Mr. Gaston J. Vives.

Of the shares belonging to Mr. Gaston J. Vives, some are in the possession of various friends of his, but these shares constitute an insignificant number.

For all the shares of the company, both paid and bonus, provisional certificates have been issued.

The methods of Mr. Vives are covered by patents covering his inventions as follows:

No. 15542, dated October 19, 1915, for an invention to protect the breeding of the mother-of-pearl shell and other molusks, conserving their vitality, which is attained by the use of an apparatus denominated "jaula conductora"(transporting inclosure or cage).

No. 15604, covering an invention made for the procreation of the mother-of-pearl shell and other mollusks on sandy bottoms, protecting them against the attack of malignant animals through the use of an apparatus denominated "pabellon protector"(protecting crate).

No. 15606, covering an invention made for the artificial procreation of the mother-of-pearl shell and other mollusks by means of an apparatus denominated "incubadora de madre perla"(mother-of-pearl incubator). This patent is dated November 16, 1915.

Commercially, the business is of such importance, now that Mr. Vives has perfected his methods, that all the money inverted into it can be doubled in a relatively short time.

The discoveries and methods of Mr. Vives are widely known to the scientific world, the proof of which is that in 1914 Dr. Charles H. Townsend, Director of the New York Aquarium, commissioned by the American Government, made a trip of inspection to Lower California aboard the American war ship "Albatross", to visit and inspect the works and doings of Mr. Vives, and to observe the results of his methods. The Doctor published a very flattering report illustrated by explanatory photographs, which report was published in the Bulletin of the Museum of Natural History of New York under date of August 2nd, 1916.

Mr. Reginald Tower, Chargé d'Affairs of Great Britain, after having visited the works on the Espiritu Santo Island, made a report to the English Government in terms of high encomium.

The French Government sent a commission, headed by the naturalist Mr. Leon Diguet, member of the Natural History Institute of Paris, and the report that this scientist gave to his government could not have been more flattering to Mr. Vives.

All the pearl fields of the world have been suffering an acute crisis for some time due to the every day increasing scarcity of mother-of-pearl, caused by many circumstances, but principally owing to the attacks of marine animals which search for the pearl producing mollusk as their most appetizing prey, and it has been impossible

to protect them adequately against this destruction by the thousands of methods tried. In consequence, the diminishing quantity of pearl oysters obtained decreases proportionately the possible yield of pearls. In our pearl fields (Mexico), there exists, in addition to the causes bringing about the diminution in other parts of the world, an entire lack of care in the exploitation of the mollusk, and the beds are thus destroyed by those who should most carefully preserve them by fishing out of season and without taking any precaution whatsoever, which naturally results in the destruction of the embryonic shells.

The Compañia Criadora de Concha y Perla, or better, Mr. Gaston J. Vives, has in the first place secured the prevention of the destruction of the shells by marine animals by means of the different apparatus patented under the names of "Coraza Protectora", Pabellon Protector", etc., etc. This in itself sould be sufficient reason for the Government to extend aid and protection to the enterprise referred to, but there is still more.

The Compañia Criadora, or rather, Mr. Vives himself, has discovered a manner of collecting the spat or larva so as to give it protection, isolate it and facilitate its development in appropriate incubators, taking care of them afterwards through a method and invention of his own, nurturing the life of these mollusks until they reach the age of maturity, when they are removed for the extraction of the pearls they may contain, or simply to utilize the mollusk and the shell, which

alone constitutes a magnificent business.

In recapitulation: The Compañia Criadora, or Mr. Gaston J. Vives (being the same), has discovered the manner of artificially cultivating the pearl oyster as one might breed domestic animals, without any limits to the possibilities of the business other than the capital necessary for the fabrication of the incubators, containers for transportation, protecting crates, and all other equipment together with the funds required for operations. In other words, the profits will be in proportion to the investment.

To demonstrate the importance of the business we have only to take into consideration that with an initial capital of one hundred and fifty thousand pesos, the Compañia Criadora de Concha y Perlas was able in less than ten years to spend on works and in materials more than a million and a half pesos, and there then existed more than one hundred and fifty pesos'worth of shells ready for exportation.

In the Pearl Field of San Gabriel, situated on the Island of Espiritu Santo, the Company used wooden constructions for offices, housing of employees and workmen, and for the storage of products, etc. They had an ample carpenter shop and machine shops. For the work of collecting the shells, the breeding and other work which must be done where there is no sunlight, they had a gallery or shed, one hundred meters (say 430 ft.) long by ten meters (say 34 ft.) wide. The incubators in service exceeded five hundred. For the protection of the small growing shells a construction of masonry had been built which had

thirty-six divisions (canals), all roofed over with lumber and palm, the length being almost a kilometer (5/8 of a mile). To establish a continuous circulation of sea water in the canals of the hatchery (viveros) an artificial lagoon was constructed in an elbow of the sandy beach by running a masonry wall or dyke five hundred meters (about 1600 feet) long by ten meters (about 33 ft.) wide by eight meters (26,ft.) high.

For elements of food for the workmen they had on hand two thousand five hundred head of sheep and goats on the Island (Espiritu Santo), and over a thousand head of cattle on the Cerralvo Island.

In the beds around the Island of Espiritu Santo over four million shells were planted, half of which had matured, and in the hatcheries, ready to be planted in the open sea were four million young shells more.

The Company owned seventy-two vessels, large and small, some were motor boats, but most were sailing vessels, and the small steamer "Paris", which did inter-island service.

They had over twenty diving equipments, and fourteen diving suits. The number of employees and workmen in the service of the Company exceeded four hundred.

In 1914 the revolutionary wave viped out all the properties of the company, leaving intact only the material constructions (masonry, etc.) which represent a value of more than a million pesos. The fleet in its majority was destroyed, part stolen, some comandeered, as likewise happened to the diving apparatus and equipment, suits, etc. The "Paris" was destroyed. The re-

sidence of Mr. Vives, in which were installed the offices of the company in the City of La Paz, was attacked by the revolutionists and completely sacked, the records anihilated and the safe blown open with dynamite, in which were pearls and values to the amount of fifty thousand pesos. They also carried away all the utensils, equipment, movables of value, etc., belonging to the company, confiscating for their own benefit the mother-of-pearl which was already packed for shipment to Europe, and which represented a value of one hundred and fifty thousand pesos.

On the Espiritu Santo Island they burned and destroyed the ware houses, galleries and dwelling houses in existence, and also destroyed the incubators. The provisions disappeared as did also the herds and live-stock.

In order that no sign, trace or record be left behind of their vulgar and savage brigandage, they searched for Mr. Vives to kill him. Providentially, knowing the danger he was in, he succeeded in getting protection aboard an American gunboat which at that time was anchored in the bay of La Paz.

During almost three weeks the revolutionists, with diving suits of the company, dedicated themselves to the extraction of all the pearl oysters possessed by the Company. Over twenty divers were constantly and actively working, that the sacking might be complete.

From reliable reports it has been proved that in pearls alone the result of these diving operations came to a value of over six hundred thousand pesos.

The value of the shell stolen may therefore be calculated at approximately three hundred thousand pesos.

From all of the foregoing may be seen the enormous importance of this company and its great transcendency in the world market of pearls if the industry be operated on a big scale.

ADDITIONAL REMARKS

Mr. Gaston Vives has to struggle constantly against secret enemies and clandestine divers pilfering around the islands of the Compañia Criadora de Concha y Perla, with the object of extracting the shells and securing the pearls.

The bitterness with which Mr. Vives was attacked through calumny and libel, now ridiculing his methods and inventions for the cultivation of pearls, now pretending under hypocritical, altruistic sentiments that the concessions of Mr. Vives prejudiced the poor divers of Lower California; and, finally, these clandestine divers, for their own individual gains, converting themselves into so-called revolutionists, fell upon the properties of Mr. Vives, sacked them, and robbed him of the fruits of his investigations and labors of many years, clearly demonstrated the real and actual value of his methods and inventions and the wealth and importance which had been attained by the Compañia Criadora.

Mr. Vives, deprived for eight years of the elements with which to work, has been unable to continue the business, lacking the necessary resources to reconstruct houses for storage purposes, dwellings, replace utensils, machinery and equipment, floating equipment, etc., etc., as a capital of some importance is required for all of this.

During this misfortune Mr. Vives is being assisted by friends and admirers with money and influence to keep the concessions in force, without trying to do any work until such time as the company can be reorganized on a firm basis. To this end it has been arranged with the Secretary of the Department of Fomento that the concessions remain in suspense, with the object of thus eliminating the charges against said concessions and the annual payment of taxes as well as the obligation of beginning work again.

Thus it is that at any moment the company can renew its operations, and the government, through contracts executed with Mr. Vives through his attorneys, will reinstate the company in the possession of its rights to continue developing the cultivation of the pearl shell.

Mr. Vives has contracted some debts for maintaining the company during the time transucrring, as it must be remembered that as Mr. Vives holds the great majority of the shares he is, in reality, the owner of the company.

With thirty thousand dollars, U.S.cy. Mr. Vives could liquidate all the debts contracted in his own name and that of the company.

The company can rehabilitate itself with the elements of work, notwithstanding all this, and again become prosperous, since the raw material exists in unlimited quantities at the bottom of the sea, and the canals and shallows constructed around the islands have not deteriorated and can take care of millions and millions of shells.

At least five hundred incubators will be required, the greater the number the greater the crop of spat or young oysters. With the incubators it is necessary to have a floating equipment of boats, and all the utensils, equipment and machinery and material appropriate to this class

of industry.

And, finally, there should be sufficient funds on hand to pay, for a period of at least thirty months, all the employees and workmen of the company, in view of the fact that, as a rule, the first harvest cannot be obtained in less than from thirty to thirty-two months.

For this reason a capital of two hundred and fifty thousand dollars, U.S.cy. will be required to take care of all these expenses and put new life into the company.

After the operations are once resumed and the necessary capital in hand to push the business on a large scale, it will spontaneously expand, as it has already been practically demonstrated that astonishing profits result from the industry, the only one of its kind in the world.

Mexico, March 1923.

(Signed) Prof. R. Sala.

A G R E E M E N T .

AGREEMENT made by and between Mr. Pastor Rouaix, Secretary of Fomento, representing the Executive of the Union, party of the first part, and Mr. Gaston J. Vives, representing the Compañia Criadora de Concha y Perla de la Baja California, S.A., party of the second part, for the purpose of popularizing the planting and cultivating of the pearl oyster on the marine bottoms along the coast of Lower California, in the Gulf of Cortes.

Art. 1. The Compañia Criadora de Concha y Perla de la Baja California, S.A., which hereinafter will be designated as the "Compañia Criadora", dedicated to the cultivation of the pearl oyster at the pearling stations established on the Island of Espiritu Santo of the Gulf of California, by virtue of an agreement made with the Government under date of July 23, 1903, and because of the patents which cover the system and apparatus invented by Mr. Gaston J. Vives for this cultivation; promises to place at the disposal of the Mexican Government, represented by the Department of Fomento, the quantities of young pearl oysters hereinafter specified, for the purpose of repopulating the pearl oyster beds which have become exhausted on the littoral of Lower California in the Gulf of Cortes, and distribute them among the poor people who want to dedicate themselves to the planting and cultivation of the pearl oyster in the fractions or parcels of bottoms which the said Government may grant them on said littoral.

I. During the second year in which this agree-

ment is in force, half a million young oysters.

II. During the following year, one million young oysters.

III. During the fourth year, one million and a half young oysters, and thus successively, half a million young oysters shall be added annually, until the quantity delivered each year shall have reached five million young oysters.

IV. During the following years, the deliveries shall consist of five million young oysters per year as long as this agreement remains in force.

Art. 2. The delivery of the young oysters referred to in the preceding article shall be made in the pearling seasons of the Compañia Criadora, to such persons as may be designated by the Department of Fomento. Said young oysters shall have a minimum size of three centimeters, exterior measurement of the living shell in its natural state, that is to say, without being cleaned; the young oysters must be in good condition as to vitality, and the price shall not exceed twenty pesos ($20.00) National Gold per thousand young oysters, it being clearly understood that the Government is not obligated to take the quantities of young oysters specified in article 1, but that it reserves the privilege of disposing only of whatever number may suit it each year within the quantities specified.

Art. 3. The Compañia Criadora agrees to supply gratis to such persons as the Department of Fomento may designate, all the necessary information regarding the rules, conditions and other details for the conser-

vation, transportation, planting and cultivation of the pearl oyster, and, if said Department should so determine, give said persons practical lessons in said operations at the pearl stations of the said Compañia Criadora.

Art. 4. The Compañia Criadora likewise agrees to supply the Government, at cost price plus 10% for administrative expenses, the "Corazas"(Cuirasses or protective coverings) and other manufactured articles which may be necessary for the protection and cultivation of such young oysters as the Department of Fomento may cause to be planted in beds of collective exploitation, or which are given to individual poor people for planting in the parcels granted to them. In such cases as the Department of Fomento may specify, the Compañia Criadora shall effect the transportation and planting of the young oysters, being compensated for the expense of this work in the manner indicated, its responsibility ceasing as soon as said plantings or beds have been received by the inspector appointed by the Department for this purpose, or by the poor individual beneficiaries.

Art. 5. If for any reason it should happen that the Department of Fomento or the individual poor persons authorized by the Department of Fomento, do not dispose of, during the period comprised within the first of April and the thirty-first of October during one or various years, all the young oysters which should be supplied in accordance with the stipulations of this agreement, the Compañia Criadora shall dispose of the balance and shall plant same for its own account in the beds under its jurisdiction.

Art. 6. If, in spite of having properly established the works and having taken the necessary precautions, it should happen some year, by accidental or fortuitous circumstances contrary to the will of the Company, that the harvest of young oysters obtained in the incubators be less than double the quantity which has to be supplied to the Government, the Compañia Criadora shall be obligated to deliver only half of the young oysters obtained, leaving the other half of the young oysters for the needs of its own beds, and the same procedure shall be followed if the accident or fortuitous happening should occur while the young oysters are deposited in the hatcheries awaiting transplanting to the open sea.

Art. 7. In order that the Compañia Criadora may have sufficient space for its operations in the production of young pearl oysters, and thus be able to supply the Government with both the quantities stipulated in this agreement and such quantities as may be agreed upon in the future, for the purpose of establishing the industrial cultivation of said mollusk along the entire Pacific coast; the Compañia Criadora agrees to take over (incorporate) within two years the pearl zone of the island of San Jose, Lower California, which has been granted to the Compañia Perlifera de San Jose, with the understanding that said zone shall form an integral part of the marine bottoms which the said Compañia Criadora must cultivate and exploit according to the methods established on the island of Espiritu Santo.

Art. 8. The Compañia Criadora, for a period of ten years, counting from the date of this agreement, shall have the right to import free of duty the machinery,

accessories, apparatus, tools, materials, and other articles which may be necessary for the work it is authorized to carry out, the Compañia Criadora to present in advance to the Department of Fomento the respective detailed lists, with the understanding that the said Department shall determine if the articles are appropriate for the purposes designated in this agreement and shall fix the quantities which the Compañia Criadora may introduce free of duty.

Art. 9. The Compañia Criadora must submit to the rules and regulations which the Departments of Fomento and the Treasury may dictate in such cases, for the importation, conservation, application and consumption of the articles whose free importation is authorized in the preceding article, and it shall not have the power to refuse the inspection by the said Departments of Fomento and the Treasury of the grounds, factories, waters and bottoms(beds) where the work is carried on, for the purpose of ascertaining that the rules and regulations prescribed, or which may be prescribed, are complied with.

Art. 10. The articles imported free of duty cannot be used for other purposes than those which the Compañia Criadora is authorized to carry out, nor can they be sold, granted, rented, hypothecated or in any way alienated by said Compañia Criadora for purposes outside of this agreement, without previous authorization of the Department of the Treasury, without being guilty of smuggling.

Art. 11. The persons employed by the Compañia Criadora to watch its beds and other property and repel

trespassing, shall have the standing of private fishery guards and their names shall be made known to the Captain of the Port of La Paz, who will give each one a license for the carrying out of his duty, and, in accordance with the last part of Article 16 of the Political Constitution of the United Mexican States, signed January 31, 1917 and promulgated February 5th of the same year, said fishery guards shall have the right to arrest the delinquents and their accomplices in cases of flagrante delicto, placing them without delay at the order of the local authorities for the punishment of whatever has taken place. In other cases, they shall report the facts to the respective authorities, so that due investigations may be made.

Art. 12. The Compañia Criadora shall not have the right to transfer, hypothecate, alienate, or in any manner jeopardize this agreement in favor of individual Mexicans or Mexican companies constituted in accordance with the laws of the country, without first procuring the written authorization from the Department of Fomento, which Department shall have the right to refuse, if it so deem advisable, or impose such stipulations as it may see fit.

Art. 13. Under no circumstances nor at any time shall the Compañia Criadora have the right to transfer, hypothecate, alienate or in any manner jeopardize this agreement or any of the rights arising from same to any foreign Government or agents of same nor admit same as partners.

Art. 14. The Compañia Criadora can never, as far as matters relative to this agreement are concerned, allege any alienship rights in any form or manner, and it shall only have the rights and means conceded by the laws

of the Republic to Mexicans, and, consequently, foreign diplomatic representatives cannot intercede in said matters.

Art. 15. This agreement shall become void for any of the following reasons:

I. For the absolute cessation of the work for more than two consecutive months without duly justified cause.

II. For infringement of Article 12 relative to the transfer, alienation or hypothecating of this agreement, in favor of Mexican individuals or companies.

III. For transferring, hypothecating, alienating, granting or in any way compromising this agreement, or any of the rights arising from it, to a foreign Government or company or agents of same, or admitting them as partners, it being an essential condition that if any of these acts should occur, the Compañia Criadora shall lose, to the Mexican Government, all the properties and installations which it may have acquired or set up, as well as the ships and other properties belonging to said Company.

IV. In case the Compañia Criadora should impede the application of the means for furthering the popularization of the industrial cultivation of the pearl oyster in accordance with the stipulations of this agreement.

Art. 16. The lapse of this agreement shall be declared by the Executive of the Union after due administrative investigation, in order that the Compañia Criadora may have ample margin of time to render proofs, formulate its defense and exercise its administrative rights.

Art. 17. The lapse of this agreement shall be

without prejudice to any further responsibilities which the Compañia Criadora may have, and if such lapse should be declared within the first ten years from the date of this agreement, the Compañia Criadora shall pay to the Government all fiscal duties of importation on the stock of articles which shall not yet have been utilized for the purposes of the present agreement and which shall have been imported free of duty.

Art. 18. The life of this agreement shall end on the date on which the concession of July 23, 1903 relative to the cultivation, development and exploitation of the pearl industry on the island of Espiritu Santo, Lower California, shall have expired.

Art. 19. If for any reason this agreement should be declared null and void, the agreement of July 23, 1903 shall remain in full force and power, in accordance with the respective concessions to the Compañia Criadora for the exploitation of the pearl oyster on the island of Espiritu Santo, Lower California, and those of July 5, 1893, December 20, 1901 and July 12, 1908, belonging to the Compañia Perlífera de San José (the same company which has to be incorporated with the Compañia Criadora), relative to the exploitation of pearl oyster on the island of San José.

Art. 20. This agreement is not exclusive for which reason the Department of Fomento shall have the power to grant other similar concessions for pearl stations or zones which are not ceded or do not belong to the Comñia Criadora.

Art. 21. The stamps for this agreement, which is executed in duplicate, shall be paid by the Compañia Criadora, the entire rate per sheet being due for each copy, in accordance with the Stamp Law in force.

Mexico, June fifteenth, Nineteen Hundred and Sixteen.

(Signed) Pastor Rouaix

(Signed) Gaston J. Vives

MEXICAN UNITED STATES

DEPARTMENT OF COMMERCE (SECRETARIA DE FOMENTO)

Office of Patents and Trade Marks

LETTERS PATENT OF INVENTION No. 15542.

KNOW ALL MEN BY THESE PRESENTS

That the Commander-in-Chief of the Constitutional Army, vested with the Executive Power, in view of the fact that Mr. Gaston J. Vives has complied with the requirements established by Law, has granted him an exclusive patent for twenty years, counted from the 19th of October, one thousand nine hundred and fifteen, at nine thirty A.M., for the invention which he affirms having made for protecting young pearl oysters and other mollusks of the same form against attacks of the fishes or harmful sea animals which destroy them, which protection is effected by means of the invention called "Coraza Protectora" (Protective Cuirass or Covering).

Wherefore this Patent is issued and a description of said invention attached to same.

Mexico, D.F., October 26, 1915.

The Assistant Secretary,
In Charge of the Office of Commerce(Fomento),
Colonization and Industry.

(Signed) Pastor Rouaix

(S E A L)

TO WHOM IT MAY CONCERN:

Know ye, that I, Gaston J. Vives, tradesman, citizen of the Mexican Republic, with residence at the Port of La Paz, Territory of Lower California, and having selected the Fourth Block of Tacuba Street, No. 33, in the City of Mexico, as my legal adress for receiving notices, have invented a new and useful procedure by which new methods are applied to obtain industrial results.

The name of my invention is "Coraza Protectora" (Protective Cuirass or Covering), the nature and effect of my invention being that of an industrial process for securing the protection of the young pearl oyster and other mollusks of the same shape against the attacks of their enemies, the sea animals, by means of a covering or cuirass made of thin metal sheeting, of which invention I attach the respective drawings, explaining the figures in the course of the description which is as follows.

The pearl oyster is a mollusk producing the commercial article known as mother-of-pearl which has so many applications in industry, as well as the pearl, a precious gem.

Its cultivation requires protection against fishes and other sea animals which destroy it, expecially when it is small and delicate, and in order to overcome this danger of destruction, which is its chief danger, I have invented a new device which consists of a kind of cuirass of tin plate or other thin metal, which has more or less the same shape as the shell or young oyster, and which is shown on drawing Fig. No. 3.

The young oyster or shell is placed inside the cuirass which is shown on the drawing in Figs. 1, 2, 4 and 5, in such a manner that its lower part, or the side of the hinge, corresponds to the doubled part of the cuirass which also serves as the hinge of the latter.

The cuirass is formed by two leaves or sheets which fold over by the hinge without closing entirely so as not to impede the circulation of the water and the growth of the young oyster or shell; the open edges may be smooth as shown on Figs. 4 and 5, or they may have points as shown in Figs. 1 and 2, the object of these points being to serve as an obstacle to the fish or sea animal which attempts to bite the small oyster.

As the young oyster or shell fastens itself to the rock by a part of its body possessing some fine filaments known by the name of "byssus", an opening or free space is left at the back of the cuirass so that the bivalve may extend its byssus through it and attach itself to the solid bodies on the bottom.

Furthermore, in order that the cuirass may fall in the right direction after it is released at the surface of the water and the opening, which is opposite the mouth of the cuirass and pointing in the opposite direction, may settle on the side towards the bottom of the sea, a small piece of cork or light wood is fixed to the cuirass to serve as a rudder and insure that it falls to the bottom properly.

Wherefore I replevy as my invention the following:

R E P L E V I N

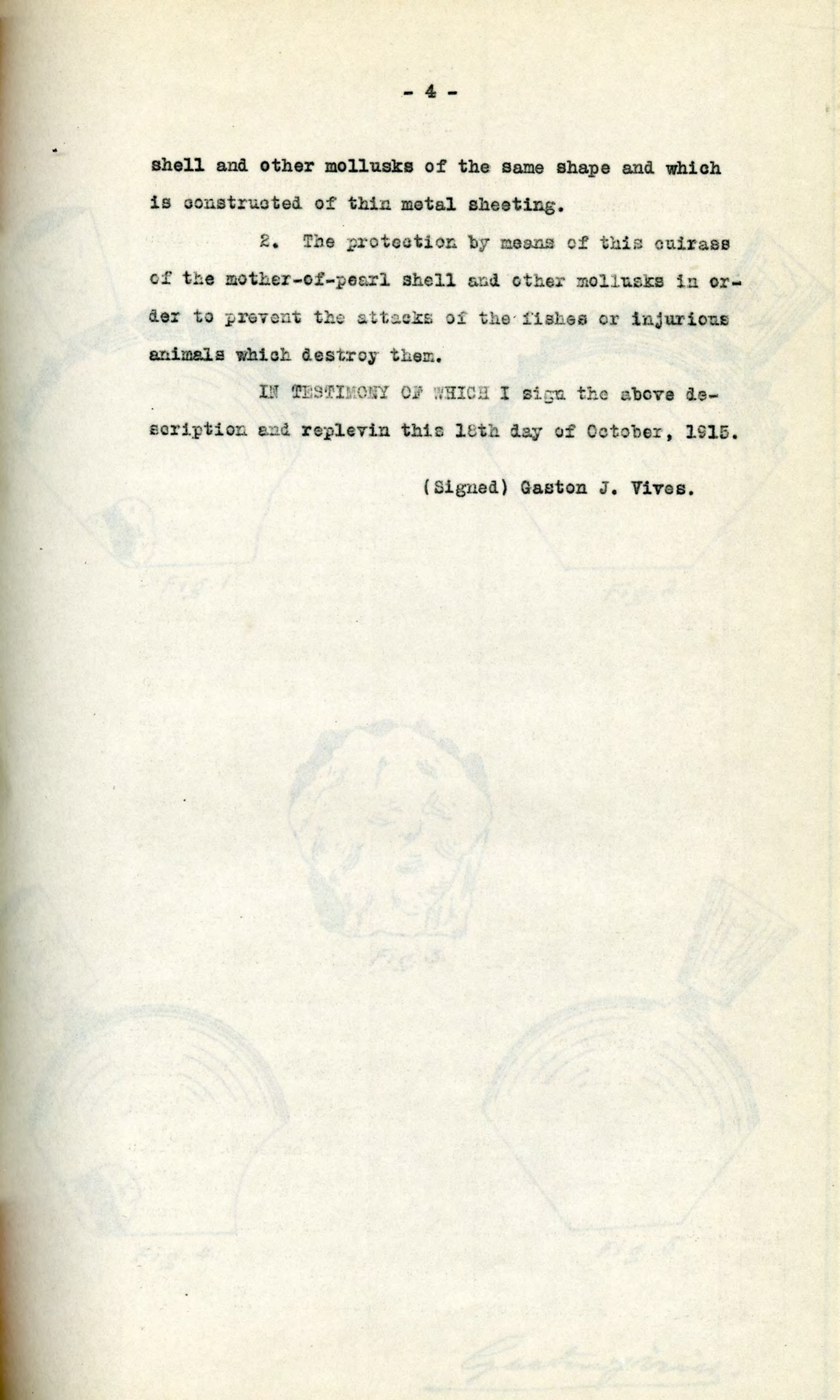
1. The cuirass which protects the mother-of-pearl

shell and other mollusks of the same shape and which is constructed of thin metal sheeting.

2. The protection by means of this cuirass of the mother-of-pearl shell and other mollusks in order to prevent the attacks of the fishes or injurious animals which destroy them.

IN TESTIMONY OF WHICH I sign the above description and replevin this 18th day of October, 1915.

(Signed) Gaston J. Vives.



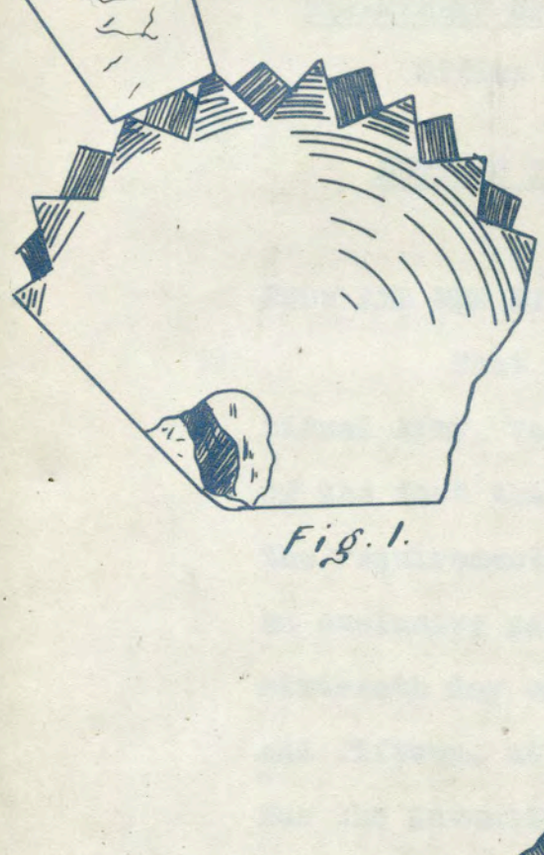


Fig. 1.

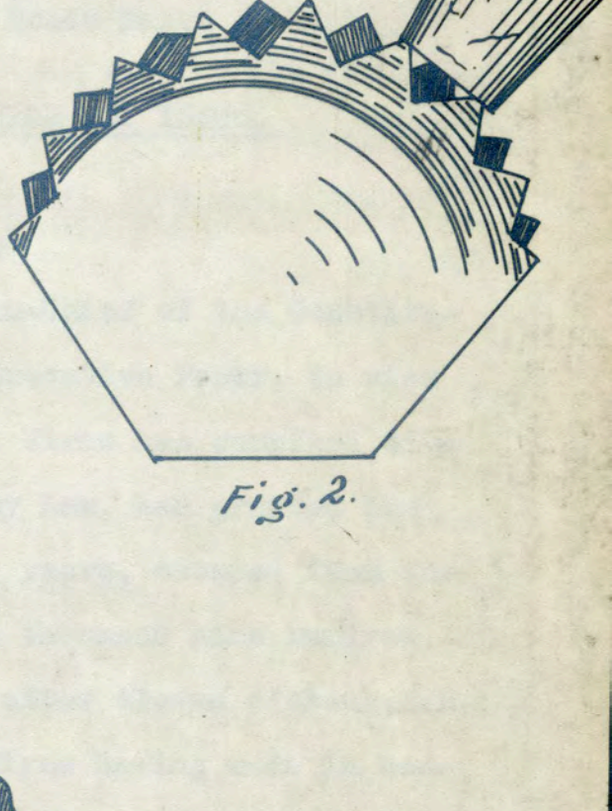


Fig. 2.

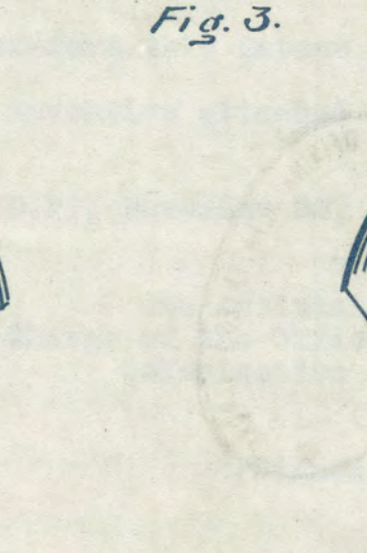


Fig. 3.

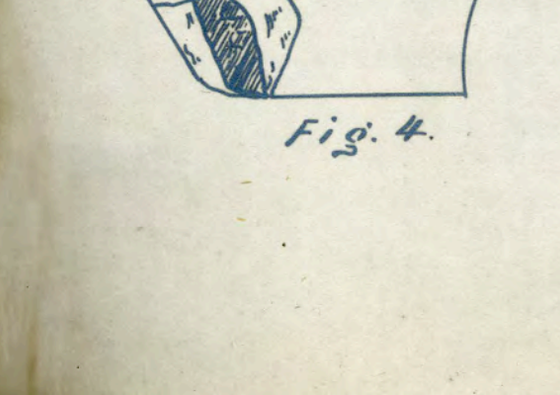


Fig. 4.

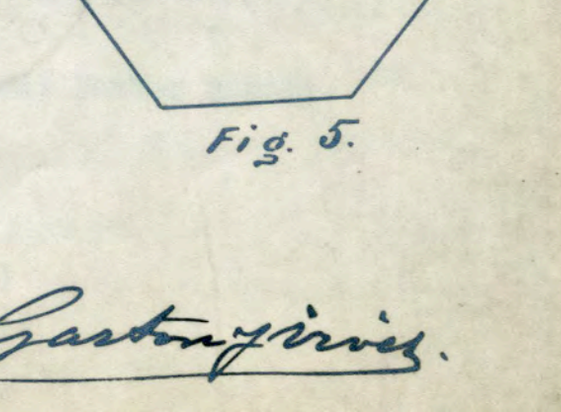


Fig. 5.

Gaston Giris.

M E X I C A N U N I T E D S T A T E S

DEPARTMENT OF COMMERCE (SECRETARIA DE FOMENTO)

Office of Patents and Trade Marks

LETTERS PATENT OF INVENTION NO. 15604.

KNOW ALL MEN BY THESE PRESENTS

That the Commander-in-Chief of the Constitutional Army, vested with the Executive Power, in view of the fact that Mr. Gaston J. Vives has complied with the requirements established by Law, has granted him an exclusive patent for twenty years, counted from the sixteenth day of November, one thousand nine hundred and fifteen, at forty minutes after eleven o'clock,A.M.; for the invention which he affirms having made in connection with the procreation of the pearl oyster and other mollusks on sandy bottoms of the sea, protecting said molluska against attacks of sea animals by means of an apparatus called "Pabellón Protector" (Protective Crate).

Wherefore this Patent is issued and a description of said invention attached to same.

Mexico, D.F., November 23, 1915.

The Assistant Secretary,
In Charge of the Office of Commerce(Fomento),
Colonization and Industry.

(Signed) Pastor Roaux.

(S E A L)

TO WHOM IT MAY CONCERN:

Know ye, that I, Gaston J. Vives, tradesman, citizen of the Mexican Republic, with residence at the Port of La Paz, Territory of Lower California, and having selected the Fourth Block of Tacuba Street No. 33, in the City of Mexico, as my legal address for receiving notices, have invented a new and useful procedure for the procreation of the pearl oyster and other mollusks on sandy bottoms of the sea by means of the apparatus called "Pabellón Protector" (Protective Crate), which protects the mollusks against attacks of sea animals, of which invention the description follows.

The pear oyster is a mollusk producing the commercial article known as mother-of-pearl which is used so extensively in industry, as well as the pearl; and it does not grow on sandy or muddy bottoms. It is only found on solid rock bottoms because the young oyster must attach itself to a solid or firm spot in the sea in order to develop, and for this reason said mollusk, so highly prized for its product, is never produced on sea bottoms which are sandy, muddy or not sufficiently firm. My invention has the advantage that it makes possible the development of the young oyster on such bottoms as by their nature are inappropriate; furthermore, at the same time it protects the young oyster from the danger of destruction by attacks of sea animals, this danger being so great that it may be said that the enemies of the pearl oyster destroy more than fifty per cent of the young oysters which are in course of development in places naturally suitable for their procreation and without any kind of artificial

protection.

The apparatus which I have invented is composed of three distinct parts: A block of cement or natural stone, a tray, and a crate.

The block has the shape of a rectangular parallelepipedon; it is made of cement and sand, or of natural stone cut to give it the suitable shape, being generally longer than wide, and the height more or less half of the width; it may be made of various sizes, although its weight should not be greater than that it may easily be handled by one man.

One of the sides, the upper one, or that which is placed so it faces upward, is smooth; the other sides may also be smooth or flat, although this is not necessary. Following the same instructions, the blocks may also be made circular.

The tray is composed of a series of square compartments formed and joined together by long narrow strips of small mesh metal cloth or by thin metal strips.

In order to form the compartments said strips cross each other at certain intervals and are fit into each other by means of cuts to the middle of their width.

The depth of the compartments is three to five centimeters, and the width and depth should be in proportion to the size of the young oysters placed in them.

The aggregate of the compartments, that is to say, the size of the tray, is equal to the upper side of the block for which it is constructed.

The top and bottom of the compartments are left entirely uncovered.

The crate has the shape of a rectangular paral-

lelepipedon and is composed of an iron frame made up of two rectangular squares of the same size and made of flat, narrow, thin iron bars or strips. Said squares are superimposed horizontally and in a parallel position at a certain distance from each other, and are held together by means of vertical strips or bars of the same material, whose ends fit together at the respective corners of said squares.

The upper side of the frame as well as the four lateral sides are completely covered with galvanized wire cloth or netting, the remaining side, i.e. the bottom, being left free from netting, that is to say, entirely uncovered.

The length and width of the crate should be a little greater than the length and width of its respective block so as to cover it, and the height or depth is double that of said block.

In case the block is circular or of some other form, the crate must be adapted to this same form.

The respective plans are attached hereto: Fig.No.1 represents the apparatus complete with an imaginary cut in the crate so as to show the interior arrangement in readiness for the operation of said apparatus.

Letter "A" designates the stone or cement block. Letter "C", the outside crate. Letter "B", the tray. Letter "D", a young oyster placed in one of the compartments.

Fig.No.2 represents the exterior of the crate complete.

In order to use the apparatus it is put on the

bottom of the sea, the respective block being placed on the sand or mud so that the flat side is turned up and in a horizontal position. The tray is then placed on the block and a young oyster is put in each compartment; at last the whole is covered with the crate which, as far as size is concerned, fits around the block perfectly covering everything, its edges resting on the mud or sand.

This same apparatus may also serve for the procreation of the pearl oyster on bottoms which are not sandy or muddy.

Wherefor I replevy my invention as follows:

R E P L E V I N

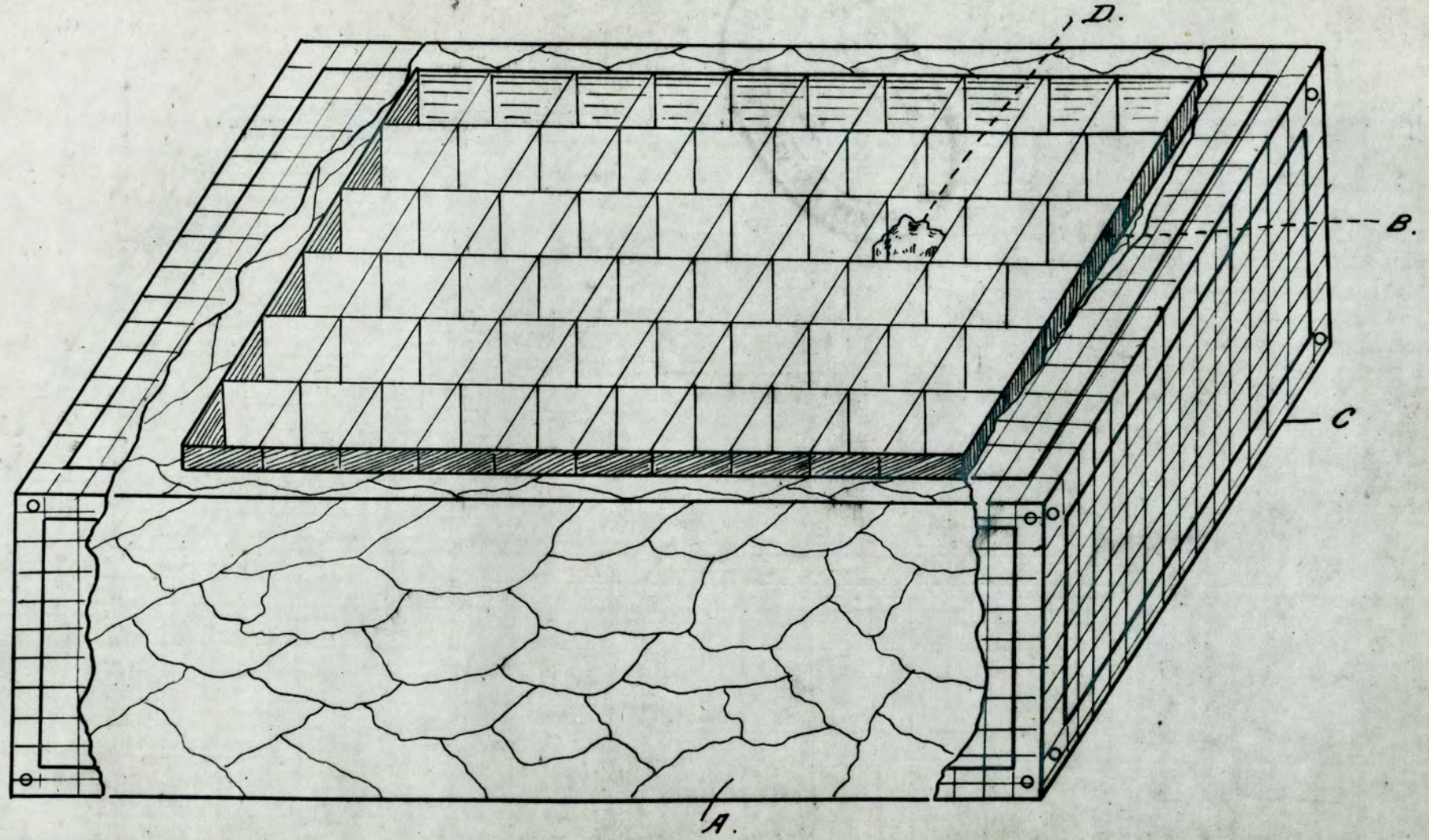
1. The apparatus described for protecting the young pearl oyster and other mollusks of the same form in any part of the sea where it may be placed for its development.

2. The planting of young pearl oysters and other similar mollusks on sandy or muddy sea bottoms, not naturally suitable for their procreation.

IN TESTIMONY WHEREOF I sign the above description and replevin this 12th day of October, 1915.

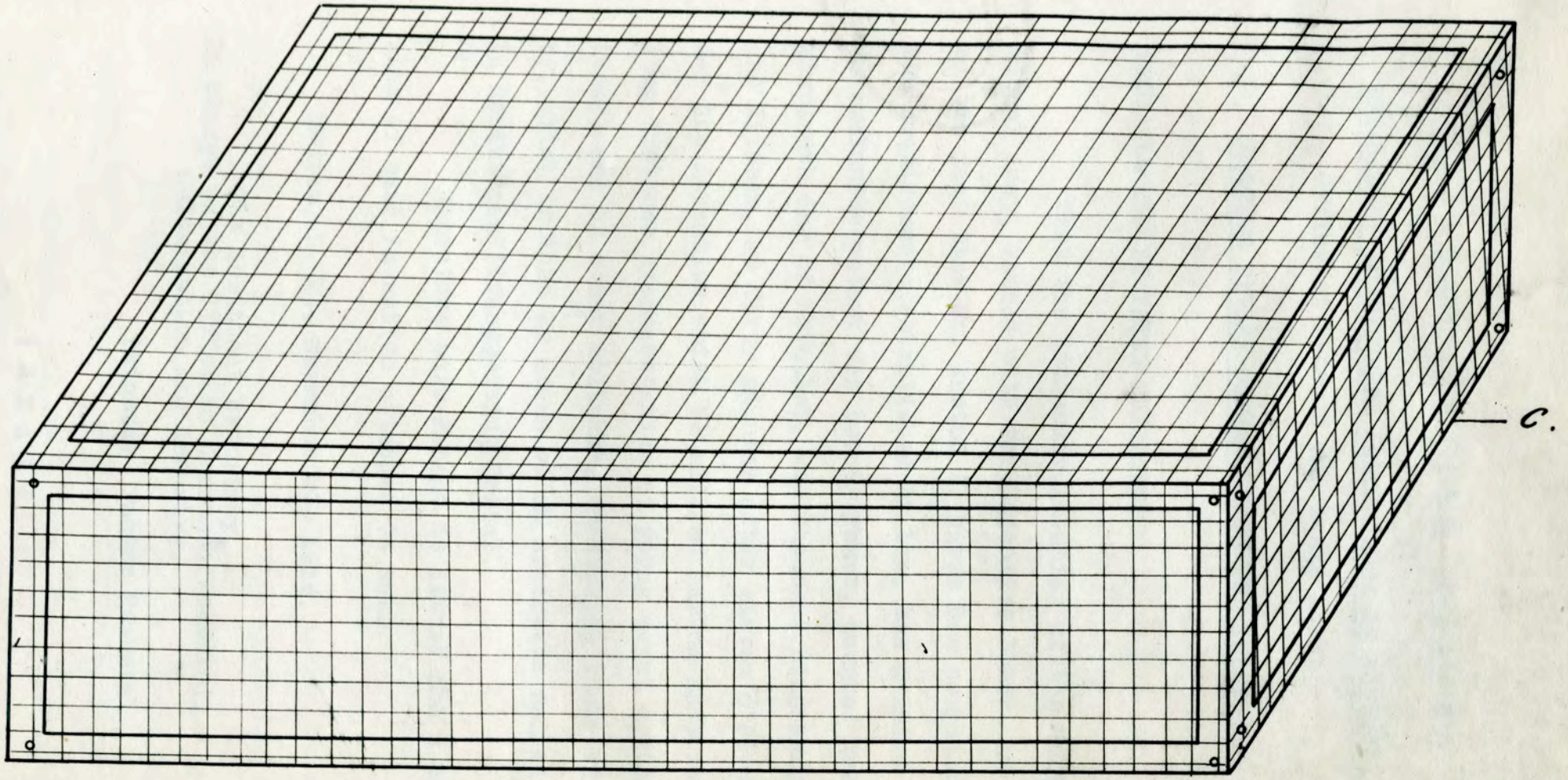
(Signed) Gaston J. Vives.

Fig. 1.



Gaston J. Vivet.

Fig. 2.



Gaston Boivin.

M E X I C A N U N I T E D S T A T E S

DEPARTMENT OF COMMERCE (SECRETARIA DE FOMENTO)

Office of Patents and Trade Marks

LETTERS PATENT OF INVENTION NO. 15605.

KNOW ALL MEN BY THESE PRESENTS

That the Commander-in-Chief of the Constitutional Army, vested with the Executive Power, in view of the fact that Mr. Gaston J. Vives has complied with the requirements established by Law, has granted him an exclusive patent for twenty years, counted from the sixteenth day of November, one thousand nine hundred and fifteen, at forty minutes after eleven o'clock, A.M.; for the invention which he affirms having made for the long distance transportation of young pearl oysters (spat) and of other mollusks, conserving their vitality, which is done by means of an apparatus called "Jaula Conductora"(Transporting Crate).

Wherefore this Patent is issued and a description of said invention attached to same.

Mexico, D. F., November 23, 1915.

The Assistant Secretary,
In Charge of the Office of Commerce(Fomento),
Colonization and Industry.

(Signed) Pastor Roauaix.

(S E A L)

TO WHOM IT MAY CONCERN:

Know ye, that I, Gaston J. Vives, tradesman, citizen of the Mexican Republic, with residence at the Port of La Paz, Territory of Lower California, and having selected the Fourth Street of Tacuba, No. 33,in the City of Mexico, as my legal address, have invented a new and useful procedure for the long distance transportation of young pearl oysters (spat) and other mollusks, which is done by means of the apparatus called "Jaula Conductora" (Transporting Crate) of which the description follows.

It happens frequently that young oysters have to be transported from one place to another for transplanting and development until they shall have attained the commercial size; and as the young oysters would die if left out of the water more than twelve or ten hours, the apparatus invented supplies the means for long distance transportation as it keeps them alive, even if the trip should last one or several days.

The apparatus has the form of a rectangular parallelepipedon.

It is composed of a frame of slats joined to each other in the form of a perfect cube.

Each side is made up of four slats fastemed at the ends with nails or screws. The slats forming the angles serve for two sides, naturally.

One of the sides is designated as the "top" or "cover"; it is joined to the frame by means of hinges and serves as door. The other sides are covered with galvanized wire netting.

The top or cover is supplied with handles or similar contrivances so that the apparatus can be suspended in the water by means of ropes or in some other manner.

Flat galvanized wire trays with low sides are placed in the interior of the apparatus.

The length and width of the trays is in proportion to the width of the crate, as they should be placed in sets of two.

The trays are placed in the crate in sets of two each, leaving a vacant space between them. In order that the trays may remain firmly in their places, their ends are secured by means of small pieces of wood nailed to the slats which make up the frame.

In the drawing or plan attached, the apparatus is represented in various positions: Fig. No. 1 gives the front view; Fig. No. 2 represents the apparatus seen from the side; Fig. No. 3 represents the apparatus seen from above and with the two boards which form the cover open; Fig. No. 4 shows one of the trays.

The method of using the apparatus in transporting the oysters from one place to another consists in placing them in the trays; the trays are then placed in the crate in the manner indicated and the cover is closed. The crates are then submerged in water for one or two hours, after which the shipment is made. During the transportation and until the oysters are finally placed in the sea, the crate and all must be submerged in water for one hour at the time each ten hours.

For which reason I replevy as my invention the

following:

R E P L E V I N

I. The Apparatus described for transporting young pearl oysters and other mollusks of the same species, conserving their vitality.

II. The manner of transporting the young pearl oysters and other mollusks of the same species by means of the apparatus already described.

IN WITNESS WHEREOF I sign the above description and replevin this 12th day of November, 1915.

(Signed) Gaston J. Vives

Fig. 1.

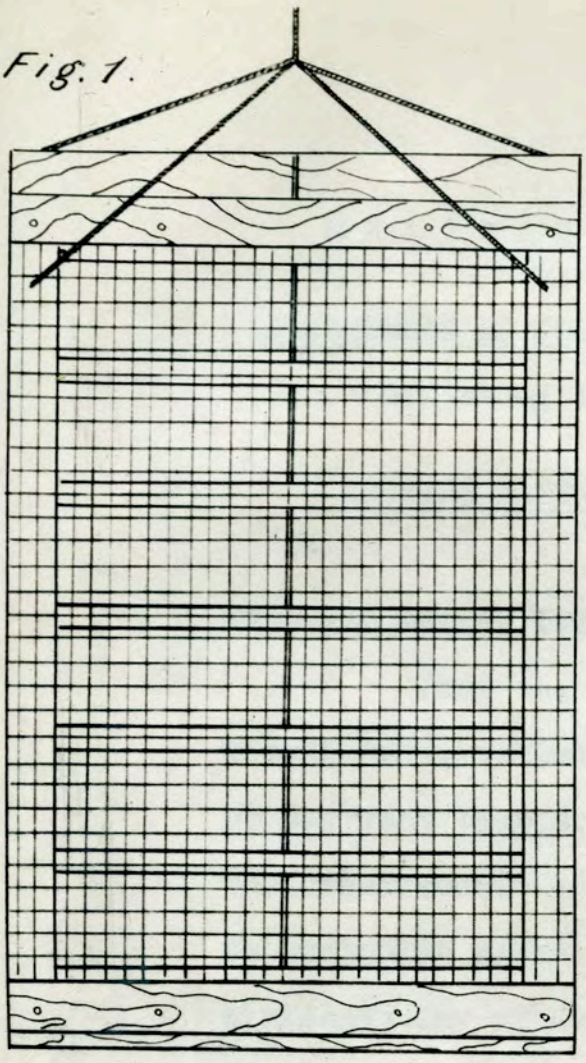


Fig. 2.

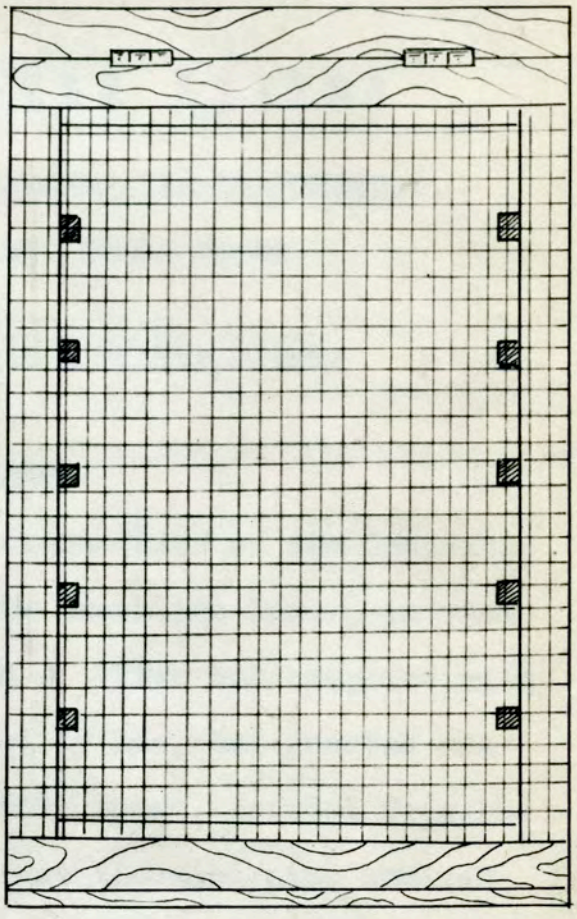


Fig. 3.

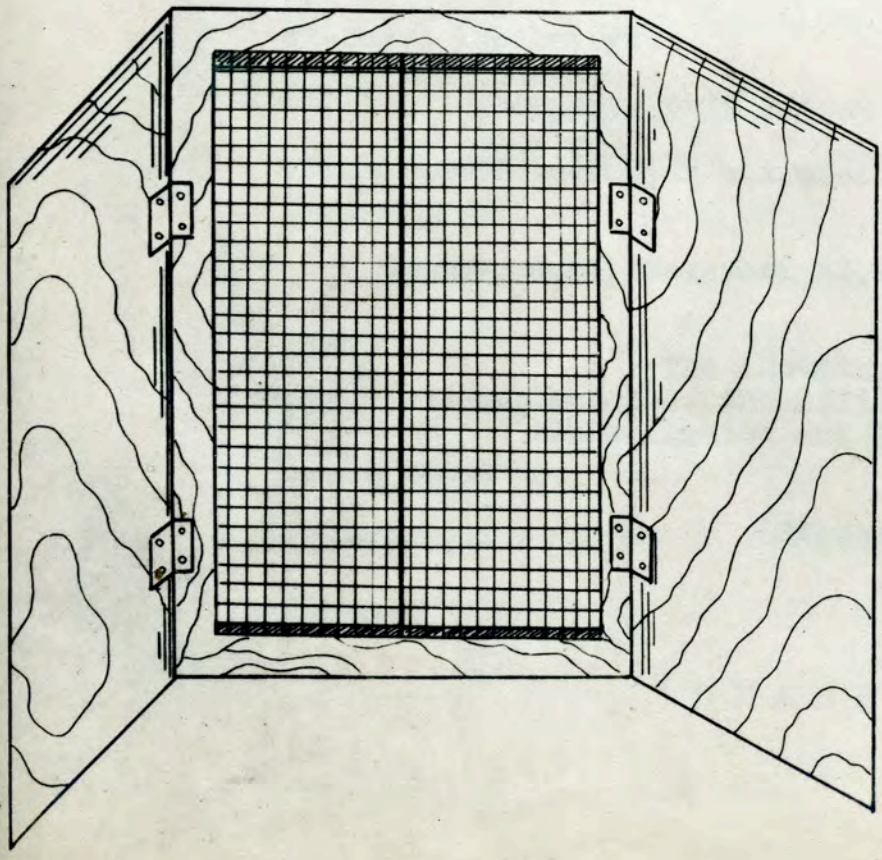
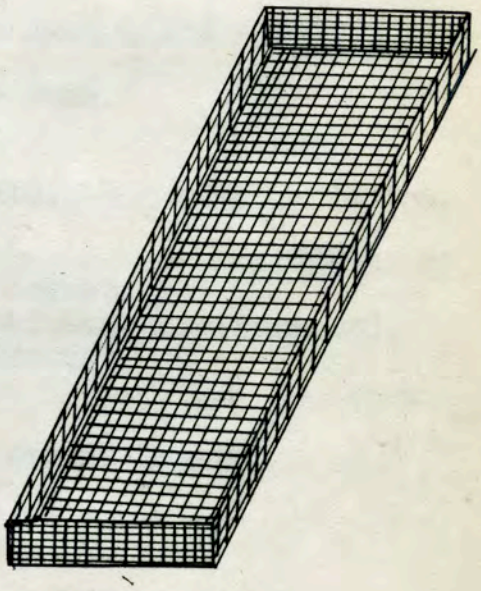


Fig. 4.



Gaston Javivier

M E X I C A N U N I T E D S T A T E S

DEPARTMENT OF COMMERCE (SECRETARIA DE FOMENTO)

Office of Patents and Trade Marks

LETTERS PATENT OF INVENTION NO. 15606.

KNOW ALL MEN BY THESE PRESENTS

That the Commander-in-Chief of the Constitutional Army, vested with the Executive Power, in view of the fact that Mr. Gaston J. Vives has complied with the requirements established by Law, has granted him an exclusive patent for twenty years, counted from the sixteenth day of November, one thousand nine hundred and fifteen, at forty minutes after eleven o'clock,A.M.; for the invention which he affirms having made in connection with the artificial procreation of the pearl oyster and other mollusks by means of an apparatus called "Incubadora de la Concha Madre Perla" (Mother-of-Pearl Incubator).

Wherefore this Patent is issued and a description of said invention attached to same.

Mexico, D.F., November 23, 1915.

The Assistant Secretary,
In Charge of the Office of Commerce(Fomento),
Colonization and Industry,

(Signed) Pastor Roaux.

(S E A L)

TO WHOM IT MAY CONCERN:

Know ye, that I, Gaston J. Vives, tradesman, citizen of the Mexican Republic, with residence at the Port of La Paz, Territory of Lower California, and having selected the Fourth Street of Tacuba No. 33, in the City of Mexico, as my legal address for receiving notices, have invented a new and useful procedure which has for its object the artificial procreation of the pearl oyster and other mollusks of the same species by means of an apparatus invented by me and called "Incubadora de la Concha Madre Perla" (Mother-of-Pearl Incubator), of which the following is a description.

The apparatus invented by me consists of two rectangles each formed by four slats joined at the ends by means of nails or screws. Said rectangles are placed horizontally and parallel to each other, one above the other, at a certain distance, and are supported in this position by means of other short slats placed vertically at the corners and at the centers of the slats composing the rectangles, said short slats being also secured by nails or screws.

The aggregate of these slats, fastened in the manner indicated, constitutes the frame or skeleton of the apparatus, forming the geometrical figure of a parallelepipedon. This shape is the most convenient and practical one, although the apparatus may be constructed in other various shapes, but what really constitutes the invention is the method of the procreation and the manner in which the apparatus is made to function.

Two sides of the parallelepipedon is covered

with vertical or horizontal boards, leaving a space between the boards so that the water may flow in and out.

The other two sides are left uncovered, that is to say, they are not provided with boards, and are called "los frentes" (the fronts or faces).

Both the fronts or faces and the open spaces of the sides and bottom, that is, the lower side, are covered with galvanized wire netting.

The superior part of the apparatus is covered with wooden covers which can be taken off or put on.

On the bottom side some cross slats are fixed to serve as buffers against shocks and to protect the interior part.

In the interior of the apparatus sort of double wooden grates are placed, leaving an empty space between them. Tough branches, pieces of hard shell and old shell is also put into the apparatus. The grates and other objects indicated constitute the nests to which the young oysters attach themselves.

The gratings are made of thin wooden slats nailed to wooden cross pieces; the number placed in the apparatus varies according to the height of the apparatus, this depending on the strength of the current at the spot where the apparatus is placed to function.

In the attached drawing Fig. 1 represents the apparatus from one of its lateral sides with its top covering. Fig. No. 2 represents the apparatus seen from the front with its covers. In Fig. No. 3 the apparatus is represented seen from above and open, without the covers. Fig. No. 4 represents one of the gratings (A) from above;

(B) from below; (C) view of the long or side edge; (D) view of the end or short edge.

In order to put the apparatus to function, after it has been filled and the covers closed, it is submerged in the sea so that the fronts or faces are alongside of the currents of water at the spot where it is placed.

After the apparatus is placed, pearl oyster spawn and the larvas produced are introduced or put into it, and the evolution of same continues until transformed into shells which attach themselves to the nests, where they are left for some time to acquire the necessary size for the further steps in the operation of their cultivation.

In order to gather the young oysters from the incubators, these are pulled up on dry land and the nests taken out, the apparatus being left to rest and ready for use at any time they may be needed, and so on, successively.

For which reason I replevy my invention as follows:

R E P L E V I N

1. The artificial procreation of the mother-of-pearl shell and other mollusks of the same species by means of the apparatus described.

2. The method or special operation described for the procreation of the pearl oyster and other mollusks of the same species, independent of the shape, dimensions or materials used in the construction of the incubating apparatus.

IN TESTIMONY WHEREOF I sign the above description and replevin this 12th day of November, 1915.

(Firmado) Gaston J. Vives

Fig. 1.

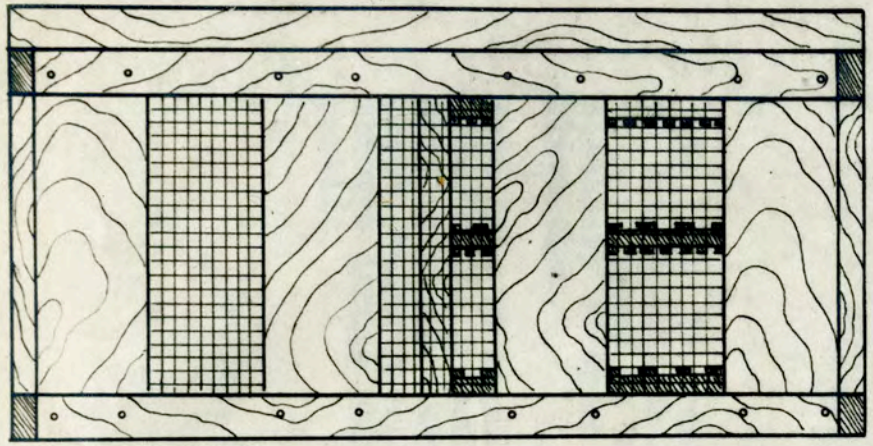


Fig. 2.

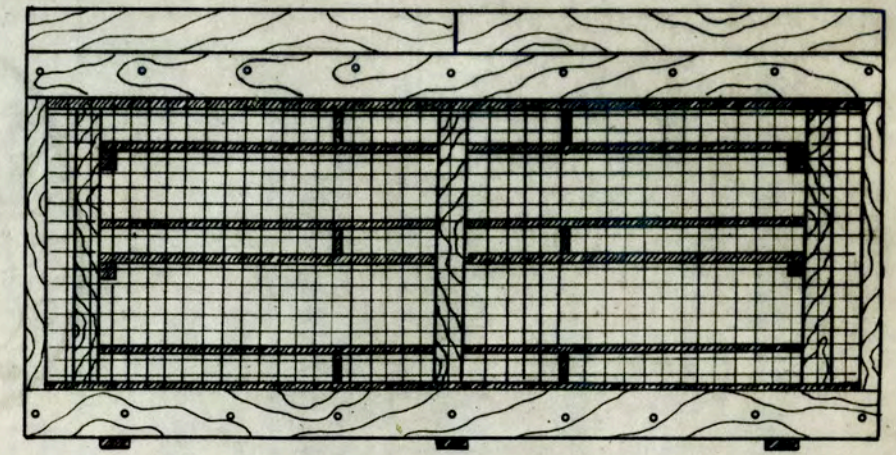


Fig. 3.

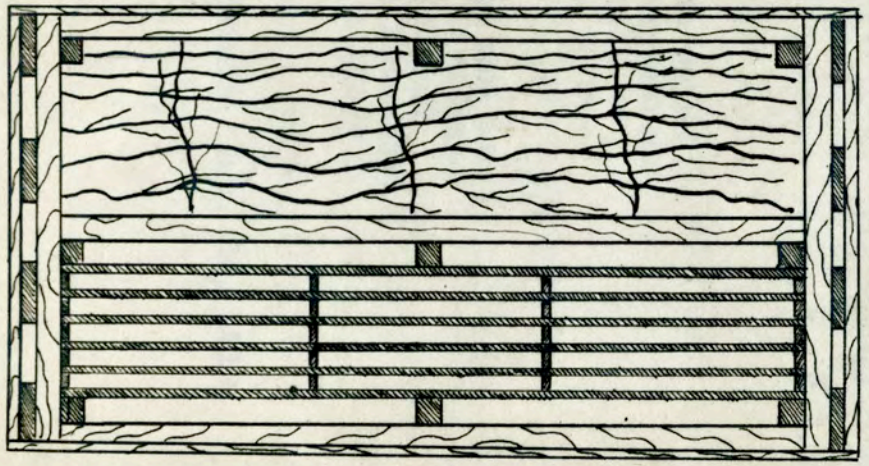
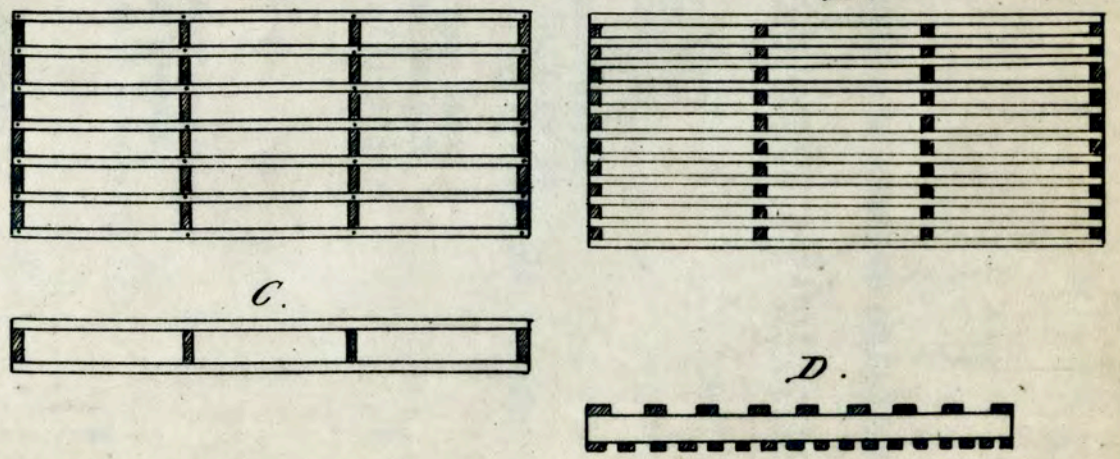


Fig. 4.



Gaston J. Rivet

RECAPITULATION OF THE INVENTORY AND REMARKS RELATING TO SAME.

.....

ISLAND SECTION.

Existing buildings and constructions of the Compañia Criadora, figures in first column.....	$ 488,740.00	
Property of which the greater part has disappeared, figures in second column.....		$ 1,113,425.50

LA PAZ SECTION.

Property of which the greater part has disappeared, figures in second column.....		175,656.82
		$ 1,289,082.32
Note I. - Property which has been recovered in the course of time, more or less.....		189,082.32
NET LOSSES.....		$ 1,100,000.00
Note II.- The losses caused by suspension of work for more than four years are considerable, but we have reduced them to.....		$ 1,000,000.00
TOTAL LOSSES.....		$ 2,100,000.00

Note III.- In order to fix the value of the objects which have disappeared we have taken as base what would be necessary to spend at present to replace them.

Note IV.- In legal proceedings and to recover the property it will be necessary to pay out about five thousand pesos, which probably will be recovered through damage suits against private parties.

La Paz, Lower California, Jan. 24, 1919.

L I S T

of the properties of the "Compañia Criadora de Concha y Perla de la Baja California, S. A." and those of its Manager, Mr. Gaston J. Vives, of which properties they were dispossessed upon the entrance into the Port of La Paz of the Constitutionalist forces under the command of Col Miguel L. Cornejo,

July 18, 1914.

	C H A T T E L S ,	
	existing on that date in the offices, warehouses, dwellings, and patios of the Company, located in Block No. 3, formed by the "Playa", "La Paz", Comercio", and "Puerto" Streets of the city of La Paz.	
	ARCHIVES.	
2	Sets book-keeping books of the"Cia.Criadora" composed of 3 books ea.:DAYBOOK (DIARIO), LEDGER ("MAYOR") and CASH BOOK ("CAJA"), bound in sheepskin, duly legalized, all closed.....	
1	Set ditto, of the "Cia.Criadora", same as above, in use.....	
2	Only books denominated "Inventories"and "Balances" of the Cia.Criadora, in use.	
19	Only books denominated "Journals" of the Cia. Criadora, all closed.....	
1	Only book denominated "Journal" of the Cia Criadora, in use.....	
23	Auxiliary Books for accounts,denominated "Workmen"("Trabajadores"), of the Cia.Criadora, all closed.....	
1	Only Auxiliary Book for accounts, denominated "Workmen"("Trabajadores"), of the Cia. Criadora, in use.....	
22	Books of the Cia. Criadora, denominated "Notebooks"("Borradores") all used.....	
1	Only book same as above of the Cia.Criadora, denominated "Notebook"("Borrador") in use.....	

A la Hoja No. 2

24	Books denominated "Inventories" with special ruling for the purpose, of the Cia. Criadora, all closed.....
2	Only books, same as above, denominated "Inventories", of the Cia.Criadora, in use.....
1	Only book denominated "Minute Book of the Board of Directors and of the Meetings of the Cia. Criadora de Concha and Perla", finished.....
1	Only book denominated "Minute Book of the Board of Directors and of the Meetings of the Cia.Criadora de Concha & Perla", in use.....
1	Only stub-book of Certificates of payable shares of the Cia. Criadora,in use:
1	Only stub-book of Certificates of exempt shares(Liberadas) of the Cia. Criadora, in use.....
2	Only books, cardboard bound, of the Cia: Criadora, denominated "Shell Exports,..: in use.....
1	Only book, cardboard bound, of the Cia.: Criadora, denominated "Historical", in: use.....
1	Set of books consisting of "Daybook" (Diario), "Ledger"(Mayor), and "Cash Book" (Caja), bound in gray duck, in which the various business transactions: of Mr. Gaston J. Vives were kept.Closed:
1	Set of books consisting of"Daybook"(Diario), "Ledger"(Mayor), and "Cash Book" (Caja), same as above, in use.....
14	Books, carboard bound, denominated "Journals", relating to the transactions in the above books, closed.....
1	Only book, cardboard bound, denominated: "Journal", same as above, in use.....
18	Books, cardboard bound, denominated "Notebooks"(Borradores), relating to the transactions and entries of the principal books, closed.....
1	Only book, cardboard bound,denominated "Notebook", for the same purpose and relating to the same transactions as the preceding.....

To Page No. 3

11	Books, cardboard bound, Auxiliaries, referring to the accounts of the Pearl Zone of the Island of San Jose, closed and numbered with even numbers from 2 to 22.....
1	Only book, cardboard bound, Auxiliary, relating to the accounts of the Pearl Zone of the Island of San Jose, in use, No. 24.....
18	Books, cardboard bound, denominated "Inventories" relating to the business of the "Empresa" of the Pearl Zone of the Island of San Jose, specially ruled for the purpose, closed.....
2	Only books, cardboard bound, same as the preceding, relating to the same "Empresa" of San Jose and destined for the same purpose, in use.....
20	Books, cardboard bound, denominated "Daybooks"(Diarios), relating to the "Negociación Perlífera de San José" (San Jose pearl business), closed.....
3	Only books, cardboard bound, relating to the same enterprise of San Jose, denominated "Daybooks", in use.....
14	Books, carboard bound, 1/2 width, denominated "Libros de Mareas", relating to the diving expeditions of the Pearling Enterprise of the Island of San Jose, closed.....
2	Only books denominated "Libros de Mareas", relating to the same Enterprise, in use.....
6	Only books, cardboard bound, Auxiliaries for accounts relating to the "Empresa 'Esteros Osteones y Vásquez'", closed..
1	Only book, cardboard bound, Auxiliary, for accounts relating to the same enterprise as the preceding item, in use....
10	Books, Auxiliaries, for accounts relating to the "Empresa de 'Curiosidades Marinas"', closed.....
14	Books, Auxiliaries", for accounts relative to the Enterprise of "Peces & Cetáceos"(Fishes and Cetaceious), closed.
1	Only book, Auxiliary, for accounts relating to the preceding enterprise, in use.....

To page No. 4

16	Books, denominated "Inventories" with special ruling for the purpose, relating to the Enterprise of "Fishes" and Cetaceans", closed.....
1	Only book, denominated "Inventory"with special ruling for the purpose,relating to the Enterprise of "Fishes and Cetaceans", in use.....
2	Only Auxiliary books of accounts relat- to pilot boat "Tornado", closed.....
1	Only auxiliary book relating to pilot boat "Tornado" in use.....
1	Only book denominated "Inventory" with special ruling for the purpose, relating to pilot boat "Tornado", in use....
2	Only Auxiliary books of accounts relat- to pilot boat "Ciclón", closed.....
1	Only Auxiliary book of accounts relat- to pilot boat "Ciclón", in use.....
1	Only book, denominated "Inventory" with special ruling for the purpose, relating to pilot boat "Ciclón", in use.....
8	Only Auxiliary books for the accounts relating to the steamer "Paris",closed.
1	Only Auxiliary book for accounts relating to S/s "Paris", in use.....
2	Only books denominated "Inventories" with special ruling for the purpose,relating to the S/s "Paris", closed.....
1	Only book denominated "Inventory" with special ruling for the purpose, relating to S/s "Paris", in use.....
12	Books 1/2 width denominated "Day-books": relating to S/s "Paris", closed.....
2	Only books 1/2 width, denominated "Day-Books" relating to S/s "Paris",in use..
11	Books,Auxiliaries, for accounts relating to the business of the Island of Cerralvo, numbered with odd numbers from 1 to 21, closed.....
1	Only Auxiliary book for accounts relating to the business of the Island ---- Cerralvo, No. 23, in use.....

To Page No. 5

10	Books denominated "Inventories" with special ruling for the purpose,relating to the business of the Island of Cerralvo, closed.....
1	Only book denominated "Inventory" with special ruling for the puspose, relating to the business of the Island of Cerralvo, in use.....
18	Books, denominated "Day-Books" relating to the business of the Island of Cerralvo, closed.....
3	Only books denominated "Day-Books"(with special ru)relating to the business of the Island of Cerralvo, in use.....
6	Only Auxiliary books relating to the salt business of the "El Amortajado", closed.....
1	Only Auxiliary book for the accounts relating to the "El Amortajado" salt business, in use.....
2	Only books denominated "Inventories" with special ruling for the purpose,relating to the "El Amortajado" salt business, closed.....
1	Only book denominated "Inventory" with special ruling for the purpose, relating to the "El Amortajado" salt business, in use.....
8	Only Auxiliary books for accounts relating to the "Las Cruces" Hacienda,closed:
1	Only book, Auxiliary, of accounts relating to the "Las Cruces"Hacienda,in use
6	Only books denominated"Inventories"with special ruling for the purpose,relating to the "Las Cruces"Hacienda, closed....
1	Only book denominated "Inventory"with special ruling for the purpose,relating to the "Las Cruces" Hacienda, in use...
12	Books,denominated"Day-Books",relating to the "Las Cruces" Hacienda,closed....
2	Only books denominated"Day-Books",relating to the"Las Cruces"Hacienda,in use..
2	Only books containing recipes of all kinds, hand-written or printed.....
3	Only books containing data (Statistical) regarding the pearl business.....

To Page No. 6

3	Only books relating to pearl shipments	
1	LIBRARY COMPOSED OF one thousand volumes of scientific and literary books in Spanish, English and French.....	3,000.00
	DOCUMENTS OF VARIOUS KINDS.	
10	Files containing annual accounts of the Cia. Criadora, referring to the fiscal years of 1904 to 1913.....	
10	Files containing invoices and monthly accounts of Mr. Antonio Ruffo and other local merchants, for the Cia. Criadora.	
10	Files containing reports made to the Secretaria of Fomento, regarding the establishment of new artificial pearl oyster beds, new "hatcheries", descriptive plans of the same, planting of oysters in same, official letters, etc., from the Department of Fomento and other public offices, all relating to the Cia. Criadora de Concha y Perla de la Baja California.....	
1	File containing receipts made out by the Maritime Custom House referring to yearly payments made by the Cia. Criadora for the lease of the Espiritu Santo land and sea-bottoms (marine zone) around said Island, covering the years 1904 to 1913.....	
1	File containing lists of minor ships of the Cia. Criadora.(Bills.of.purchase)	
1	File containing titles to properties, bills of purchase of ships and crafts of the Cia. Criadora.....	
1	File containing Certificates of Seaworthiness of the ships and crafts belonging to the Cia. Criadora.....	
1	Lot of printed By-Laws of the Company..	
1	Collection of the of the official paper of the Mexican Government, "Diario Oficial" covering the years 1904 to 1913..	
1	Topographical plan of the Island of Espiritu Santo, made by Mr. Alfredo Savín Engineer, original, with cloth backing.	1,000.00
	SEVERAL files containing correspondence from workmen of the Cia.Criadora regarding work in Island of Espiritu Santo...	
	To Page No. 7	4,000.00

		From Page No. 6	$ 4,000.00
1		Complete file containing: 2 General Powers of Attorney executed by Mr. Jose Arce in favor of Mr. Vives; account books, plans and maps; several bundles official correspondence with Mexican and local Authorities, as well as communications and rulings of the latter; reports made to the Department of Fomento regarding operations, and other documents concerning the "El Amortajado" salt mines of the Island of San Jose...	
1		Lot of printed contracts relating to the lease of the pearl zone of the Island of San Jose.....	
		SEVERAL files containing reports to the Department of Fomento regarding the establishment of artificial pearl beds, new "hatcheries", respective plans, official communications from the Department of Fomento regarding said matters, relating to the sections of San José and Cerralvo.....	
		SEVERAL files of correspondence with the employees and workmen of the sections of San Jose and Cerralvo.....	
		SEVERAL files containing petitions, legal documents and communications to the Authorities, with communications from these latter, relative to the enterprises of San Jose and Cerralvo.....	
1		File containing Bills of Purchase, transfers and other documents concerning the ownership of 8 diving vessels and several boats belonging to San Jose and Cerralvo.....	
1		File containing reports made to the Department of Fomento regarding the construction of artificial pearl beds, new "hatcheries", planting of oysters in same, plans relative to these operations, all relating to the Cerralvo Island.....	
		SEVERAL files containing correspondence with employees of the Company, referring to work in the Island of Cerralvo.....	
		SEVERAL files containing petitions, legal documents and communications to the Authorities with communications and rulings from the latter, relating to the Cerralov enterprise.....	
		To Page No. 8	4000,00

	From Page No. 7	$ 4,000.00
1	File containing reports made to the Department of Fomento referring to the establishment of artificial pearl beds, planting same, all referring to the business of the "Osteones Vázquez" on the Island of San Jose.....	
1	File containing reports made to the Department of Fomento, relative to the exploitation of "Peces & Cetaceos", defining the zone of exploitation.....	
	SEVERAL files containing correspondence with the Authorities of Mexico as well local authorities and communications from same, referring to the business of: "Peces & Cetaceos".....	
1	File containing reports to the Department of Fomento annually, referring to the work relating to Mrine Curiousities:	
	SEVERAL files referring to pilot boat "Tornado" containing various documents relative to said vessel.....	
	SEVERAL files referring to pilot boat "Ciclon" containing various documents relating to said craft.....	
	SEVERAL files referring to S/s "Paris" containing various documents relating to said steamer.....	
	SEVERAL files relating to the "Las Cruces" Hacienda containing correspondence with workmen, bills of purchase and sale, relative to said Hacienda.....	
1	Complete file of the "Agencia de Agricultura" with all its books, notebooks, pamphlets and documents relative to said Agency.....	
1	Complete file of the California-Mexico Land Co. containing: 1 General Power of Attorney and 1 Special Power of Attorney executed by the Company in favor of: Mr. Vives; 1 account book of the Company; 1 file correspondence between Mr. Vives and the Company; 1 file correspondence between Mr. Vives and private individuals; 1 file official projects approved by the Department of Fomento, be-: part of the titles of the territory of the Company in Baja California; copies, certified, of the Titles of the Company: duly legalized; 1 file with copies of	
	To Page No. 9	4,000.00

	From Page No. 8		$ 4,000.00
	petitions, legal documents, rules and communications from the Authorities; 1 file with receipts for taxes of the said Company.....		
1	Complete file of the company "La Pescadora,S.A." containing: 1 General Power of Attorney by the said Company in favor of Mr. Vives; 1 file correspondence between Mr. Vives and the Company; 1 account book of the Company; 1 file communications from the Authorities and rulings of same; 1 file documents interchanged between Mr. Vives and private individuals, in representation of the Company; 1 file containing printed contracts, "Diarios Oficiales", all relative to said Company.....		
1	Collection of Regulations of work.....		
1	File containing leases of houses, and receipts for the rent of same, not yet collected.....		
1	Promissory note issued by Mr. Vicente Varcovich in favor of Mr. Vives, as balance of payment of pilot boat "Ciclon", not yet collected.....		1,000.00
1	Receipt given by Mr. Francisco de P. Santisteban acknowledging a debt to Mr. Vives.....		200.00
1	Receipt given by Mr. Gilberto Isaia,acknowledging a debt, in favor of Mr.Vives		100.00
	Several documents representing sundry values.....		
1	File containing rulings on fishing and diving.....		
	SUNDRY files of Mr. Vives's private correspondence.....		
	SEVERAL envelopes containing photographs (loose) of the Compañia Criadora.....		
1	Album containing a collection of photographs of the Compañia Criadora.....		
1	Envelope containing documents relating to properties of Mr. Francisco Garcia whomhad left them in the care of Mr.Vives.....		
	SEVERAL files containing special correspondence of the different enterprises.		
	T o Page No. 10		5,300.00

	From Page No. 9	$ 5,300.00
1	Envelope containing Mariners' Registry and titles of ownership and other documents of the pilot boat "Tornado".....	
1	Envelope containing Mariners' Registries and titles of ownership and further documents of the pilot boat "Ciclon".....	
1	Envelope containing Mariners'Registries and titles of ownership and further documents of the S/s "Paris".....	
1	Envelope containing Mariners'Registries and titles of ownership and further documents relating to boats, craft and the boat "Ciclonito".....	
1	Large collection of catalogs of all kinds, of machinery, plants, installations; newspapers containing scientific news; folders and other papers relative to arts and sciences.....	
1	Complete collection of Laws, Decrees and rulings of the General Government..	
	Stock Certificates of the Compañia Criadora, belonging to Mr. Gaston J. Vives for the value of $ 92,000.00.....	
	Stock Certificates of the Compañia Criadora belonging to Mr. Edmond J. Vives, for the value of $ 20,000.00.....	
	STOCK CERTIFICATES of the Compañia Criadora belonging to Mr. Jose Arce,member of the Board of Directors, for the value of $ 500.00.....	
	Stock Certificates of the Compañia Criadora belonging to Mr. Carlos Rivas, for the value of $ 500.00.....	
	Certificates of Stock of the Compañia Criadora belonging to Mr.Rafael Osuna, for the value of $500.00.....	
2	Only Pictures, gilt frame with glass, containing Diplomas and artistic Medals of metal and celluliod respectively, awarded to Mr. Vives by the Exposition of San Antonio, Texas.....	
	Various files containing real estate titles;;;

	From Page No. 10	$ 5,300.00
	F U R N I T U R E .	
1	Wood cabinet with compartments, drawers and divisions for books and documents, belonging to the Cia. Criadora.....	100.00
1	Wood cabinet with 8 folding doors, 40 pigeon-holes for correspondence of the the workmen, and lateral divisions for books, belonging to the Cia. Criadora..	160.00
1	Wooden Cabinet, with 10 folding doors, 80 pigeon-holes for workmen's correspondence, with lateral divisions for books	200.00
1	Wooden cabinet, with 10 folding doors, 72 pigeon-holes for correspondence of employees and other individuals.....	200.00
1	Wood cabinet with 6 doors, 72 pigeon-holes for correspondence with fishers, and accounts with foreign Branches, relative to the business of "Peces & Cetaceos".....	150.00
1	Wooden cabinet, without doors, with only 20 pigeon-holes for documents of divers matters and businesses.....	120.00
1	Wood cabinet with pigeon-holes and doors lengthwise, destined for filing papers of divers matters.....	100.00
1	Wood cabinet with two departments: the upper, with four small doors with glass interior transverse divisions, and the lower, with 2 wooden doors, destined for the library of the Manager of the Company.....	500.00
1	Wooden stand, P.B.wood, without doors, with only divisions or pigeon-holes for papers and documents.....	50.00
1	Cabinet, constructed of P.C.wood, with 2 doors lengthwise, and two drawers in the lower part for general office supplies.....	200.00
1	Wooden cabinet with two lengthwise doors and 2 drawers in the lower part, for Mr. Vives's personal papers and documents.....	200.00
1	Small wooden cabinet with pigeon-holes, without doors, for different supplies..	40.00
	To Page No. 12	7,320.00

	From Page No. 11	$ 7,320.00
1	Wooden wardrobe, with 4 doors and two drawers in the lower part.....	200.00
1	Wooden wardrobe, with 4 doors, 2 drawers in the lower part, same as above....	200.00
1	Stand made of fine wood, turned columns with several compartments.....	100.00
2	Shelves in the shape of a half-moon, for placing objects.....	10.00
1	Medium Wardrobe, wood, 2 doors, 2 drawers in the lower part.....	50.00
1	Sideboard for dining room, wood, with two parts: the upper, with 4 small glass doors for glassware and china, and the lower with two wooden doors for table linen.....	100.00
1	Wooden cabinet for the dining room, 2 doors, 2 drawers and interior transverse divisions.....	50.00
1	wood desk, large, for two employees, with 10 drawers and 2 lateral compartments for books and documents.....	125.00
2	Desks made of cedar, with dark blue cloth top, 3 drawers and lateral compartments for books and documents (belonging to the California-Mexico Land Co.) at $150.00 ea.....	300.00
1	Desk, cedar wood, high, with four feet, 4 drawers and railing on the upper part for books.....	150.00
1	Wood desk, in shape of half moon, with pigeon-holes, compartments and drawers, resting on a square wood base.....	100.00
1	Wood table, turned feet(legs), varnished with dark blue cloth top.....	60.00
1	Wood table, turned legs, oval shape, oil-cloth top, for dining room.....	40.00
2	Wood tables, medium size, turned legs, varnished, with dark blue cloth tops, at $25.00 ea.....	50.00
1	Small P.S. wood table, turned legs, 4 drawers, for typewriters.....	15.00
	To Page No. 13	8,870.00

	From Page No. 12	$ 8,870.00
2	Iron copy presses, American make at $35	70.00
2	P.C.Wood tables,small,ea. with a small drawer, for the copy presses, at $15.00	30.00
2	Wood railings,varnished,with turned columns and a narrow counter on top at $20	40.00
1	Safe, with safety combination, American make, 1 door, with interior compartments for valuables, documents and cash.....	300.00
1	Wooden bench for the safe.....	15.00
1	Set of skeleton shelves made of P.B. scantlings, with compartments, for placing the diving sets, tackle and sails of the boats and other accessories..... (7 mts. long x 4 mts. high)	350.00
1	Ditto, constructed of P.B.wood and P.C. boards, with departments and divisions for accessories, tools and various objects, made up of 3 stretches, located on the warehouse floor of the Cia.Criadora.....	450.00
1	Show case, P.C.Wood, also in the warehouse of the Cia. Criadora.....	50.00
1	Iron bed painted white, American make, with spring mattress.....	45.00
3	new cots, wood & duck at $15.00 ea.....	30.00
2	Wooden wash stands with basins,pitchers and soap dishes of enamel ware at $25..	50.00
1	Center parlor table,mahogany,carved, oval shape.....	100.00
1	Set Austrian furniture, black, consisting of: 16 chairs,2 arm chairs,2 rockers and 2 sofas.....	200.00
24	Chairs,American make,chocolate color at $80.00 per Doz.....	160.00
8	Rocking chairs,same kind and color as above chairs at $80.00 per doz.....	54.33
1	Console, gilt,2 legs,with bevelled mirror, American make.....	200.00
2	Sets curtains fine Reps cloth,composed of 2 curtains ea.- 2-1/2 mts. long by 1-1/2 wide.....	100 .00
	To Page No. 14	11,128.33

	From Page No. 13	$11,128.33
24	Curtains ea. 2 pieces, flowered percale including making.....	140.00
18	Wooden curtain poles, complete with rosettes at $10.00 ea.....	180.00
1	Old piano, American make.....	200.00
1	Wooden table, cedar, for drawing, resting on tripods, tools and accessories for drawing, complete.(Belonging to the California Land Co.).....	300.00
2	Corner pieces made of wood, P.C.,varnished, at $15.00 ea.....	30.00
1	Plated table service,"Cristophe" consisting of: 12 knives, 12 forks, 12 spoons, soup, 12 teaspoons, 12 desert forks, 1 salt,pepper,oil,etc. stand, etc.....	300.00
1	Hunting gun, double barrelled, cal.20. French make, with its hunting bag,empty: cartridges, apparatus for charging cartridges and other tools and accessories.	300.00
1	Small hunting gun, for lady, cal. 12 mm: single bbl., with all accessories.....	40.00
1	Complete table service for the Manager of the Company consisting of: 1 set porcelain dishes, salt, etc. stand,bottles: goblets, glasses, covers for dinner and dessert, soup spoons and teaspoons, table cloths and napkins.....	250.00
	SEVERAL pictures with photographs of the family.....	
2	Pictures de luxe with child's photo....	300.00
1	Mirror, ordinary size and quality.....	20.00
1	Set shower bath, complete.....	25.00
1	Triangular "Daguita" for lady's garter, mother-of-pearl covering with the words: "Amor y Honor" engraved on each side of the covering, in a de luxe box, gilt and silver plated.....	100.00
1	Bronze bell, large, half spherical.....	12.00
2	Small bells for dining room at $3.00 ea:	6.00
1	Ditto tortoise shape.....	4.00
1	Bronze bell, medium size.....	15.00
1	Kitchen stove,iron,American make, with 4 holes and oven, new.....	50.00
	To Page No. 15	13,400.33

		From Page No. 14	$ 13,400.33
		SCIENTIFIC INSTRUMENTS AND APPLIANCES	
1		Microscope with 5 lenses and various accessories	500.00
1		Theodolite, superior grade, large, belonging to the California-Mexico Land Company	800.00
1		Theodolite, superior grade, medium size belonging to the Cal. Mexico Land Co.	500.00
1		Assaying scale, superior grade	300.00
1		Ditto, smaller	150.00
2		Scales for weighing pearls at $30.00	60.00
1		Drug scale	20.00
2		Small scales for weighing letters	12.00
1		Complete set for adjusting pearls	50.00
1		Special knife, made to order, for adjusting pearls	30.00
1		Complete outfit for analysing	300.00
1		Gold watch, "Chaude"	200.00
1		Watch, steel cover, showing the time in different parts of the world	100.00
1		Silver watch, extra thin	60.00
1		Parlor clock, black enamel case with a bronze bird on top	100.00
1		Small clock, square, with alarm	10.00
1		Small alarm clock	10.00
3		"Aneroide" barometers at $20.00 ea	60.00
3		Thermometers at $3.00 ea	9.00
2		Compasses (ship) in their boxes at $30.00 each	60.00
2		Log-lines, complete, with screws and apparatus showing the distances traveled by the ships, at $25.00 ea	50.00
2		Platform scales for weighing up to 500 kilos, with sets of weights, complete, at $400.00 ea	800.00
1		Scoop scale, with complete set of wts	25.00
1		Scale with scoop for weighing up to 120 kilos with complete set of weights	60.00
6		Magnifying glasses with iron frame, nickeled, at $5.00 ea	30.00
		SUNDRIES	
1		Assortment of shells, smalle fishes, made up of several dozen shells, some of great interest(merit)	1,000.00
4000		Karats leavings, remnants of pearls, 2nd class pearls, a small box filled with pearls and "topos", large and small, to be put in order. Average value per karat, $10.00	40,000.00
1		Gold ring, blue enamel, with diamond setting	300.00
		To Page No. 16	122,652.33

	From page No. 15	$122,652.33
	CASH in silver and bills and other valuables	1,500.00
	EFFECTS IN WAREHOUSE.	
4	Large lanterns, green and red, for ships at $20.00 ea	80.00
24	round pieces of glass for headpiece of diver at $2.00 ea	48.00
96	panes of glass 16x20 for windows, packed in crates at $2.00 ea	192.00
72	Tons clean mother-of-pearl, packed in cases, ready for export, contracted in London at $400.00 per ton	57,600.00
1119	Kilos shark fins, dried, salted, at $2	2,238.00
258	Tins of various kinds of cetacean oil at $6.00 per tin	1,548.00
1	Square galv. iron tank, 250 gal. capacity, for oil	100.00
2	Cylindrical galv. iron tanks, 500 gal capacity ea. for oil, at $175.00 ea	350.00
88	Black iron drums, painted red, for oil, at $25.00 ea	2,200.00
8	Spears, steel shaft 1/2", with knife for sharks at $4.50 ea	36.00
4	ditto, steel rod 1/2", with hinge, at $3.50 ea	14.00
10	Special shark hooks at $2.00 ea	20.00
11	chains for shark hooks with unwinder at $1.50 ea	16.50
250	iron unwinders for shark hook chains at 50¢ ea	125.00
10	new paddles or oars for canoas at $3.	30.00
696	empty tins for oil at 20¢ ea	139.00
626	empty cases for packing the oil tins at 50¢ ea	313.00
21	Spears, iron shafts, for shark, at $3.	63.00
6	Kettles for boiling oil at 15.00 ea	90.00
6	Oil strainers at $3.00 ea	18.00
7	shark hooks, 1/2" steel rod at $1.50	10.50
5	New galv. iron hooks for fishing "garopa" at 25¢ ea	1.25
3	Harpoons for fishing tortoise at $1.25	3.75
27	Shafts of wood for tortoise harpoons at $1.50 ea	40.50
4	Knifes, horn handle, at $1.50 ea	6.00
7	Wood barrels of 50 gal. capacity at $2.50 ea	17.50
	To Page No. 17	$125,796.33

	From page No. 16	$ 125,796.33
200	Wooden side pieces for packing cases for mother-of-pearl shell	
203	Ditto for ends of cases	
390	Ditto for tops and bottoms, at $2..	200.00
95	New wodd packing cases for pearl shell at $2.50 ea.....	237.00
35	Large wooden pulleys for large ships at $4.00 ea.....	140.00
31	Wood tackle blocks for large ships at $6.00 ea.....	186.00
32	Galv. row locks for 8 diving boats at $2.00 ea.....	64.00
32	Oars 20 ft. long for 8 diving boats at $10.00 ea.....	320.00
16	Iron anchors or kedges for 8 diving boats at $30.00 ea.....	480.oo
16	Warps of Manila rope 1"dia.25"arms" lengths ea.for 8 diving boats at $75.00 ea.....	1,200.00
8	National flags for 8 diving boats at $1.00 ea.....	8.00
8	Masts for diving boats complete with rope,tackle,halliards,etc.at $150.ea	1,200.00
8	Booms or gaffs for 8 diving boats at $20.00 ea.....	160.00
8	Main sails,new,duck,for 8 diving boats at $150.00 ea.....	1,200.00
8	Small sails,duck,for 8 diving boats at $15.00 ea.....	120.00
8	Wooden rudders with brass pintle and wood sockets at $20.00 ea.....	160.00
8	Wooden rests for boom at $2.00 ea...	16.00
8	Galv.iron buckets for use of boats at $1.50 ea.....	12.00
45	Tin mugs at 30¢ ea.....	13.50
51	Small tin trays at 30¢ ea.....	15.30
8	Tarpaulins with their respective bolt ropes for 8 diving boats at $15	120.00
80	Tin spoons at $2.00 per doz.....	13.34
34	Enameled plates at 50¢ ea.....	17.00
37	Enameled mugs 50¢ ea.....	18.50
20	" cups at 50¢ ea.....	10.00
6	" soup bowls,large at $4.00..	12.00
2	" coffee pots at $3.00 ea....	6.00
2	" trays, large, at $4.00 ea..	8.00
9	Prs. table covers at $1.50 pr. pair.	13.50
2	Large enameled spoons at 50¢ ea.....	1.00
7	DIVING OUTFITS EACH COMPOSED OF: 1 air pump or diving machine, "DENAYROUSE", made in France, with cylinders ea. 12 dm.dia.; 1 iron platform and post; 1 swing bar; 2 iron beams or yards with wooden sleeves; 4 iron bolts for securing the pump to the boat; 1 brass helmet for the diver with glasses; chest or breast plates with butterfly blts; 2 diving suits, for morning and afternoon diving; 2 prs.brass shoes	
	To Page No. 18	131,747.97

	From Page No.17		$ 131,747.97
	for the diver; 2 prs. leads with 3/8" rope; 1 hose of four lengths complete with couplings; 2 wire baskets for the shells; 1 iron lance for the diver; 1 life rope 1/2" dia.20 arms'lengths long; 1 iron tank for air with 2 smallpieces of hose with their tubes;2 wooden floats for the hose; 1 small tool chest with comlete set of tools for the diving outfit; 1 iron ladder for the diver; 1 set woolen underwear for the diver composed of : 1 cap, 4 shirts, 4 drawers, 2 prs. stockings; another set, light woolen, composed of the same articles; 2 rubber wrist bands and 1 pair of gloves for the diver. Value of each diving outfit $2000.00..		14,000.00
1	Diving outfit composed of:m1 air pump, French Make "DENAYROUSE", 1 cylinder of 10 cm. dia.; 2 iron flywheels with their handles for same pump, in wood box, complete and with all accessories, same as detailed above.....		2,000.00
6	Large axes with handles at $6.00 ea.		36.00
5	Shovels with short handles at $3.00		15.00
4	New brooms at $1.00 ea.....		4.00
14	Balls sail twine at $2.oo ea.....		28.00
16	Kilos Manila rope 3/8" at $2.00 Kgr.		32.00
26	Kilos oakum at $2.00 per kilo.....		52.00
27	Packages copper tacks 7/8" at $2.00		54.00
21	" iron rivets at $2.00 ea...		42.00
109	Kilos 2-1/2" nails at 50¢ per kilo..		54.50
44	Kilos ditto 1-1/2" at 50¢ per kilo..		22.00
12	Kilos ditto 2" at 50¢ per kilo.....		6.00
27	Bottles liquid rubber at $10.00 ea..		270.00
8	Galv. iron pails at $1.00 ea.....		8.00
15	Meters prepared cloth for diving suit at $10.00 per meter.....		150.00
2	Tins ea. 11-1/2 kilo white paint at $15.00 ea.....		30.00
28	Light woolen undershirts at $3.00 ea		84.00
6	Skeins hemp at $1.00 ea.....		6.00
23	Meters duck No. 12 at $1.00 per m...		23.00
16	Parches porosos at $1.00 ea..... (Porous Plasters)		16.00
20	Marine Lanterns with globes at $5.00		100.00
6	only globes for Marine lanterns $2..		12.00
22	Knives for killing pearl oysters $1.		22.00
2	Tins black paint at $2.50 ea.....		5.00
2	Sledge hammers with handles at $6.00		12.00
3	"Cautines" at $5.00 ea.....		10.00
4	Fishlines, 25 arms' lengths ea. at $3		12.00
9	Sailmaker's palms at $2.00 ea.....		18.00
	To Page No. 19		148,876.47

	From Page No. 18	$ 148,876.47
1	tin tar for rope	10.00
18	Wood tubs at $2.00 ea	36.00
27	Jute bags for shell at $1.00 ea	27.00
5	Planks 2x12x20 at $6.00 ea	30.00
84	Sheets tin plate at 25¢ ea	21.00
1	Gun, in case, with all accessories for for shooting the harpun in whaling	150.00
2	New wooden casks, painted green, capacity 25 gal. for storing water at $10.00 ea	20.00
60	Stearine candles	10.00
1	Case Kerosine	10.00
1	Lot pulley blocks for the masts of large ships.(wood)	150.00
1	Ditto, Iron for boat masts	20.00
1	Lot packing of all kinds for steam engines	100.00
1	Capstan , iron, for large ship	300.00
1	Windlass for large ship for taking in anchor chains	100.00
1	Steering wheel complete with all machinery	300.00
1	Lot galv. wire rope for masts of large ship	500.00
2	Masts for large ship, of the following measurements: Dia.at base.....5'4") " at thickest part.....5!8") Length.....86'8") at $200.00 each	400.00
1	Boom for large ship	50.00
1	"Botabara" for large ship	40.00
2	Iron anchors for large ship,500 kilos weight ea. at $300.00 ea	600.00
1	Lot galv. telegraph wire	100.00
1	Thick glass plate packed in crate destined for use in Aquarium	90.00
1	Screw-2 blades for S/s "Paris	100.00
1	Ditto for Ditto	100.00
	FOUR THOUSAND yellow wood posts 3 m. long for fencing, singed at the base to preserve them from dampness at 50¢	2,000.00
150	tons yellow cord wood at $10. per ton	1,500.00
80	Tons coal at $70.00 per ton	5,600.00
100	Tons broken stone for construction work at $4.00 per ton	400.00
1500	Bricks for construction work at $75.00 per M	112.50
1	Lime.(1.ton)	20.00
1	Box containing a complete porcelain table service for the journeys of the Manager of the Company	200.00
1	Case assorted vines, strong liqueurs, table wines, Champagne, for the journeys of the Manager of the Company	175.00
	To Page No. 20	162,148.47

	From Page No. 19		$ 162,148.47
1	Lot fine selected conserves of all kinds		350.00
18	Bags sulphured beans at $20.00 bag.		360.00
600	Kilos dried meat at 80¢ per kilo		480.00
450	Kilos dried bones at 10¢ per kilo		45.00
32	Bags pilot biscuits containing in all 1280 kilos at $15.00 per bag		480.00
11	Cargoes grain at $40.00 per cargo		440.00
6	Cases lard- net total weight of the 6 cases 216 kilos at 75¢ per kilo		168.00
175	Kilos potatoes at 20¢ per kilo		35.00
141	Kilos coffee at 60¢ per kilo		84.60
1	Containing 50 tins sardines		20.00
1	Demijohn domestic vinagre		18.00
1	BBl. bottled old vine		55.00
1	Bbl. French red vine, bottled		150.00
1	Bbl. fine "fencal", bottled		100.00
12	Bbls. olives in brine at $25.00		300.00
8	Bags dried olives for making oil, total net weight, 400 kilos at 50¢		200.00
	REPAIR PARTS		
19	Iron screws for platform at $1.00 ea		19.00
27	brass screws with nut at $2.00 ea		54.00
17	Iron screws at 50¢ ea		8.50
16	Safety valves for diver's helmet 50¢		8.00
13	Iron bolts for piston at 50¢ ea		6.50
15	Bolt rings, copper, for the foot of of the diving pump at $2.00 ea		30.00
13	Brass screws for helmet at $1.00 ea.		13.00
23	Pasadores de fierro (Iron bolts for the swing bar of diving pump at $1		23.00
9	Wrenches (Llaves Españolas) with 2 jaws at $2.00 ea		18.00
18	Brass screws with butterfly bolts for plates of diving suit at $2.00		36.00
9	Leathers for pumping post at 25¢ ea.		2.25
8	New diving suits at $200.00 ea		1,600.00
14	Lengths of new hose at $100.00 ea		1,400.00
1	Hand saw		20.00
16	Rubber wriste bands for diver at 50¢		8.00
7	Brass couplings at $4.00 ea		28.00
55	Ditto at $4.00		220.00
2	Brass sockets for boat rudder at $15		30.00
2	Brass pins for ditto at $15.00 ea		30.00
26	Spears or harpuns for killing sea monsters at $1.00		26.00
12	Small chains for boat ropes at $4.00		48.00
2	Iron rings for boats at $5.00 ea		10.00
15	Iron handle protectors at 50¢ ea		7.50
3	Prs. brass shoes for diver at $25.00		75.00
15	Axe handles at $1.00 ea		15.00
	To Page No. 21		169,163.82

	From Page No. 20	$ 169,163.82
	OFFICE SUPPLIES.	
1	"Oliver"Typewriter, new, nickeled....	150.00
1	"Yost" No. 10 Typewriter, used.....	90.00
1	Ream legal size paper for typewriter with the name of the Company.....	18.00
2	Reams letter size paper for typwriter	18.00
2	Reams legal size plain paper for minutes of meeting at $12.00 per ream.	24.00
1	Ream letter paper with name of Mr. Gaston J.Vives.....	15.00
1	Ream legal size paper ruled.....	20.00
1	Ream legal paper with margin,ruled..	20.00
4	Doz. ruled paper pads,letter size at $18.00 per doz.....	72.00
1/2	Gross small pads,cheap paper for notes at 50¢ ea.,,.....	36.00
2	Gross note-books with special ruling for workmen called"Conduct & Work"at 40¢ ea.....	115.20
1	Gross small note-books"C.D." for accounts of workmen at 20¢ ea.....	28.80
50	Cardboard bound books,special ruling for Inventories at $7.00 ea.....	350.00
6	Doz. black erasers with rubber at 10:	7.20
2	Doz. pencil holders at 20¢ ea.....	9.60
1	Doz erasers.....	2.00
6	Boxes steel pens at $1.50.....	9.00
3	Doz pencils, blue , at $4.50 doz....	13.50
3	Doz red pencils at $4.50 per doz....	13.50
1	Doz. copying pencils	3.00
2	Bottles black Stafford ink at $7.00.	14.00
1	Ditto red ink.....	7.00
8	Iron inkstands for red & black ink at $3.00 ea.....	24.00
12	Sheets blotting paper at 30¢ ea.....	3.60
12	Boxes assorted clips at 50¢ ea.....	6.00
12	New typewriter ribbons for"Oliver"at $4.50 ea.....	54.00
2	Inkpads for "Yost"typewriter at $3..	6.00
1000	Envelopes,long,blue,with card of Mr. Gaston J. Vives.....	18.00
1000	Envelopes,letter size,with card of Mr. Vives.....	16.00
1000	Large envelopes for note-books.....	20.00
200	Plain letter envelopes.....	10.00
500	Long plain envelopes.....	25.00
	CARPENTER SHOP.	
1	Bench for carpenter with iron clamp,	40.00
2	Rip saws at $5.00 ea.....	10.00
2	Cross saws at $5.00 ea.....	10.00
1	Pointed saw.....	4.00
	To Page No. 22	170,446.22

	From Page No. 21	$ 170,446.22
2	Wood planes at $7.00 ea.....	14.00
2	Ditto Jack planes at $7.00 ea.....	14.00
2	Large iron squares at $10.00 ea.....	20.00
2	Ditto, small at $4.50 ea.....	9.00
7	Ratchet drills at $4.00 ea.....	28.00
12	Assorted bits for above.....	9.00
12	Chisels from 1/4"to 2" at $2.00 ea..	24.00
4	Iron nail pullers at $7.00 ea.....	28.00
12	Carpenters' hammers at $2.00 ea.....	24.00
12	Claw hammers at $1.50 ea.....	18.00
6	Hatches with handles at $3.00 ea....	18.00
6	Adzes with handles at $8.00 ea.....	48.00
2	Gauges at $2.00 ea.....	4.00
2	Planes, wood , at $6.00 ea.....	12.00
4	Marking gauge at $1.00 ea.....	4.00
2	Wood rulers 2 ft. long at $1.50 ea..	3.00
12	Cold chisels from 1/4" to 2" at $2..	24.00
6	Rasps at $1.25 ea.....	7.50
6	Files,(half) round at $1.75 ea.....	10.50
6	Flat files at $1.75 ea.....	10.50
6	Round files at $2.50 ea.....	15.00
24	Triangular files from 4 to 6" at 40¢	9.60
4	Iron "Sargentos" at $3.00 ea.....	12.00
2	Saw sets at $4.00 ea.....	8.00
2	Levels,wooden box,horizontal & verti cal at $15.00 ea.....	30.00
	BLACKSMITH SHOP.	
1	Wood bench for blacksmith shop with iron clamp.....	150.00
2	Steel anvils 250 lbs. at $80.00 ea..	160.00
6	Sledge hammers of astd.weights with handles at $8.00 ea.....	48.00
12	Ball pein hammers asstd.sizes at $5.	60.00
24	Chisels,steel,asstd.sizes at $2.00..	48.00
24	Steel punches " " at $2.00..	48.00
1	Large drill,American make,set up with its wood bench.....	150.00
1	Medium size ditto, set up ditto.....	125.00
48	Drill bits from 1/4"to 1".....	90.00
12	Monkey wrenches asstd.sizes at $3.50	42.00
12	Spanish wrenches,2 jaws at $2.00 ea.	24.00
6	Stillson wrenches for pipe at $6.00.	36.00
12	Steel pincers,asstd.sizes at $4.00..	48.00
2	Ventilators,American make,at $150.00	300.00
1	Pipe cutter.....	10.00
1	Large "LITTLE GIANT"pipe stocks com- plete with dies,guides and taps from 1/4" to 4",in its wood box.....	250.00
4	Medium size "LITTLE GIANT" screw plates, complete with taps and dies from 1/4" to 1",in wooden box.at.$75	300.00
24	Extra dies for above screw plates, asstd. sizes at $5.00 ea.....	120.00
2	Sleeves for screw plate taps at $9..	18.00
	To Page No. 23	172,877.32

	From Page No. 22	$ 172,877.32
1	Forge with blowers and furnace.....	75.00
4	Iron compasses,Asstd.sizes,at $3.00.	12.00
2	Graduated iron squares at $7.00 ea..	14.00
1	Iron magnet horse shoe shape.....	5.00
1	Complete set of Suages composed of 12 pcs. at $2.00 ea.....	24.00
3	Steel gouges at $2.50 ea.....	7.50
3	Micrometers at $2.00 ea.....	6.00
12	"Cautines" asstd. sizes at $2.50 ea.	30.00
12	Flat files 14" at $2.00 ea.....	24.00
12	Half round files at $2.00 ea. -14" -:	24.00
12	Round files asstd. sizes at $1.50 ea:	18.00
24	Triangular files,asstd. sizes at 75¢:	18.00
1	Hack saw.....	6.00
24	Hack saw blades at $1.00 ea.....	24.00
	SUNDRY ARTICLES.	
1	Evening dress suit,black,frock coat, vest and trousers, new.....	150.00
1	Cloth overcoat, new.....	100.00
1	New suit, coat,vest & trousers.....	75.00
1	Coat of mail -steel - front & back..	300.00
1	Doz. shirts,set in front,white.....	40.00
2	Doz. white collars at $12.00 per doz:	24.00
1	Prs. white cuffs.....	12.00
2	Doz. socks at $18.00 per doz.....	36.00
1	Doz. made neckties, colored, at $4.00	48.00
1	Doz. white neckties at $4.00 ea.....	48.00
18	Undershirts at $20.00 per doz.....	30.00
18	Drawers at $20.00 per doz.....	30.00
18	Towels at $18.00 per doz.....	27.00
3	Doz. handkerchiefs at $10.00 per doz:	30.00
2	Only razors and 2 sharpeners,new....	25.00
1	New umbrella.....	20.00
4	Canes.....	20.00
1	Panama hat.....	25.00
2	Felt hats,new, at $15.00 ea.....	30.00
4	Pairs new boots at $15.00 per pr....	60.00
8	Wool quilts at $25.00 ea.....	200.00
12	Blankets at $10.00 ea.....	120.00
16	Pillows at $5.00 ea.....	80.00
24	Cotton sheets.....	100.00
6	Boxes fine perfumes.....	60.00
1	Doz. jars "Formalina".....	24.00
6	Boxes tooth powder.....	18.00
1	Jars fine pomades.(1.doz.jars).....	36.00
6	Pieces fine soap at $3.00 ea.....	18.00
6	Ditto medium at $1.00 ea.....	6.00
1	Assortment of medicinal drugs for the service of the Company.....	200.00
2	Portable gasoline motors, complete with all accessories at $250.00 ea..	500.00
		$ 175,656.82

To Page #24

	PROPERTIES.
1	Lot of properties denominated "El Palo", "Playas de El Palo", and "Los Bledales" located to the South of the legal property of the port of La Paz.....
1	Lot of properties denominated "Las Cruces", "Santa Cruz", and "El Salitito".....
1	Lot of properties denominated "Pichilingue" and "San Lorenzo".....

(Signed) Gaston J. Vives.

Signed) A.Sanchez Laurel Guadalupe Yepis

.....

THE TREASURES OF THE OCEAN
and
NATIONAL INDUSTRY.

(Translation of an article from the Bulletin of the Department of Labor of Mexico, Year 1, No.1, 1914.)

It is not from curiosity but on account of the enormous importance which the exploitation of one of our greatest, oldest and best known resources may acquire, a resource which, like so many others, scarcely even attracts the attention of the mexicans, that we have judged it opportune to make this brief historical and descriptive summary of the pearl cultivation on our Pacific coast. This business is at present arousing interest on account of the efforts made by the manufacturers of buttons and other articles made of mother-of-pearl to obtain the raw material of the country direct, and also because of the proposed contract, presented by a Mexican enterprise which for several years has dedicated itself to fishing for the beautiful gem.

As early as 1534, the Marques del Valle gave the stray pieces of land in the sea near the shores of Lower California the seducing name "Isles of Pearls", after the written description left by Fortún Jiménez, the pilot, who was killed there by the natives while on a trip searching for gold. The famous adventurer presently sent Sebastían Vizcaíno to examine the islands in the Gulf of Cortés, and this new explorer brought back with him a large quantity of pearls, which awoke a very lively interest among the "Conquistadores". They sent to Manila for three divers and in 1587 the catch of pearls was so large that 316 kilos

were sent to Seville, of which five were set aside as a gift to the Crown of Spain.

The whole world then commenced to talk about the treasures guarded by the boundless ocean in its depths, along the entire coast, from the shores of Oaxaca to those of California. Beautiful specimens, acquired in very small quantities at Mazatlán were exhibited, and it was said that thousands of these pearls of huge dimensions and resplendent lustre were in the hands of the natives at the port of Santa Cruz, today La Paz, where the sailors, Hernando de Grijalva and Fortún Jiménez, had acquired collosal fortunes in gold and pearls.

On account of the indifference of the viceregal governments or the greater facilities for exploitation offered by the mines, and later because of our wars and strifes, these immense sources of riches were left abandoned. It was not until ten or fifteen years ago that they commenced to be exploited properly through concessions from the Federal Government, issued when the beds of the precious mollusk were already on the verge of exhaustion on account of the irregular and generally clandestine pearl fishery which was carried on for the exclusive purpose of evading the taxes.

The example of France and England, whose governments, in view of the considerable income which they derived from the exploitation of the pearl-shell, had appointed cientific commissions and spent much money in the study of means for utilizing the greatest possible number of spat or young oysters, attracted the attention of some Mexican business men, who contracted with the President of the Union for the privilege of propagating the pearl oyster in some

of the regions of Lower California and adjacent islands; and in these concessions the inspection of the fishery in question was instituted. This to a great extent has prevented the extinction of the valuable product. But on a littoral which is so vast, strict vigilance is impossible, and it is known, according to information from the representative of one of the interested companies, that numerous vessels exist which are dedicated to the fraudlent exploitation of the fishery to great detriment of the lawful business and even serious danger that the pearl oyster may disappear.

The company referred to (the same which has presented the proposal to the Department of Public Works (Fomento) for the modification of the agreement under which it operates at present, suggesting definite bases by which the control of the business is offered to the Federal Government), has not confined itself to the extraction and sale of the shells and pearls, but looking farther ahead, hasplanned for the future and has studied with laudable carefulness the various systems which may widen the exploitation and perpetuate it, so to say, by developing the artificial cultivation of the mollusk by means of procedures whose efficacy has now been proved and recognized by official representatives. The system consists in making artificial bottoms, install hatcheries (viveros, and arrange breeding places with apparatus specially invented and made for protecting the spawn and young oysters, etc.

These attemps have been crowned with the greatest success, even to the extent that, up to a few years

ago, several millions of young oysters (spat) were produced, offering an attractive outlook for the development of the Peninsula and the well-being of its inhabitants and the prosperity of the numerous individuals to whom this industry gives, or will give, the means of subsistence. Considering this from a humane point of view, it denotes a very satisfactory step forward because, in addition to the fact that the wages earned by the workmen are larger than those earned by other fishermen or workers, they execute the work with scaphanders and all the requisites which prudence and modern science demand.

The illustrations which we reproduce show that the gathering of the oysters on the Japanese and Persian coasts is accomplished by nude men and women divers who have no means of defending themselves against asphyxiation or attacks of large and voracious fish.

Furthermore, the artificial cultivation of the pearl oyster in Lower California, is carried on under perfect cientific conditions; and the product obtained is entirely natural, because it does not contain foreign substances as in Japan, where, for the production of the artificial pearl, small pebbles, fragments of mother-of-pearl and even small figures of earthenware or stone are introduced into the shells. In Mexico without resorting to this expedient, specimens valued at many thousand pesos have been obtained.

The former Department of Fomento had already terminated the new Law covering fishing in national waters and along the national coasts, for which reason attention is called to what is said above regarding the proposal of

the company referred to and others who may solicit similar concessions.

If it is borne in mind that in accordance with the procedure already introduced and to which we referred above, artificial production is obtained in three or four years, it would not be rash to predict that the new regulations of this industry, as well as a stricter inspection to prevent cladestine fishing, would, in a very short time, perhaps, give large regions on the Pacific a new living source of wealth which would produce ample means to take care of public necessities and give abundant work to support comfortably hundreds and perhaps thousands of families.

There could not be a betteruse for the millions of pesos which would result from the sale of these beautiful little spheres of irridescent silver, and Mexico could control the world market of pearls according to the opinion of one of the best informed Ministers acredited to our Government by England. And this in spite of the fact that Ceylon, a British possession, produces the gem in such quantities and sizes that the Hindu Rajas adorn themselves with hundreds of them, as for instance, the Prince of Dolphur, whose picture we publish.

ILLUSTRATIONS.

San Gabriel Station. Young oysters transferred from the spat collectors to galvanized wire trays. Second operation in the cultivation.

San Gabriel Station. Southern part of hatcheries (Viveros).

Diver with scaphander(diving dress) at the moment of descending from the little steamer "Paris" to examine the artificial beds.

San Gabriel Station. Spat collector open showing the nests filled with spat or young oysters.

Pearl Fishing in Japan.

The Prince of Dolphur with pearl turban and necklaces valued at seven and a half million dollars.

Pearl Divers in the Persian Gulf.

PEARL FISHERY

From Bulletin of the American Museum of Natural History. Vol.XXXV.Art.XXIV. pp.433-444. New York, Aug. 2, 1916.

Important pearl fisheries have been conducted in the Gulf of California ever since its discovery by the Spaniards.

La Paz is the center of the pearl shell industry of Lower California, in which there are three companies engaged. The largest of these is the Mangara Exploration Company, Ltd., an English corporation which operates from the head of the Gulf of California southward to Guatemala. According to Mr. F. W. Moore, general manager, the Lower California yield of pearl shell amounts to about 60 tons a year from the Gulf alone, valued at $100 to $350 (gold) a ton, according to the grade. (The value in 1912 was much higher ranging from $200 to $500 gold). The shell is classified in three grades, the first being the most valuable. The product finds its principal market in England. The company operates with a capital of $150,000. The principal part of the catch is made in Pacific waters, where operations are carried on from November to May. In the Gulf of California the work is done chiefly from July to October. The concession of the Mangara company extends until 1932.

The Mangara Company operates 4 schooners and 21 boats: there being diving outfits with each boat. The number of men employed by this company is 150 and the annual yield of shell 175 to 200 tons. The schooners with their boats are divided into three fleets, the divers of

each fleet using their schooners as the home base. Pearl fishing is carried on at depths varying from 20 to 120 feet.

A concession for pearl fishing around the islands of Espiritu Santo, San José and Ceralbo in the Gulf, and also in Charmela Bay, sixty miles north of Manzanillo in the Pacific, is held by Señor Miguel Cornego of La Paz. With him is associated Señor Gaston J. Vives, in the management of the "Compania Criadora de Concha y Perla de la Baja California", engaged in the propagation of the pearl oyster. The concession for oyster cultivation dates from 1903.

During the years 1910 and 1911 the total amount of shell exported from La Paz and derived from the waters adjacent to the Peninsula of Lower California was 331 tons. The industry has suffered considerably as a result of disturbed political conditions in Mexico.

The above figures relate to pearl shell only, and do not include the value of pearls, which is reported to amount to about $100,000 annually.

PEARL OYSTER CULTIVATION

An important feature of the pearl fishery of La Paz is a station for the cultivation of the pearl oyster under the management of Señor Gaston Vives. This station is located at San Gabriel Cove, Espiritu Santo Island, in the Gulf of California, fifteen miles from La Paz and is the only establishment of the kind in the world.

The station has the appearance of being well

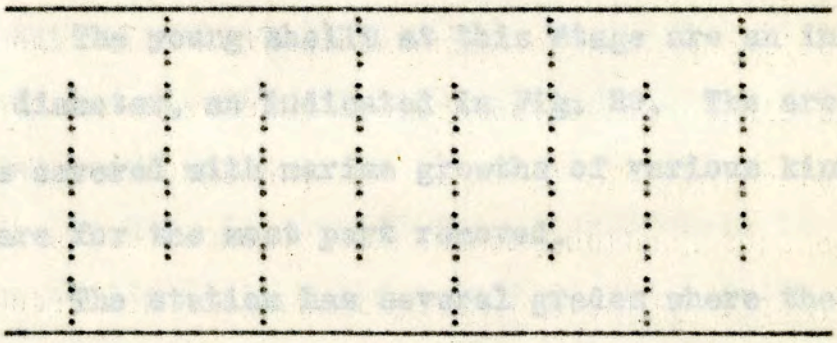
adapted for the purpose for which it was constructed. A great deal of space is occupied by the equipment of the station and there is evidence that a considerable amount of money has been carefully invested in the enterprise. The sub-station of La Gallina on the opposite side of the cove, we had no opportunity to visit.

The methods of pearl-oyster culture practised here include the collecting of young spat or seed in the open bay in artificial collectors, the transferring of this seed to an artificial canal to which the tide is admitted and where they are protected from their enemies by wire-screened gates, and finally, after a period of growth and protection, a transferrence back to the natural bottom in the open bay, in protected crates until mature growth is attained.

The lagoon at San Gabriel has been cut off from the bay by a heavy barrier of masonry, behind which has been constructed a long zig-zag canal of masonry for the protection of the immature crop of shells. This, the so-called hatchery, is the place of growth for young shells obtained from the spat collectors in the bay outside. The numerous cross sections of the canal afford ample space for the operations of oyster cultivation and have a uniform depth of seven or eight feet.

The entrance is well screened to exclude mollusk-eating fishes, star fishes and other enemies of the young pearl oyster, and through it the tide flows and ebbs, carrying minute forms of food for the growing young. The tide through it can also be controlled so that a sufficient covering of water for the young oysters

can be maintained. The canal is provided with thatched covering throughout its entire length as a protection against undue heat when the tide is low. A general view of the station is shown in Fig. 27. The dividing barrier of masonry is seen extending to the opposite shore; nearer it is somewhat hidden by the tatch shelters of the cross sections of the canal. The general plan of the canal is indicated by the following diagram:



A closer view of the closely set roofed sections is presented in Fig. 28 taken from the protecting barrier of masonry, the open bay lying at the right. Beneath the sun shelters of each section the young shells are laid at low water, to be covered and fed by the tides. The shallow wire trays containing the shells are placed on lattice racks centrally located in each section, where they are supported above the bottom and exposed to the free flow of the water. As the shells grow larger their cultivation is continued on the rocky bottom of the canal. Some of the wire trays are shown in Fig. 29.

A view of one of the spat collectors is shown in Fig. 30. It is a heavy-framed, wire covered crate, containing five shallow, latticed trays, closely set with short upright pieces of lath, to which the young free-swimming oysters attach when shell growth begins.

This collector has been brought to the beach from its original position in some part of the bay and hauled up the cemented grade by a chain and windlass. A nearer view of one of its trays is shown in Fig. 31, containing young shells from two to three months old.

Fig. 32 shows the trays of the crate removed, and employees ready to transfer young oysters to the shallow wire trays for placing in the canal. Each operator is provided with small wire trays.

The young shells at this stage are an inch or two in diameter, as indicated in Fig. 29. The are more or less covered with marine growths of various kinds, which are for the most part removed.

The station has several grades where the heavy collectors are dragged up the sloping beach from the water (Fig. 33). Much of the manipulation is performed under the large thatched shelter shown at the right in the same photograph.

After a growth of eight or nine months in the protected canal, the pearl oysters are, as stated above, returned to the bay for final growth, or until they are about three years old.

All pearl oysters placed in the bay for growth are protected in wire-screened crates, and all crates whether containing spawn collectors or growing oysters, are lowered oh prepared bottom which has been cleaned of marine growths, and roughly paved with rocks and stones by divers in diving armor.

The clean stony bottom on which the crates rest, serves also to catch more or less oyster spawn,

but the bulk of the set of young shell is secured in the wooden trays of the wire-protected collecting crates. The bottom prepared by the divers is usually in coves, small bays or inlets.

Each collecting crate when put in proper position, is provided with numerous adult pearl oysters as breeders. Mr. Vives found by experience that some collectors, even when provided with breeders, came up without a good set of young. This he now guards against by putting as many as fifty adults in a crate as spawners, to insure the presence of both male and female oysters, the sexes being separate in the pearl oyster.

In Fig. 34 some of the matured shell is shown in boxes at the left, while a heap of shell being scraped and cleaned is shown at the right. Figs. 35, 36 and 37, show various forms of crates used in collecting and distributing growing shells and protecting them from their enemies.

There are several hundred spat collecting crates in use, some of them being sent out to favorable points many miles distant from the station at San Gabriel. All crates are protected by heavy, galvanized wire netting of about half-inch mesh. The spawning season of the pearl oyster in this region lasts from October until April or May. The intelligent efforts of Mr. Vives to secure an abundant set of spat in collectors located on the natural beds of the pearl oyster have undoubtedly been successful.

Two or three crops of matured shell had already been secured when the "Albatross" called at San Gabriel in March, 1911, and subsequently an additional crop of

of shell was reported for that year.

Mr. Vives was apparently devoting all his energy to a successful solution of the problems of artificial cultivation and expressed the conviction that his work would prove successful.

There was abundant evidence that the methods of collecting spat were effective. There appeared to be also an abundance of apparatus for the different operations of pearl shell culture.

Mr. Vives obtained his concession from the Mexican government in 1903. His brief report[1] relates to the years 1906-07. Considerable time must have been spent in preparation and experimentation.

From what is known of the pearl oyster in other regions, the shells grow large enough for industrial uses in about four years. They continue to grow after that period of course, but suffer deterioration from worms and boring sponges. What Mr. Vives had to say concerning the formation and growth of free pearls is interesting, and is presented here without comment as this has been a subject of much scientific and unscientific discussion. New pearls are secreted by pearl oysters of all ages, but chiefly by the younger oysters. After the pearl oyster is three years old fewer pearls are formed.

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1) Compañia Criadora de Concha y Perla de la Baja California, By Gaston J. Vives. Informe rendido por la Dirección General a la Secretaría de Estado y del Despacho de Fomento, Colonización e Industria, sobre los trabajos emprendidos durante los años de 1906 y 1907.

Pearls are seldom found except during the period from August to December and rarely as late as December. Mr. Vives exhibited a small but perfect pearl in the flesh of an oyster of artificial growth known to be only three months old.

He finds the pearl to be formed within a watery blister (epithelial sac) located almost anywhere in the oyster, but chiefly in the mantle, and perhaps often thrown off and lost when the sac is ruptured.

The pearly growths of irregular form attached to the inside of the shell are of course caused by injuries of various kinds to the shell. It is now believed that pearls formed in the fleshy parts of the pearl oyster result chiefly from cestode parasites around which the oyster secretes a layer of epithelial tissue within which the pearl is eventually formed.

The inception at La Paz of an original method of pearl oyster cultivation is of more than passing interest, as the application of that method to the growing of pearl oysters in our own waters may be quite within the limits of possibility.

From "Voyage of the 'Albatross' to the Gulf of California in 1911. By Charles Haskins Townsend.

LIST OF ILLUSTRATIONS

Fig. 27. General view of station for cultivation of the pearl oyster. Espiritu Santo Island, Gulf of California.

Fig. 28. Thatched roofs over the cross-sections of the canal; the open bay on the right.

Fig. 29. Shallow wire trays on which young pearl oysters are laid for growth.

Fig. 30. A spat collector landed, with a sull setting of young shells. One of the six trays is placed on top of the crate.

Fig. 31. Nearer view of the spat collector.

Fig. 32. Wooden trays of the spat collector removed and young oysters being placed on small wire trays for growth.

Fig. 33. Cemented grades on the beach to facilitate the handling of spat collectors and other oyster growing apparatus.

Fig. 34. Cleaning and packing the shells of artificially-grown pearl oysters.

Fig. 35. Shelter and apparatus.

Fig. 36. Wooden apparatus for the protection and handling of pearl oysters laid out for growth.

Fig. 37. Forms of wire apparatus for the protection and handling of pearl oysters laid out for growth.

Figs.38 and 39. Photographs of pearl oysters(Margaratifera var. mazatlantica) showing newly formed pearls which have developed on various parts of the mantle.

In each specimen the thin sac has been cut open to expose the pearl sufficiently for good photographic results. The pearls are shown in about natural size, but the oysters have been shrunken in spirits. All of the pearls are located on some portion of the free mantle,generally on the branchial surface, some being on the inner surface. The pearls are apparently spherical and vary in size from about one to three grains.

Specimens presented to the American Museum of Natural History by Gaston J. Vives of La Paz.

(Copy)

NEW YORK AQUARIUM

Under the Management of the

NEW YORK ZOOLOGICAL SOCIETY

Battery Park

Charles H. Townsend,
Director.

New York,
January 3, 1924.

Mr. H. C. Rosenow,
Consul of Mexico,
Hotel Pennsylvania,
New York City

Dear Sir:

In response to your request for my opinion as to the value of the system of pearl shell culture inaugurated by Mr. Gaston Vives, at Espiritu Santo Island, in the Gulf of California, I would state that the method is practicable and is based on sound principles.

In the year 1911 I examined this station with great interest, it being, so far as I know, the only establishment of the kind in the world. I published an illustrated account of the methods there employed, in the BULLETIN of the American Museum of Natural History, (Vol. XXXV., pp. 399-476, 1916.) to which you are referred. The cultivation of the pearl oyster was in progress in various stages, at the time of my visit, and I observed it in various stages of growth.

The processes included the gathering of young spat or seed in artificial collectors, the transfer of large quantities of young oysters to protected canals for farther growth, and finally their transfer to open waters in protected crates for mature growth.

I found the methods employed to be both logical and effective. The important work there carried on by Mr. Vives was interrupted by war and the station destroyed. I am greatly pleased to learn that capital has been secured for its re-establishment, and that Mr. Vives will have the opportunity to resume the work so unfortunately interrupted.

Very truly yours,

(Signed) C. H. Townsend.

LEON DIGUET

Extract from the Bulletin of the National Society of Acclimatization of France. June 1919.

CULTIVATION OF THE PEARL OYSTER

in the

GULF OF CALIFORNIA

The pearl oyster or mother-of-pearl shell which enjoys a world wide reputation both on account of the value of its pearls and for its abundant yield of mother-of-pearl, has not been the object of an industrial cultivation up to the present time because industry and commerce has heretofore been satisfied with the production supplied by the fisheries in the Tropical seas.

As the carrying on of this fishery has always been subject to serious obstacles, it was long ago hoped that the evil might be remedied through a methodical cultivation of the prescious mollusk and that as regular a yield as possible might be obtained.

The first experiments in the cultivation of the pearl oyster were made in the great pearl oyster beds of the Indian Ocean and the South Seas[1], but these experiments did not produce the decisive results expected, and although they were not entirely abandoned they were reduced to a semi-cultivation which consisted in the placing

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1) Consult on this subject: The report of Seurat in the Bulletin of the French National Society of Acclimatization, 1901, pp. 129 and 161 - Pearl Fishery, a Review of what is actually known about this Mollusk, Experiments in its Cultivation and the History of the formation of the Pearl. Also the important work of Herdman: The Fisheries of Ceylon and Marine Biology, 4 vol.in-4°, London, 1905.

or depositing of pearl oysters on special bottoms or grounds.

These first attempts, although they did not prove entirely successful, at least gave very accurate hints regarding the essential points in the biology of the mollusk and gave glimpses of the possibilities of an intense cultivation in the Tropical seas which it inhabits.

This interesting and important question was again taken up after a lapse of more than twenty years on the islands around La Paz by Mr. Gaston Vives with the aid and co-operation of his now defunct brother, Edmond.

Thanks to minute and persevering studies and to the pioneer spirit of the originators, this new branch of industry has entered the domain of the practical, and the results actually attained have fulfilled the hopes built on it, as verified in 1911 by Mr. Ch. Haskins Townsend[1].

Pearl oyster cultivation, as conceived in the beginning, and according to the report on his methods made by Mr. G. Vives to the Minister of Commerce (Fomento) in 1908[2], only had in view the conservation of the pearl oyster beds in existence and the permanent maintenance of their wealth by periodical plantings; from that time on, the results obtained through experience and indefatigable study and experimentation have assured a constant

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1) Charles Haskins Townsend. Voyage of the Albatross to the Gulf of California. Bulletin of the Natural History Society, vol. XXXV, 1916, p. 399, New York.

2) Vives. Compañia Criadora de Concha y Perla de la Baja California. Boletín de la Secretaria de Fomento, No. 6, p. 183, Enero 1908.

yield from the oyster beds, augmented the area, and even succeeded in creating new beds by imrpovising artificial bottoms.

Pearl oyster cultivation, which does not only have for its object obtaining the pearls which up to the present has been a fortuitous undertaking, but also the intensive production of the much prized mother-of-pearl, embraces three successive operations:

1. The gathering of spat.
2. Depositing this spat.
3. Planting pearl oyster beds.

To put these three operations into practice requires an establishment and working materials which represent a large capital.

In addition to the regular material employed in pearl fishery such as ships, boats and other craft suitable for the purpose of transportation and diving by means of scaphanders, this new industry requires special constructions both in the sea and on land, such as hatcheries, warehouses, galleries or shelters to house the apparatus, and everything related to the operations and life of the workmen.

The management and administration, as installed by Mr. Gaston Vives, is located at the Port of La Paz, capital of the southern section of the Territory of Lower California, and the work is carried on at the Island of Espiritu Santo in the Bay of San Gabriel (Illustration VI).

This magnificent bay, situated almost at the extreme south of the island, is well protected by a range of mountains; it has deep water and is sufficiently large to

make an excellent port where the fishing fleet can take refuge in times of bad weather. The nature of its bottom makes it favorable for the experiments on a large scale in pearl oyster cultivation.

The arrangements in the San Gabriel Bay for the under-water work in the pearl oyster cultivation, of which illustrations VII and VIII give a general idea, consist in certain number of hatcheries in zigzag canals and a protecting masonry wall which transforms a cove situated at the southeast into a lagoon with no other communication with the sea than a sluice gate at the center of the hatcheries.

The placing of the hatcheries has been in accordance with a plan which permits the automatice use of the fall and rise of the gentle tides in the Gulf of California[1] in order to maintain throughout the entire extension of the hatcheries the necessary flow of water which the biological needs and the regular development of the pearl oyster demand.

The mecanism for making this flow function is very simple; the lagoon is filled or emptied by the action of the tides which cause an afflux and reflux of water which, thanks to the masonry wall enclosing the lagoon, must pass through the hatchery canals. The result is an almost uninterrupted circulation of water which overflows the places reserved for the young oysters and incessantly carries nourishment to them.

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1) The Gulf of California because of its small width as compared with its length and on account of its being enclosed by land and running in a north-south direction, does not have well defined tides except at the time of the equinoxes; in bodies of water of this kind the tides do not make themselves appreciably felt except at the bottom of end of the bay where the beaches are somewhat sloping.

The circulation of the water can be regulated at will by a sluice gate which permits the maintenance of a certain level throughout the entire extension of the hatcheries; furthermore, this gate is supplied with metal screening which protects the entrance and prevents the intrusion of voracious fishes or other depredatory sea animals whose presence might endanger or even entirely destroy the deposits of young pearl oysters (spat).

Throughout its length the hatchery canal is provided with roofing to protect the young oysters from the burning sun which at the time of low water might be fatal.

Illustration IX gives an idea of the hatchery in use; this view was taken at the outlet of the lagoon; it shows the hatchery canal with and without roofing; the dividing barrier as well as the sides and walls of the hatcheries are made of solid masonry (cement and stone).

Following the constructions described, the most important factor in the artificial cultivation of the pearl and mother-of-pearl producing mollusk is the series of three operations producing the results strived for.

COLLECTION OF SPAT. The initial operation of this novel industry consists in the collection of oyster spat in the open sea; this is done at the time of year when the mollusk mates and at places which have proved the most favorable.

As is known, the larvas or spat of the majority of molluks lead at the beginning a wandering and nomadic

life; they even constitute at certain epochs of their existence a quite important contingent of marine life. In order to catch this spat and offer it the necessary points of support at the time when it is ready to abandon its wandering life and become definitely fixed, Mr. Vives has invented a very practical collector which at the same time as it preserves the spat against its enemies, permits it to accomplish in all security the first steps in its development. The spat collector consists of cases or crates of about two cubic meters' capacity, of which the sides are open so as to permit the easy entrance of all minute marine animals floating with the currents.

The crates, as shown in illustration X, are supplied with branches, tins, rough shells, in one word, with all sorts of material which will permit the free circulation of the water and provide suitable points to which the small oyster may attach its feeble and rudimentary byssus or filaments during its juvenile epoch.

These apparatus, after having been placed under favorable conditions and at the opportune time, are found after a relatively short time to contain a considerable quantity of spat fastened to the branches and other material, and often thousands of these young oysters may be found in one single crate.

DEPOSITING OR PLACING THE SPAT. When the young oyster or shell has attained a size of about one centimeter, which it does after a little over a month, the spat collectors are pulled out of the water and up on the beach. There, under suitable shelter, the work of the second oper-

ation begins immediately. This consists in carefully detaching the young oysters from their primary support, where they often are crowded on account of their superabundance, and place them properly on their new supports where they will find all the necessary conditions to secure their development freely.

This transplanting, which should be effected as rapidly as possible as it is performed out of water and disastrous results of the dessication may occur, is done on porcelain slabs, flat stones, pieces of large shells, etc. As soon as it is finished, the young shells are immediately carried to the hatcheries, where they promptly throw out new byssus filaments and fasten themselves definitely to their new supports.

In this operation recourse is sometimes taken to an ingenious procedure invented by Mr. Gaston Vives, and which consists in using bottomless wire cages which are placed on as flat a surface on the bottom of the canal as possible.

After these cages have been placed in position, one or two young oysters are put in each in such a manner that there is no danger that they may be dislodged by the currents of water and they are left in the hatcheries. Once there, the young oysters soon attach themselves by their byssus, and after the lapse of a few days the box or cage is removed as it is no longer needed; The young oysters then remain placed at regular intervals on supports which are easily moved, and after a more or less prolonged stay in the hatcheries they can be distributed, in a very good condition, over the bottoms or oyster beds in the open sea

to continue their growth.

THE PLANTING OF PEARL OYSTER BEDS. The third operation has for its object the planting of the pearl oyster in the open sea. This is done by divers with scaphanders who distribute the mollusks which have come from the hatcheries over selected bottoms.

However, as the young mollusks, before attaining a certain size, are exposed to the ravages of all kinds of animals, especially certain fishes, which move around in large schools, it is necessary to provide means of protection which vary according to the physical condition of the bottoms.

In rocky or rough places nature itself supplies sufficient protecting shelter, but on flat surfaces such as those which the fishermen of the Gulf of California call "Arenales", "Blanquisales", and "Chicharones",[1] and which generally present quite level surfaces and have the advantage that the shells can be placed at regular intervals, it is necessary to provide artificial protection. This may consist in an arrangement of pebbles or of wire netting, more or less similar to that employed for the same purpose in the beds of the comestible oyster. This latter contrivance is kept in place for a certain length of time and is removed when the oysters have reached a stage where they can evade the voracity of their enemies.

When the bottoms destined for repopulation have

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1) The "Arenales" consist of sandbanks; the "Blanquisales" of a mixture of sand and broken shells; the "Chicharones", which have more or less the same natural structure as the latter, are prolific in clacareous seaweed which at times cover the entire surface of the grounds.

been properly planted and protected by the aid of scaphanders, only a slight surveillance is required from time to time to ascertain that the development is proceeding properly until the mollusk reaches the proper size[1].

Experience has demonstrated that in order to assure a proper and regular growth, the number of shells per square meter should not excede fifty.

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1) The pearl oyster of the Gulf of California needs about four years to reach maturity; after this, the shell does not grow except in thickness. The pearl oyster of California is considered to be a variety of the Meleagrina margaritifera; it does not attain as large proportions as the species typical of the Indian Ocean; its maximum ordinary size hardly exceeds 18 centimeters in an adult specimen.

LIST OF ILLUSTRATIONS.

Map of San Gabriel Bay.

VI. General view of San Gabriel Bay and the oyster cultivation station.- Island of Espiritu Santo (Gulf of California).

VII. View showing the Masonry Wall shutting out the Bay and the arrangement of the structures and establishments for the pearl oyster cultivation.- Island of Espiritu Santo (Gulf of California).

VIII. Part of the masonry wall, showing the arrangements of the hatcheries for the first stage in the development of the young oysters or spat.- Island of Espiritu Santo (Gulf of California).

IX. Interior of a canal.

X. A spat collector filled with spat or young shells in proper condition to be transplanted to the hatchery canals.- Island of Espiritu Santo (Gulf of California).

THE PEARL FISHERIES OF MEXICO.

Pearl-Bearing oysters are found at various places on the Pacific coast of Mexico, and especially along the coast of Lower California, where extensive fisheries are prosecuted. The pearls are noted for the great variety of color which they display. A large percentage are black, others are white, brown, peacock green, etc. Generally they are small and of irregular form, yet sometimes very large ones are secured, weighing 100, 200, and even 300 grains.

European knowledge of the pearl resources of Mexico dates from the conquest of that country by Hernando Cortés about 1522. The diary of his lieutenant, Fortuna Ximenes, tells of finding native chiefs living in primitive huts along the seashore, with quantities of beautiful pearls lying carelessly around. From a tribe near the present site of Hermosillo, in the State of Sonora, Cortés secured great quantities of the gems. It appeared that the fishery had been in existence for centuries. The location of the pearl reefs was prominently noted on Cortés's map of this coast, made in 1535, a copy of which was procured by the Rev. Edward E. Hale when in Spain in 1883.

Following Cortés's explorations of the Pacific coast of Mexico (1533-1538) a number of expeditions were fitted out for securing pearls by trading with the natives, by forcing them to fish, and by even more questionable means. Several of these expeditions found re-

cord in history either by reason of their unusual success or through the extreme cruelty with which they were conducted. The contact of the Spaniards with the Indians resulted in very bitter feelings on the part of the latter, so it became risky for small traders to venture among them. From time to time successful expeditions were made, especially the one of 200 men sent in 1596 by the Viceroy of Mexico to "the rich Isles of California", mentioned by Teixeira.[1] Antonio de Castillo, a Spanish colonist, with headquarters south of Mazatlan, was one of the most successful of the early adventurers, and Iturbide Ortega and José Caborél were also among the fortunate ones of that period.[2] Ortega marketed his pearls in the City of Mexico, and the reported sale of one of 4500 dollars had considerable effect in stimulating the industry.

The advent of the Jesuits to western Mexico in 1642, developed amicable relations with the Indians; and although the missionaries were agriculturists rather than fishermen, the restoration of harmony resulted in a more favorable prosecution of the fisheries. The colonists of Sinaloa and Nueva Galicia, who had formerly, in small vessels and with great danger, made occassional visits to the pearl beds, built larger vessels and made more frequent visits without apprehension. The skilful Yaqui and Mayo Indians were employed or impressed as divers, just as natives of the Bahamas had served in the fisheries of Venezuela. Great profits resulted from the operations.

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1) Hakluyt's "Voyages", Glasgow 1904, Vol.ix.pp. 318,419.

2) Clavigera "Storia della California" Venezia, 1789, Vol.I.p.161.

stated that each summer, eight, ten or twelve poor Spaniards from Sonora, Sinaloa, and elsewhere on the mainland, crossed the gulf in small boats to the California shore for the purpose of obtaining pearls. They carried supplies of Indian corn and dried beef, and also a number of Indians, who served as divers, the Spaniards themselves showing little inclination to engage in the work when native fishermen could be employed so cheaply. Provided with a sack for receiving the oysters which they removed from the bottom, the fishermen dived head first into the sea, and when they could no longer hold their breath they ascended with the gathered treasure. The oysters were counted before opening; and when the law was complied with, every fifth one was put aside for the king's revenue. Most of the oysters yielded no pearls; some contained black pearls, others white ones, the latter usually small and ill-shaped. If, after six or eight weeks of hard labor and deducting all expenses, a Spaniard gained a hundred American pesos, he thought he had made a little fortune, but this he could not do every season. "God knows", said Baegert, "whether a fifth of the pearls secured in the California sea yields to the catholic king an average of 150 to 200 pesos in a year, even without frauds in the transaction. I heard only two persons - with whom also I was personally acquainted - who had accumulated some wealth, after spending 20 or more years in the business. The others remained poor notwithstanding their pearl fishing."[1)]

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1) Baegert "Nachrichten von der Amerikanischen Halbinsel Californien" Mannheim, 1772.

Father Baegert's statement of the returns seems to be substantiated by the reports of the royal fifth a few years later. For the period from 1792 to 1796 this was placed at "2 lbs. 2 ozs." by some writers; and according to others, from 1788 to 1797 it amounted to only "3 lbs. 9 ozs." which is the quantity assigned by some accounts to 1797 alone.[1] These returns apparently indicate that a great decrease had occurred since the days of Osio; but it seems very doubtful whether, under the conditions existing in Mexico at that time, the royal treasury received its due share of the proceeds.

Shortly following the independence of Mexico in 1821, and after a period of little activity, several attempts were made to exploit the pearl resources. The great prosperity in England, ensuing upon the termination of the Napoleonic Wars, resulted in much speculation and the promotion of stock subscriptions in many visionary schemes. Among these was"The General Pearl and Coral-Fishing Association of London", which in 1925 equipped and sent out to Mexico, by way of Cape Horn, two vessels prepared to exploit the pearl resources by the use of diving-bells similar to those formerly employed in submarine construction. This expedition was under the direction of Lieutenant R. W. H. Hardy, whose report thereon presents an interesting exhibit of the condition of the pearl fishery at that time.

Hardy found the fishery at a very low ebb, owing, largely, to the scarcity of oysters and the uncertainty of

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1) Arch.Cal.Prov.Pap.XVI.Ben.Mil.XVI,XVII,XVIII.

depending on the native divers. He adds with peculiar naiveté: "I had almost forgotten to mention a very curious circumstance with respect to the pearl-oyster namely that on the coast of Sonora there are none at all, except at Guaymas." He states also that to the northward of 28°30' not the trace of a shell could be discovered on either side of the gulf.

The center of the industry was then at Loreto, a village of 250 inhabitants; but another small station existed at La Paz. At Loreto six or eight vessels of twenty-five tons each were employed, each having three or four sailors and fifteen or twenty Yaqui Indians who served as divers. Head-diving was in vogue, the work proceeding from 11 A.M. to 2 P.M., and the depth ranging from three to twelve fathoms. The annual catch of pearls was "4 or 5 pounds' weight, worth from $ 8,000. to $ 10,000.[1] After the government's claim of one fifth had been set apart, the owner and captain of the vessel received one half and the divers the other half.

It was found impossible to use diving-bells when the sea was at all rough, and even during calm weather they were impracticable on account of the unevenness of the ground and the strong undercurrents. An effort was made to employ native divers, but owing to the disorganized state of affairs only four could be secured. In the Gulf of Mulege a large number of oysters were collected, but when these were opened "six very small pearls" were all that could be found. After spending about three

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1) Hardy "Travels in Mexiko" London, 1829, pp. 231-238.

years on the coast, Hardy returned to England, and the company abandoned the enterprise.

In the early history of the Mexican pearl fishery, the shells were of no market value; but about 1830 a French trader named Combier made experimental shipments to France, securing cheap freight rates by using the waste shells largely as ballast for the vessels.[1] The best quality sold for about 600 francs per ton, and the market was found sufficient for regular shipments. The value gradually increased, and in 1854 it approximated 2000 francs per ton in France, placing the industry upon a very remunerative basis. This resulted in much activity in the fishery, and an increase in the number of boats and divers.

In 1855, the fishery gave employment to 368 divers, and yielded $23,800 worth of pearls, and 350 tons of shells worth $13,500.[2] It was estimated by Lassepas that from 1580 to 1857, inclusive, 95,000 tons of oysters were removed from the Gulf of California, yielding 2770 pounds of pearls, worth $5,540,000.[3]

For the protection of the reefs, the Mexican government in 1857 divided the Gulf of California into four pearling districts, and provided that only one of them should be worked each year, and then only in areas leased for the season to the highest bidder, thereby

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1) Diguet, "Buelletin de la Société Centrale d'Aquiculture" Paris, Vol.VII, pp.1-18.

2) Esteva "Memoria sobre la Pesca de la Perla" "Boletin de la Sociedad Mexicana de Geographia," Vol X, pp. 681-688.

3) Lassepas "Historia de la Baja California", Mexico 1859, p. 65.

permitting the reefs successfully to remain undisturbed for three years.

The yield of pearls in 1868 approximated $55,000 and that of shells $10,000 in valud; while in 1869 these items were given as $62,000 and 25,000 respectively.[1] The local prices ranged from $13 per ounce for seed-pearls to $1500 for a choice gem.

At that time the fishery was carried on from shore camps or from large vessels, each carrying twenty to fifty divers, who were mostly Yaqui Indians from the eastern shore of the gulf. The camp or vessel was located in the vicinity of the reefs or beds, and the fishing was prosecuted from small boats, each carrying three or four nude divers. Fastened to the waist or suspended from the neck was a net for the reception of oysters, and each diver carried a short spud or stick with which to detach them from the bottom, and to some extent for use as a weapon of defense against sharks and similar enemies. The diving progressed mostly in the morning, when the sea was unruffled by the breeze which usually begins shortly after noon. The season lasted from May 1st to late in September, when the water became too cold for further operations.

The divers were paid a definite share of the catch, and kept in debt-bondage by means of advances and supplies. Little clothing was necessary, and the provisions consisted principally of corn, beans and sundried

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1) Pujol, "Estudio Biologico sobre la nostra Avicula Margaritiferus" "Boletin de la Sociedad de Geographia", Epoc.2, Vol. III, pp.139 et seq.

beef. Luxuries were added in the form of tobacco, and of mescal distilled from the maguey plant, indulgence in these constituting the chief remuneration for the season's labor. The finding of an unusually choice pearl brought the lucky fisherman a gratuity of a few dollars, and shore leave for several days in which to spend it. Dressing in his best calico garments, he hastened to the nearest town to indulge in release from restraint, in drunkenness and debauchery - the highest dreams of happiness of a Yaqui Indian - thoughts of which served to bring him to the fishery each year from his home across the gulf.

From the Spanish conquest until 1874, the Mexican pearl fishery was conducted exclusively by nude divers. The experiment with the diving-bell in 1825 had been without favorable result, and also an attempt by an American in 1854 to use a diving-suit with air-pump, etc., this failure being credited to imperfection of apparatus. In 1874, through the influence of European pearl merchants, two schooners, each of about 200 tons' measurement, one from Australia and the other from England, visited the Mexican grounds, with a dozen boats fully equipped with scaphanders or diving armor, including helmets, rubber suits, pumps, etc. Owing to their working in deeper water than the nude divers were able to exploit, their success was remarkable, and they secured upward of a hundred thousand dollars' worth of pearls and shells during the first season.

The hitherto somnolent inhabitants of Lower California were amazed at seeing their resources thus

easily removed, and were awakened to the opportunities afforded them to acquire the wealth which nature had scattered at their very doors. With this object-lesson before them, companies were formed for raising sufficient capital for the business, and the leading operators equipped their men with scaphanders, to the great annoyance of the would-be-independent fishermen, who had not sufficient means to purchase the costly equipment. Many of these continued to employ nude divers, but after 1880 this method of fishery was subordinate to the use of diving apparatus. The change was accompanied by many accidents, and rarely did a month pass without the loss of a man, due in most cases to faulty apparatus or to inexperienced management.

In 1884 President Gonzalez inaugurated the policy of granting exclusive concessions to the pearl reefs. On February 28 of that year five concessions were granted to as many persons, giving them and their associates and assigns the exclusive right to all shell fisheries in their respective zones of large area, for a period of sixteen years, in consideration of a royalty and export duty, amounting altogether to about $10 per ton of shells exported in the first three years, and $15 per ton for the remaining thirteen years of the term. Immediately these five grants were consolidated, forming the Lower California Pearl Fishing Company ("Compania Perlifera de la Baja California"), incorporated under the laws of California with an invested capital of $100,000.

Other concessions were given covering the ocean of Lower California, the eastern side of the gulf within the States of Sonora and Sinaloa, and the ocean shore of

Mexico southward from Sinaloa. In addition to these, certain territorial rights of fishing are claimed through grants dating back very early in the history of the country. So eagerly have these concessions been sought in recent years, that there is now little pearling ground on the coast which is not under corporate or private claim. And, owing to speculation in these concessions and in the formation of companies to develop them, it is somewhat difficult to obtain wholly reliable data relative to the condition and extent of the industry.

Two species of pearl-bearing mollusks on the Mexican coast are found. The principal one is the M.margaritifera matzatlanica, known locally as the "concha de perla fina". This species is closely related to the "black lip shell" of the Australian coast. It is considerably larger than the Venezuelan oysters, averaging four or five inches in diameter and attaining an extreme diameter of seven or possibly eight inches. It occurs to some extent all along the Pacific coast of Mexico, in detached beds intercalated in places. The principal reefs, which have been exploited for nearly four centuries, are in the shallow waters of the Gulf of California and especially within the 300 miles between Cape San Lucas and Mulege Bay. The fisheries have centered about the islands of Cerralvo, Espiritu Santo, Carmen, and San José, and in the bays of Mulege, Ventana, and San Lorenzo. The depth of water on the reefs ranges from two to twenty-five fathoms, with an average of probably six or eight fathoms. The species is generally isolated, and firmly attached by the byssus to the bottom rocks or the stone corals, from

which it may remove in case of necessity, though it probably does not do so frequently.

The second species is known locally under the name "concha nacar", and has been named Margaritifera (Avicula) vinesi (Rochebonne).[1] It occurs only in the northern part of the gulf near the mouth of the Colorado River. Formerly it was abundant in that region, occurring in large areas, but it has become much reduced and is now little sought after. It is claimed that this species is far more productive of pearls than the M.Margaritifera, and that it yielded the large quantities obtained by Osio in the eighteenth century. Although irridescent, the shell is so thin and convex that it is without commercial value.

The headquarters of the Mexican pearl fishery are at La Paz, the capital of lower California, 240 miles northwest of Mazatlan and 150 miles north of Cape San Lucas. This "Mantle of Peace" - the literal translation of La Paz - contains about 5000 inhabitants, nearly all of whom are more or less dependent on the pearl fishery. It presents an attractive picture, with the cocoanut palms extending down almost to the water's edge, and the high mountains forming a background. The low, stone houses, the tile roofs, the plaza with tropical trees, and the beautiful flowerbeds under perennial sunny skies, give it a quaint appearance. The most conspicuous objects from the harbor are the large old warehouses, with thick walls and iron-barred windows, for the storage of the

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1) Diguet, "Bulletin de la Société Centrale d'Aquiculture" 1895, Vol. VII.

pearls and the shells. During the season, from April to November, the arrival and departure of the pearling vessels presents a scene of great animation.

The present methods of the fishery on the Mexican coast are quite different from those of thirty years ago when nude diving was the only method in vogue. Instead of the haphazard work, largely in shallow water, the industry is conducted systematically, and the limit of depth is increased, much of the diving being in depths of ten to fifteen fathoms. The fishermen operate either from a large vessel making a cruise two or three months in length, or from a camp on the shore near the reefs. A vessel visits them frequently to furnish supplies and to transport the catch to La Paz. The fishing boats are undecked craft, each equipped with an air-pump and a crew of six men: a diver, a "Cabo de vida" or life-line man, who is usually the captain, two bomberos at the air-pump, and two rowers.

The greatest depth at which armored diving is attempted in Mexico rarely exceeds twenty fathoms; twenty-five fathoms is fully as deep as it is practicable to go, and it is not advisable to remain at that depth more than a very few minutes. At fifteen fathoms a diver may remain half an hour or more, at six or eight fathoms he may work uninterruptedly for several hours. When the water is very cold, the diver comes up frequently to restore his numbed circulation by vigorous rubbing. The occupation especially conducive to rheumatism, and paralysis is more or less general, due, not only to the compressed atmosphere, but to the abrupt changes of temperature. The

work is very debilitating, with particular effect on the nerves, and partial deafness is common. It is important that the diver be careful about over-eating before descending, as heavy foods, and meats especially, make respiration difficult; therefore, breakfast consists of little more than bread and coffee. The risks and dangers from sharks, devilfish, etc. have greatly diminished since the introduction of scaphanders; for a stout diver in his waterproof dress, with lead on the breast, shoulders, and shoes, and on his head a massive helmet containing great gaping windows for eyes, is enough to cause even a hungry shark to hesitate and to seek a more digestible meal.

There are yet many nude divers in Mexico, who operate in shallow waters, their cheap labor making them successful competitors of the armored divers. In arranging with these, the pearling company commonly grub-stakes a crew, pays a stipulated sum per hundredweight for the shells, and bargains for the pearls. If the fishermen are not satisfied with the price offered for these, they are at liberty to sell to other buyers under certain restrictions.

Nude diving is confined to the warm months, beginning about the middle of May and continuing until October. Owing to the cloudy or muddy condition of the water in the gulf, the nude diver can not inspect the bottom from the surface and select the best oysters before descending, nor can he work satisfactorily at depths greater than seven or eight fathoms. While the work is hard, it is more remunerative than the average branch of labor in this region.

Each day the boats deliver their catch of oysters at the fishing camps or on board the receiving vessels. After they have been freed from marine growth and refuse, the mollusks are opened and searched for pearls. This operation is performed by trusted employees, usually elderly men who have become physically disqualified for diving, and who, seated together at a low table, work under the watchful eyes of overseers. A knife is introduced between the valves of the oysters, the adductor muscle is severed, and the valves are separated by breaking the hinge. The animal is removed from the shell and carefully examined with the eyes and the fingers and then squeezed in the hands to locate any pearl which may be concealed in the organs or tissues. The debris is passed to other persons, who submit it to further examinations. A man may work all day long and find only a few seed-pearls, but occasionally there is the excitement of discovering a beautiful gem.

In some localities the flesh of the pearl oyster is a source of profit through its sale to Chinamen, who dry and otherwise prepare it for sale among their countrymen in Mexico and America, as well as in the Orient. Frequently the large adductor muscle is dried for food, making excellent soup-stock, and, indeed, it is quite palatable when stewed.

It is difficult to approximate the output of the Mexican pearl fisheries, other than the pearl shell, because the dealers place a merely nominal value on the pearls in their invoices when sending them to Europe, an invoice of $500 sometimes representing gems valued in Paris at several thousand dollars. Furthermore, it is

difficult to obtain satisfactory information from the pearling companies, owing presumably, to the fear of developing greater competition. According to the estimates at La Paz, the local value of the pearl yield now approximates $250,000 annually, and the value of the same over the counters in Europe and America probably exceeds one million dollars.

Some remarkably large pearls have been secured in the Mexican fisheries, especially considering the small size of the oysters. In 1871 a pearl of 96 grains, pear shaped and without a flaw, sold at La Paz for 3000 pesos. In March 1907, a beautiful pinkish white one, found near the lower end of the peninsula, sold for 28,000 pesos or $14,000. One of the best years for choice finds was 1881, when the scaphanders were first employed to their greatest efficiency. A black pearl was then secured which weighed 112 grains, and which brought 40,000 francs in Paris. In 1862 two, weighing 124 and 180 grains respectively, sold for 11,000 pesos. In the following year a light brown pearl, flecked with dark brown, and weighing 260 grains, sold for 7500 pesos. These are the prices which the La Paz merchants received for these pearls, and not the much greater amounts for which they were finally sold by the jewelers.

One of the finest pearls was found in 1884 near Mulege. This weighed 372 grains. The Indian fishermen is said to have sold it for $90; the purchaser declined an offer of 1000 pesos, and also a second offer of 5,000, and soon sold it to a La Paz dealer for 10,000 pesos. Its value in Paris was estimated at 85,000 francs.

Probably the most famous of all pearls obtained from these grounds was "the 400-grain pearl" found near Loreto, and "which is now among the royal jewels of Spain." It is said that this was offered by the lucky fishermen to the Missions of Loreto, and by the Director of the Missions in Lower California was presented to the Queen of Spain.[1)]

As in every other fishery, one hears in Mexico of fishermen who have grasped a prize only to lose it through inexperience or improvidence. The account given above of the sale of the 372-grain pearl found near Mulege furnishes an instance of this. It is related in La Paz that in 1883 an Indian sold for ten pesos a gem weighing 128 grains, for which the purchaser received 27,500 francs in Paris. On another occasion a Mexican sold two pearls, easily worth $4,000, for $16 worth of groceries.

In the eighteenth century, the Notre Dame de Loreto possessed a remarkable collection of Mexican pearls, which had been presented from time to time by the fishermen. During the régime of the Jesuits, it was customary to devote the proceeds of the last day of the fishery to the decoration of the altar of that mission. After the expulsion of this religious order in 1767, the mission was pillaged and the collection dissipated. From the old aristocracy of Mexico, family heirlooms of many choice pearls were placed on the European market during the civil wars in Mexico to contribute to the support of

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1) Lassepas, "Historia de la Colonizacion de la Baja California" Mexico, 1859.

the contending armies. One lady in Sonora is said to have disposed of her collection for 550,000 francs. A fine collection of these pearls, accumulated from 1760 to 1850, and showing them in a great variety of colors, shapes, and sizes, was in Chihuahua until recently.

PEARL CULTURE AND PEARL-FARMING.

(Page 293)

.....Among the most interesting of the pearl-culture enterprises are those of the Compania Criadora de Concha y Perla, under the direction of Sr.Gaston J. Vives, in the Gulf of California. This company has an extensive station at San Gabriel, near La Paz, where the breeding oysters are placed in prepared chests or cages for collecting the spat on trays. After remaining there for several weeks or months, the young mollusks are removed to prepared places (viveros) for further growth. Experiments are now made in depositing them between a series of parallel dams alternatingly touching each shore of a lagoon, thus developing a current of water over the oysters for conveying food to them, and thus hastening their growth.

In efforts to increase the output of pearls, attention has been given to the possibilities for extending the area and production of the reefs, and for stocking new areas and replenishing exhausted ones, thus bringing the pearl-bearing mollusks to maturity in greater abundance.....



Diver ready to descend to the bottom of the sea.



Diving fleet of the Compañia Criadora resting after the labors of the day.



Boat with diving machinery.
The diver is at the bottom of the sea.



Row boats waiting for their cargo of young oysters to be planted in the open sea.



Group of workmen opening mature shells in search of pearls and cleaning the mother-of-pearl. Those sitting are doing the work. The men standing are the superiors who watch the operation.



Boat with diving machinery.
Diver in act of descending to the bottom of the sea.



Divers of the Compañia Criadora taking their breakfast on board one of the ships in service.



Sailboats belonging to the Company.



Rowboats escorted by a tug starting out for the purpose of sowing young oysters on the sandy bottoms around the island of Espiritu Santo.



Cleaning mother-of-pearl on board one of the ships of the Compañia Criadora.



A tug and four boats with machinery going to their work of sowing oysters.



Pearl Station of the Isla Partida under construction
Island of Espiritu Santo.



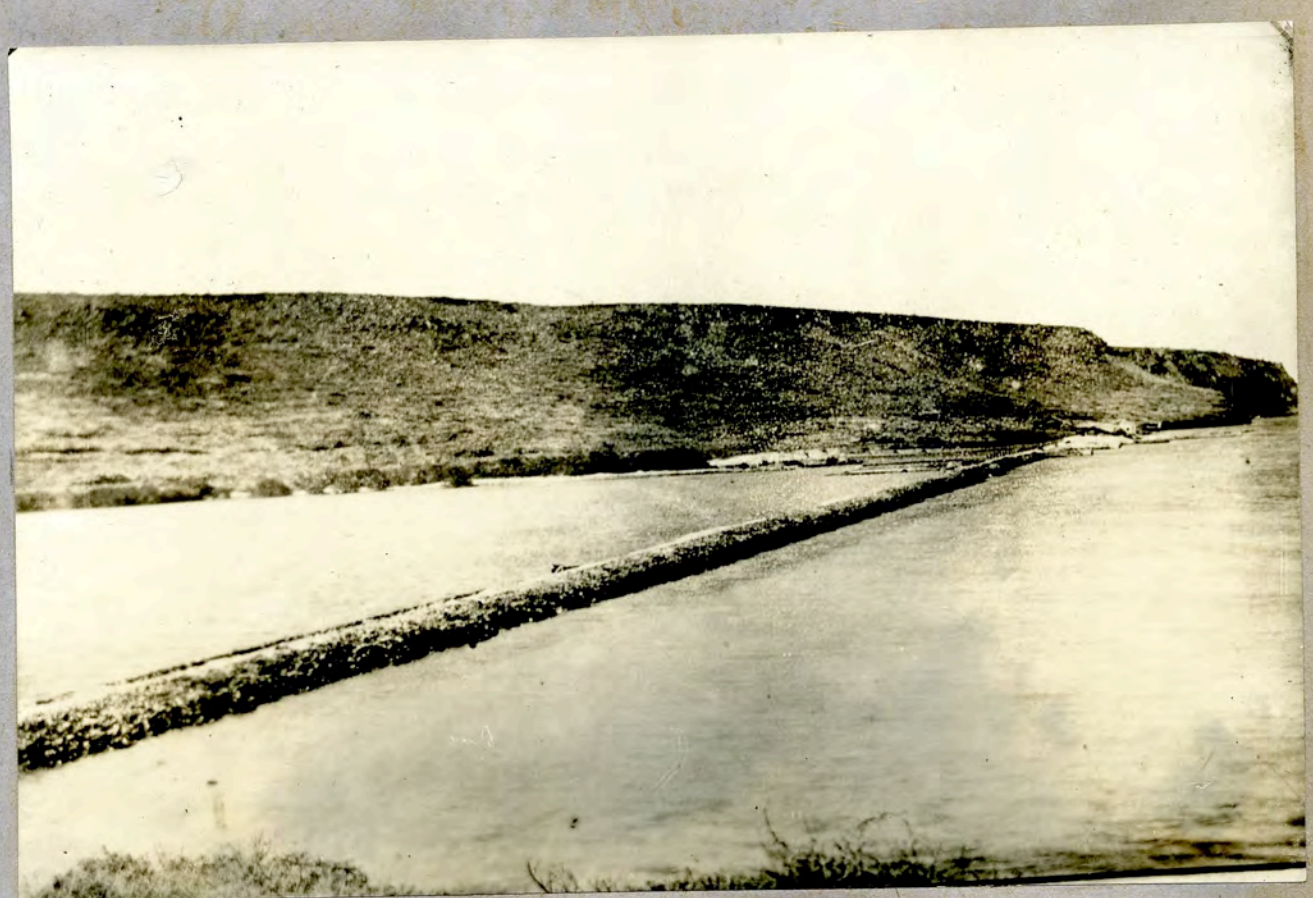
Construction of a group of deposit canals.



Mail boat from La Paz to the islands.



Two kilometers of track laid for the transportation of materials used in constructing the "deposit canals"and other works.



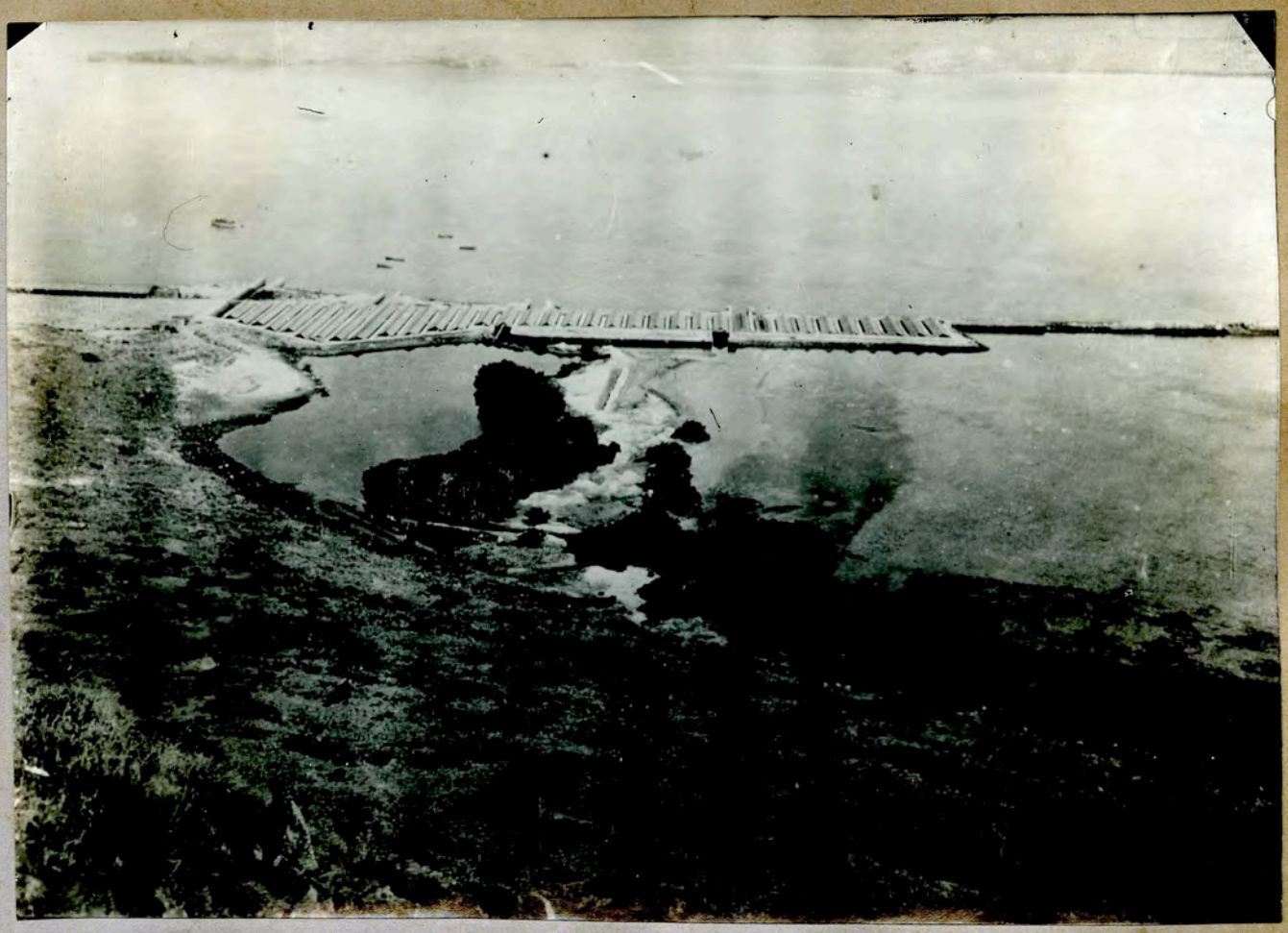
Masonry wall, 500 meters long by 10 wide at the base, which was constructed to regulate the current in the deposit canals or hatcheries.



The original installation of the San Gabriel pearl vultivation station, Island of Espiritu Santo.



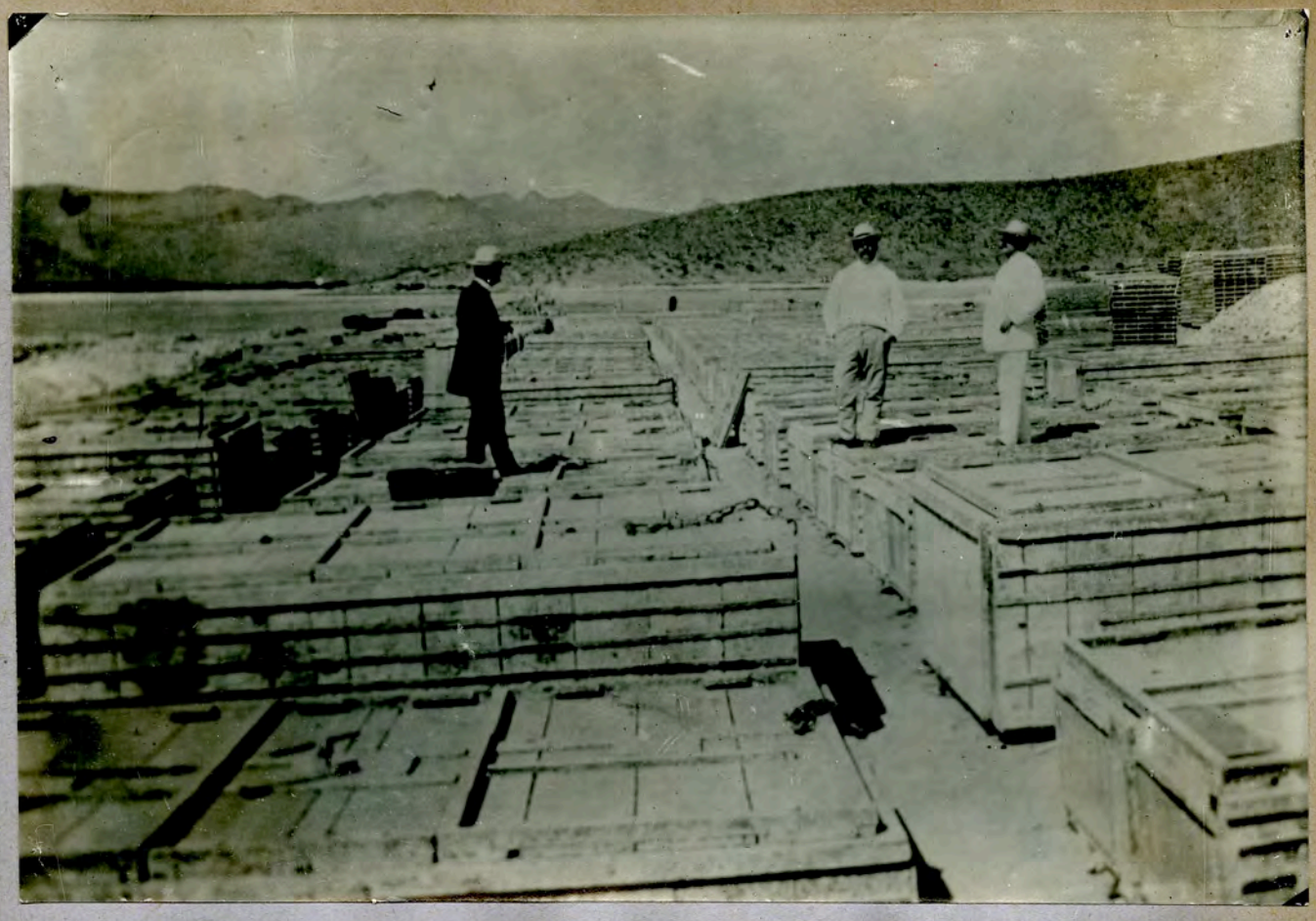
Inauguration of the work for establishing the pearl cultivation station of San Gabriel by the Board of Directors of the Company.



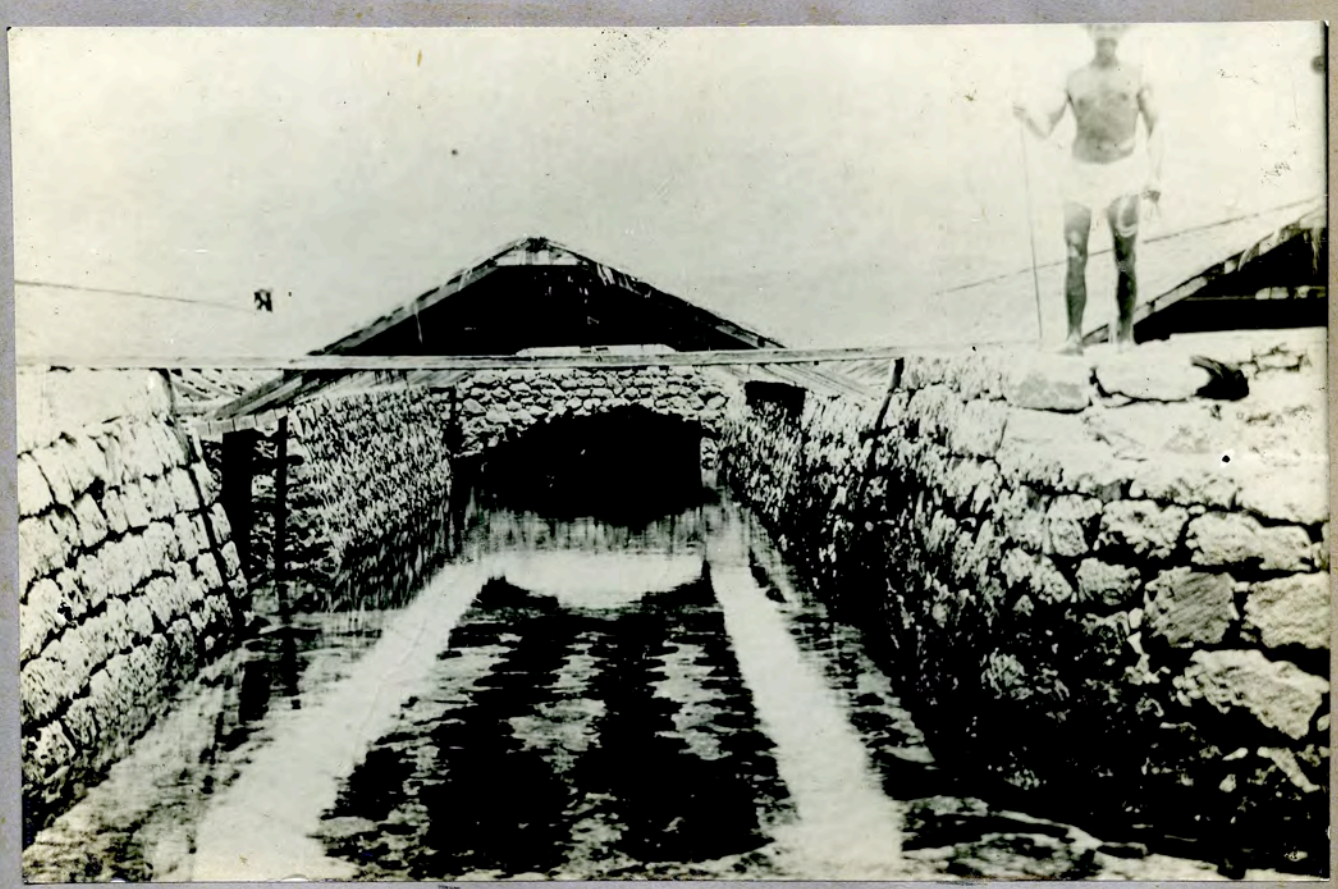
A group of "depository canals" viewed from a hill.



Incubators placed on the ground to rest until the season for again putting them to work arrives. This resting period occurs once a year and lasts for three months.



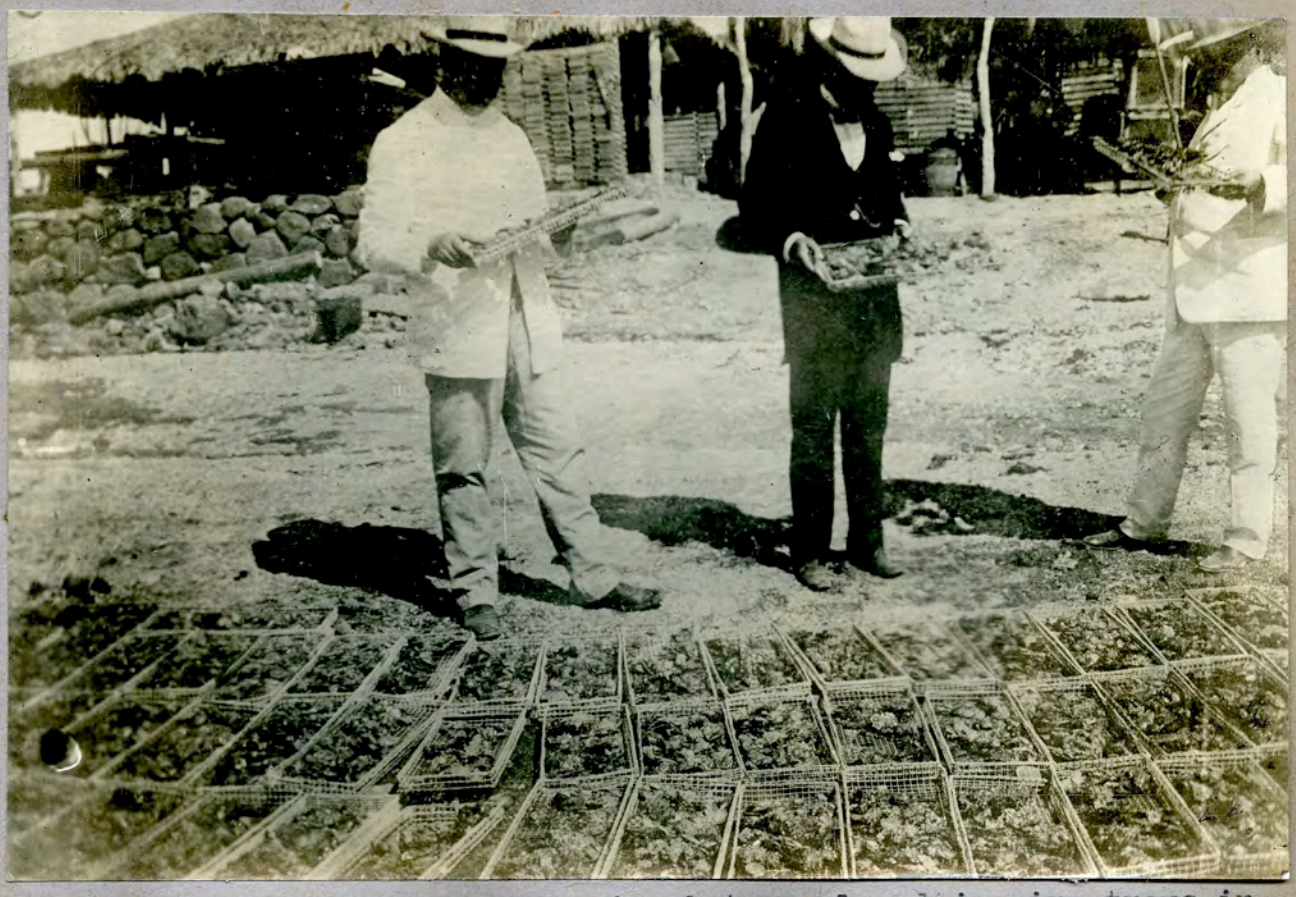
Incubators placed on level surface to await the time when they will again be put into operation.



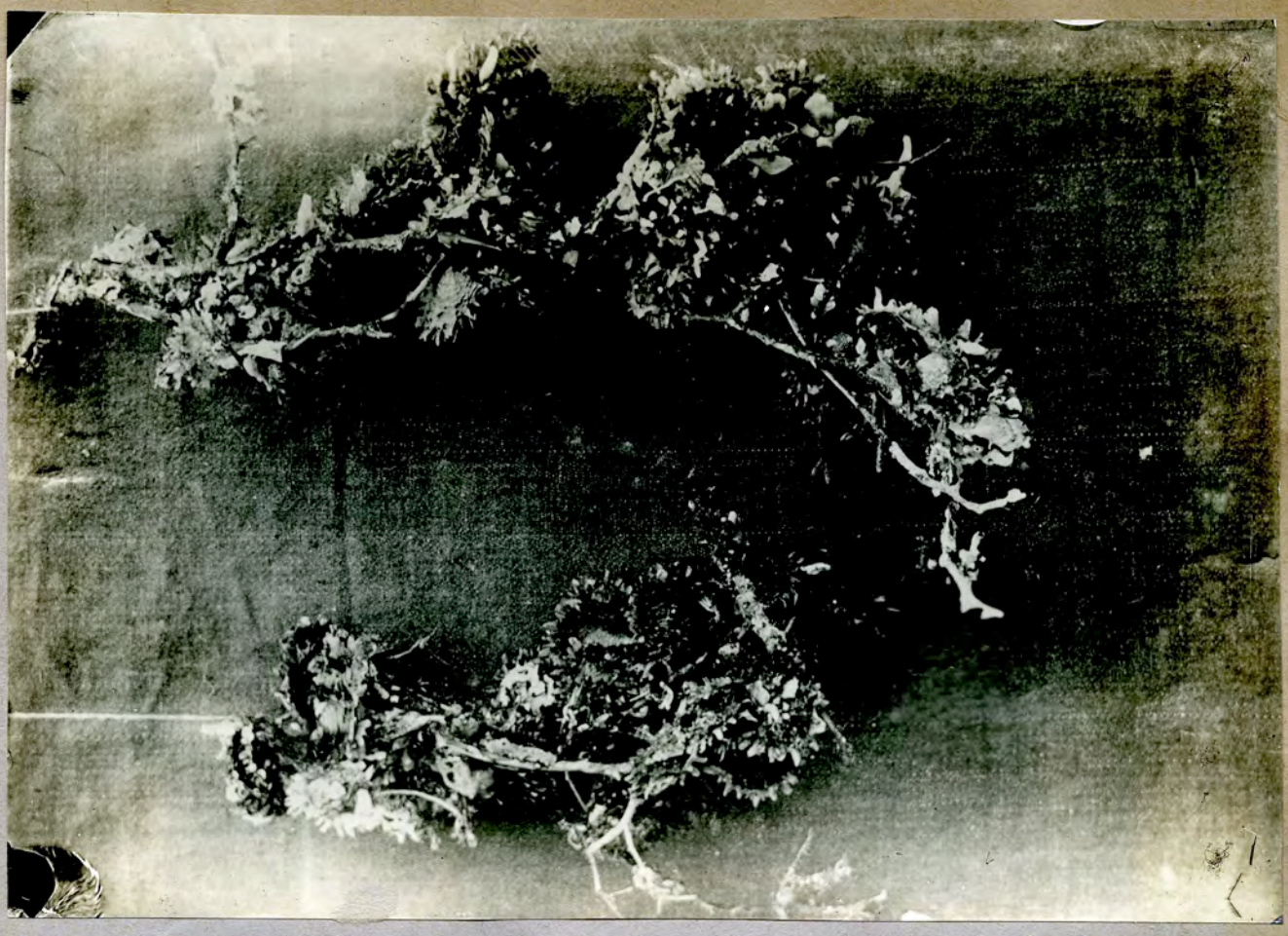
Interior of a canal on whose bottom the young oysters are deposited until they are ready to be transferred to the open sea. Hatchery guard with a rod in his hand.



Department where the harvesting of the young oysters gathered by the incubators and other work requiring shade is performed.
---100 meters long by 10 wide---



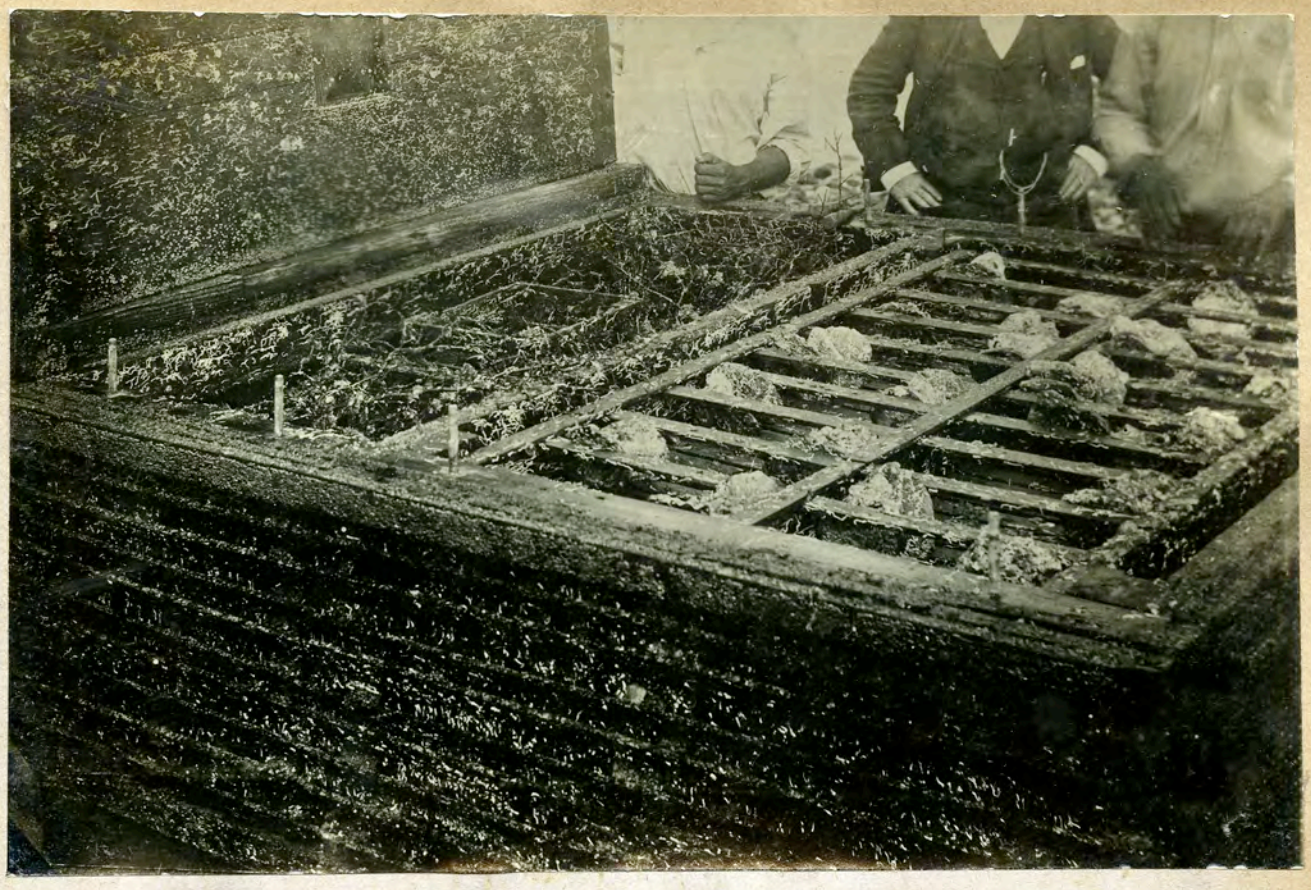
Young oysters from the incubators placed in wire trays in order to be transported to the "depository canals" where they are temporarily planted until they acquire a sufficient size to be transplanted to beds in the open sea.



Curious way in which young oysters have nested together in incubator.



Another curious nest of young oysters taken from incubator.



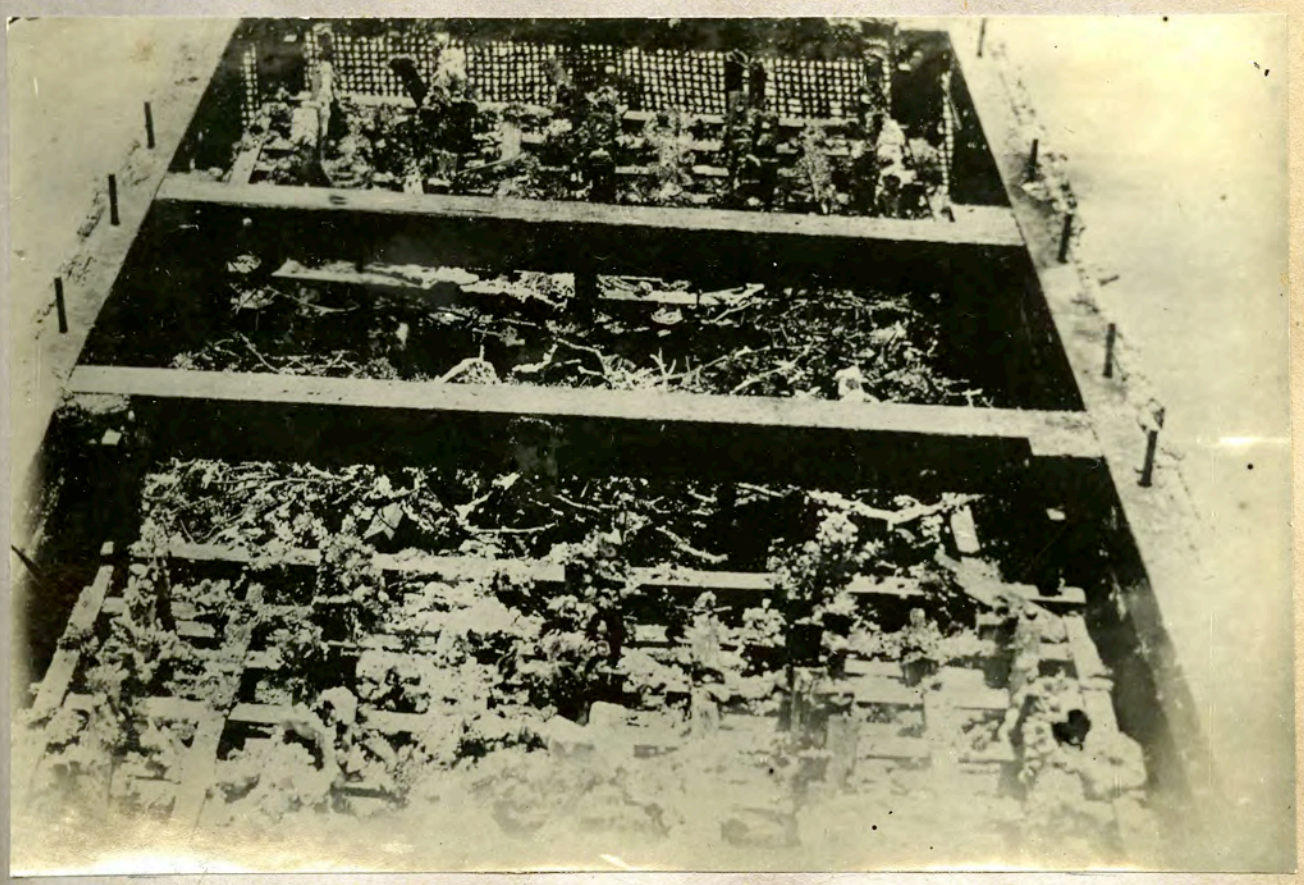
Examining an incubator to ascertain the condition of the young oysters and their sizes.



Primitive incubator seen from the side.



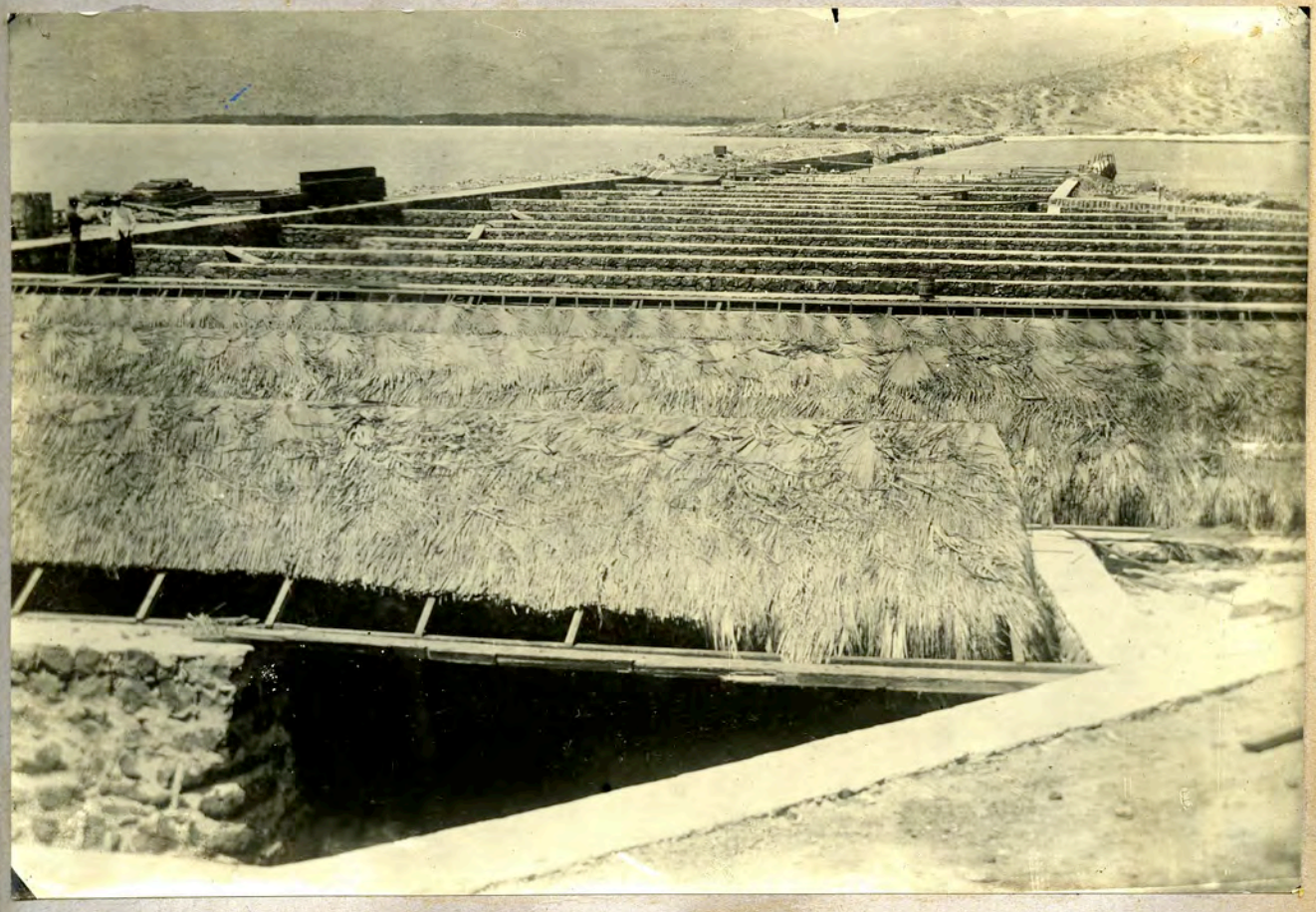
A detail in the gathering of the young oysters collected in the incubators.



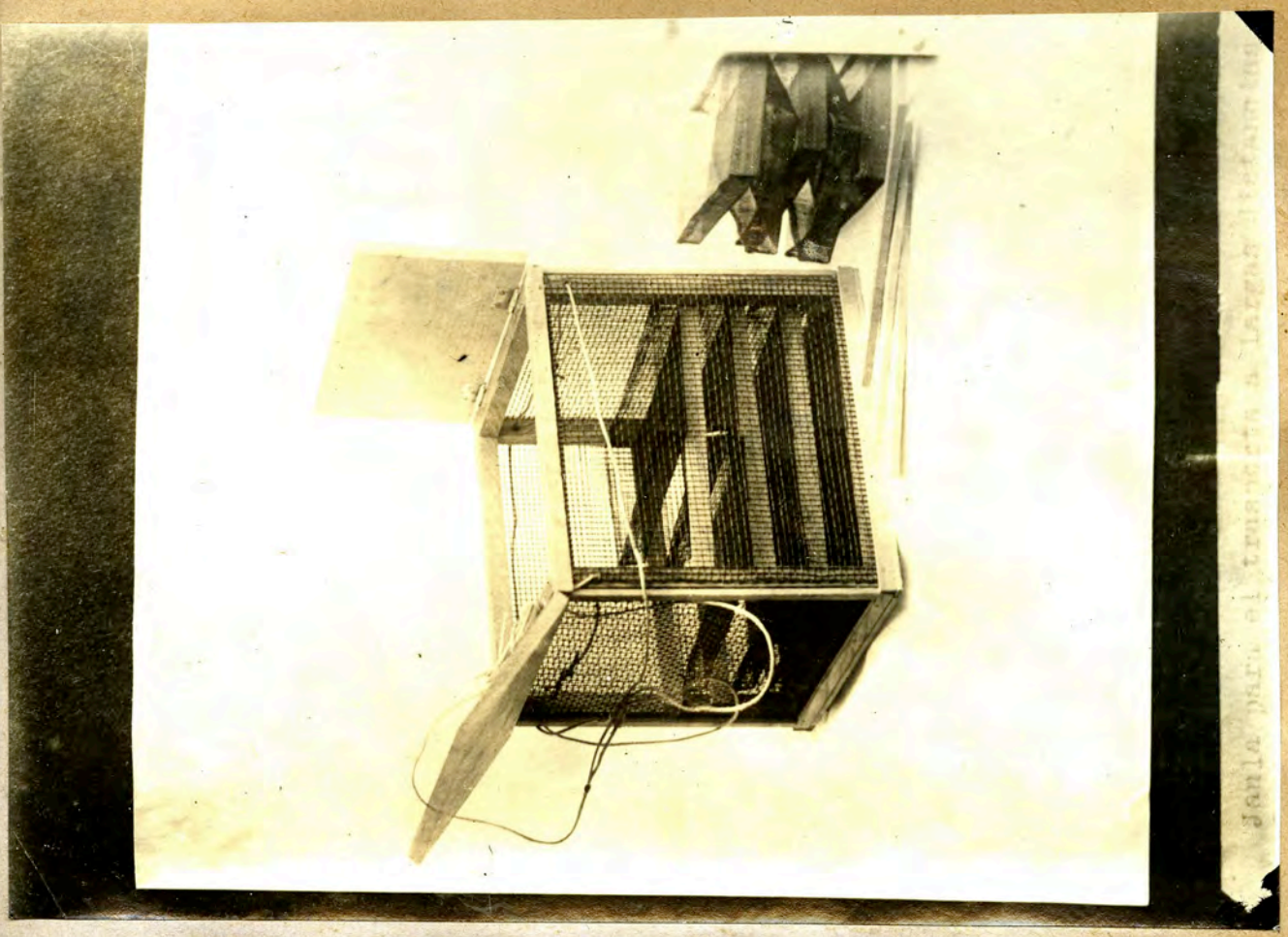
An incubator filled with young oysters in proper condition for being transplanted to the depository canals.



Incubator being pulled up on the beach.



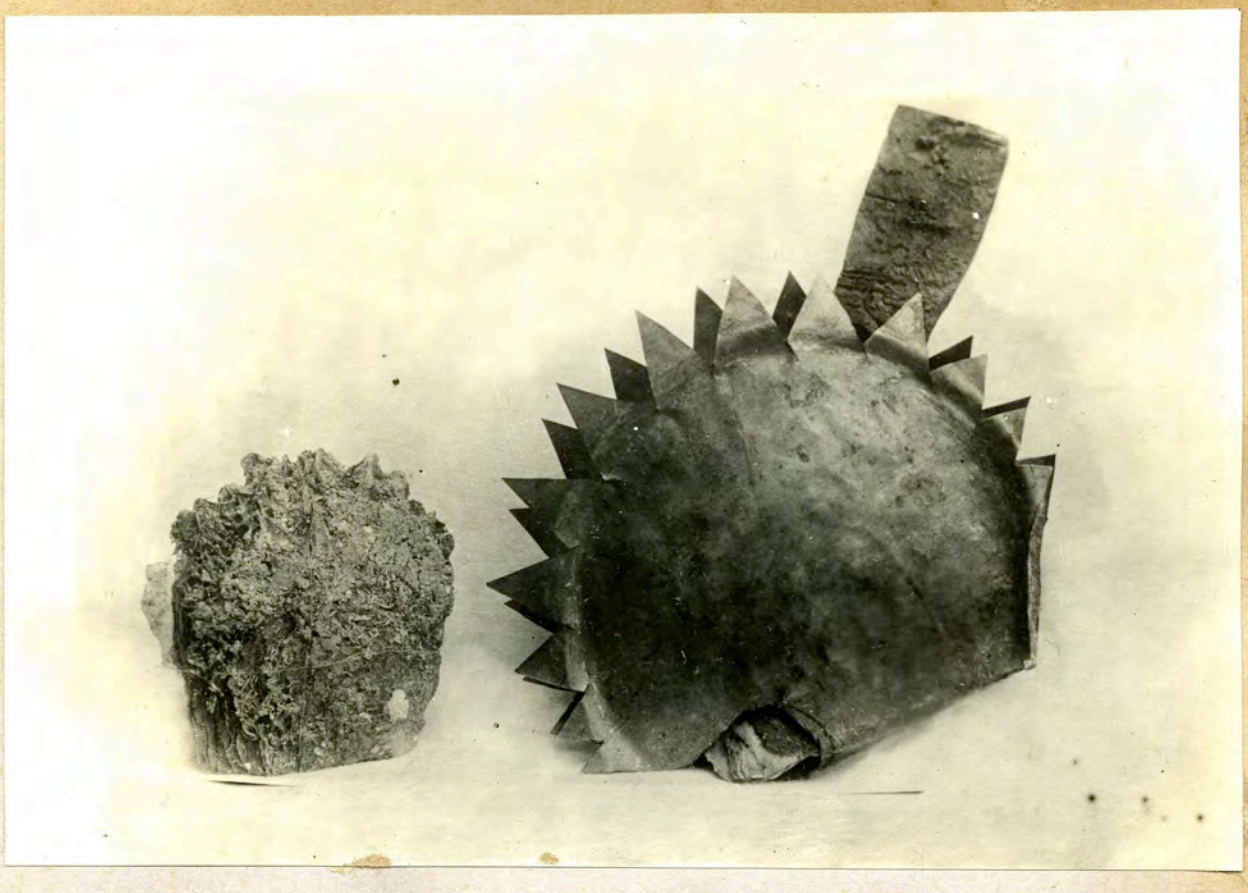
A group of depository canals with tatched roofs providing shade for the young oysters planted on the bottoms.



Crate in which the young pearl oysters can be transported long distances without danger of perishing.
---System Patented---



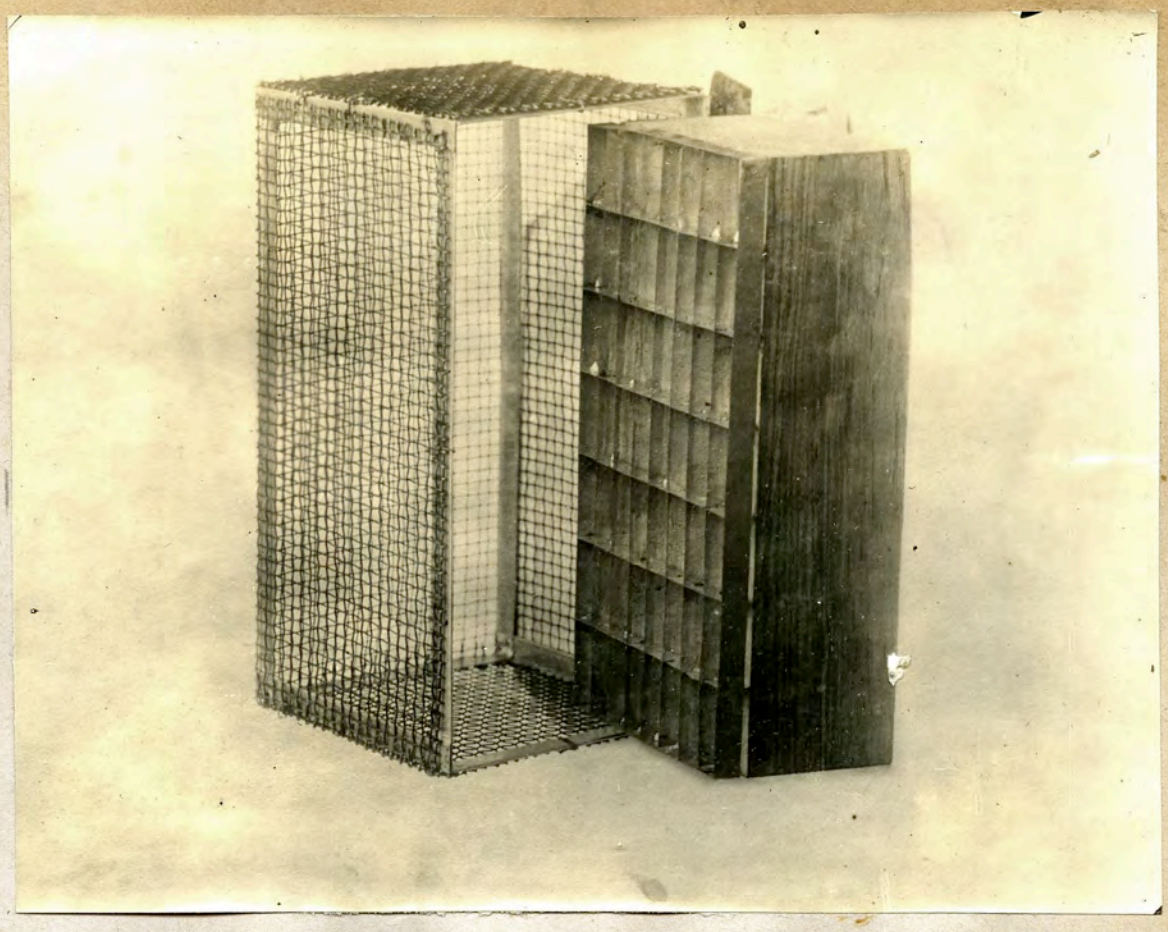
A section of a group of "depository canals".



Individual protective "cuirass", for the planting of young pearl oysters in the open sea. System patented.



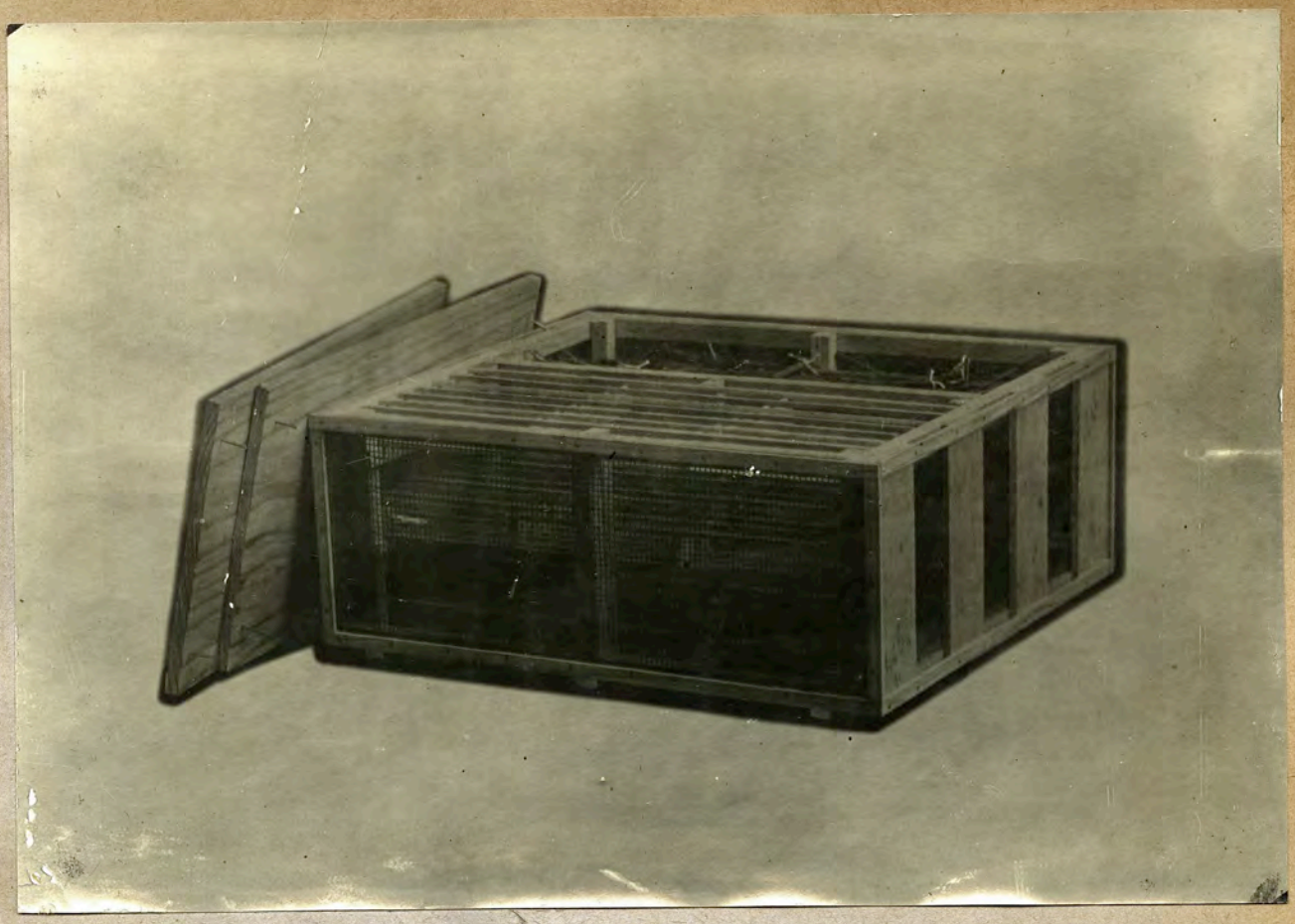
General view of the "depository canals" in which the young oysters are planted temporarily.



Apparatus for planting young pearl oysters on sandy or muddy bottoms, in the open sea. System Patented.



Intake of water from the open sea for a group of "depository canals" or hatcheries.



Modern Incubator - Patented.



San Gabriel Pearl Cultivation Station,
Island of Espiritu Santo.

ISLA
ESPIRITU SANTO
BAJA CALIFORNIA

COMPAÑIA CRIADORA DE CONCHA Y PERLA
DE LA BAJA CALIFORNIA S.A

Pozos construidos de conformidad con el artº 8º del Contrato de arrendamiento de la Isla de Espiritu Santo, publicado en el Diario Oficial en 5 de Diciembre de 1904.

Caminos que conducen de los pozos á la orilla del mar.

J. Arce
Representante Apoderado



SECRETARIA DE FOMENTO, COLONIZACION E INDUSTRIA
ENE 7 1910
MEXICO

Dirección de Terrenos y Colonización
de 1909.
COMPAÑIA
DIRECTOR INTERINO

La Paz, 13 de Diciembre de 1909.

Gastón J. Vives.

ESCALA 1: 40000