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IRON AND STEEL INDUSTRY FOR GREATER VANCOUVER

35.74.

Vancouber Magnetite (Fe₃0₄) **Iron and Steel Smelting Company, Limited**

Sent 15 Tons

to Freenader,

First Pig Iron Made In B.C.

The above high-grade No. grey pig-iron, entirely free from all supplur by analysis and produced solely from pure Texada Island, B.C., magnetite iron ores, was smelled by the above company in September, 1919, at the B. C. Electric Railway Company's Burnaby power house, being first fused in an electric furnace and then reduced by the duplex process.

This up-to-date furnace practice conforms with the very intered advancements in any skliled from and steel metallingy, thereby making absolutely obsolete for this province all ideas of treatment in antiquated blast furnaces, which necessitates additions of inferior soft ores, high in phosphorus. The fact that splendlid magnetite iron ores in abundance occur along the actual second of the islands and mainland, obviating the high cost of transportation of any ores from the interior plateau of this province, greatly cheapens all production of pig-iron locally, enabling this product to more than compete, both in quality and low costs, with any other of the world's iron centres.

Vancouver Magnetite (Fe3O4) Iron and Steel Smelting Company, Limited

Hend Office: Vancouver, British Columbia, Canada

Anthorized Capital \$100,000,00

Divided into 100,000 shares of one dollar (\$1,00) each. Of these, to September 18th instant, 78,300 shares have been already subscribed for and allotted, being paid for in full. It is now proposed by the company to increase this capital to \$200,000,00, to be used for completion of the smelting plant and accessories.

DIRECTORS

President

DR. T. S. HALL, M.D., New Westminster, R.C.

Directors

COLONFI, F. C. MCTAVISH, M.D., Vancouver, R.C. ARCH. L. TEFTZEL, of MacPherson & Teetzel, Wholesale Hardware, Vanconver, R. C.

ARCH. EDWARD WRIGHT, Civil Engineer, Trail, B. C. J. R. HML, of Hall Machine Works, Vancouver, R.C.

CAPTAIN ROBERT RAILEY, of Towing Company, Vancouver, B.C. Managing Director

PERCY 11. FRASER, Manufacturer, Vancouver, B.C. Advisory Electrical Engineer

L. B. Pictreor, of Philpot-MacDonald Co., Limited, Electrical Engineers, Vaccouver, It. C., late of the Western Power Co. of Canada

Advisory Mining and Metallurgical Engineer RONALD C. CAMPRELA-JOHNSTON, VANCOUVER, B.C.

Chemist

PERCY W. THOMAS, Analytical Chemist, Vancouver, R.C. Solicitor

D. L. BANCROFT, Dawson Building, Vancouver, B. C. Anditor

JOHN J. COWDEROY, 1173 thowe Street, Vancouver, B.C.

Bankers THE STANDARD RANK OF CANADA

Secretory

Registered Office 210 Dawson Building, Vancouver, B.C. Telephone Seymour 2300

OBJECTS

First-To manufacture pig-fron to build up British Columbia.

Second—To produce high-grade No. 1 grey pig-iron, which when offered to the trade will pernoit every kind of mnnufacture of steel.

Third-That it will be nn employment to thous. As of men and women.

Fourth-That will make Vnncouver the iron centre on the Pacific Coast.

Fifth—That will help keep in Cannda a part of the \$178,340,779 imports of iron and steel goods from foreign countries per annun.

9

Vancouver Magnetite (Fe₃O₄) Iron and Steel Smelting Company, Limited

Headquarters: Vaucouver, Britlsh Columbia, Canada

RON and steel, their smelting and manufacture. will force British Columbia, having the "Port of Predestination" to the whole Pacific Ocean, into the zcnith of all great commercial prosperity and trade by sea and land. This queen of ports already reaches out for those great marts, culminating through Asla and the other continents, impinging along the boundless seaboard of that far-flung Pacific Ocean. This achievement in metallurgy makes this most western province of the Dominion of Canada the future prime producer of commercial grey pigiron of the highest quality for every manufacture from steri, to be used both in home consumption as well as for export to all other countries.

THE FIRST PIG-IRON TO BE SMELTED IN BEITISH COLUMBIA

 \sim

Cherry

26

The following are some of the general details concerning the local pig-iron in histry. As It is cf vital impo taice for the welfare of this whole western province of British Commbia, and equally as much for the Dominion of Canada as a whole, to be intimately conversant with the following correct facts concerning the splendhl quality of the high-class grey pig-iron, the first ever smelted within its boundaries from solely local magnetite Iron ores alone, fluxed with its own limestone and melted with local charcoal in an electrical furnace, to begin by upsetting the chemical stability and extremely igh meltingroint temperature necessary for magnetite, namely, 2.780 degrees Fahrenheit, then a further and final slower reduction into actual pig-iron at a much lower temperature than in the first chemical reaction, at about 2,200 degrees Fahrenheit, in the Duplex process, the following thorough analysis of this brand of British Columbia pig-iron, carried out by Mr. F. W. Thomas, analytical chemist, of Vanconver, is now given, together with other authentic analyses, for careful comparison with the best brands of Nos. 1 and 2 grey pig-irons:

COMPARISON OF COMMERCIAL GREY PIG-IRON

		Brn	180
	B. C. Per Cent.	No. 1 Per Cent.	No. 2 Per Cent.
Shica	3.43	2.00	1.76
Craphite carbon	0.73	3.04	2.58
Combined carbon	1.07	0.70	1.18
Phoenborus	0.48	0.04	0.04
Sulphur	Absent	0.01	0.01
Metallic iron	94.13	93,80	94.30
Total determined	99.84	99,59	99,87

BIJITISH COLUMBIAN IRON ORES.

The quality of the magnetice from which the above local pig-bron was produced, by an dysis by the provincial government, gives as under:

Metallie	iron		•	•	÷	•	•	·	٠		12.57	10	69,8 ×	Der	cent,
Sulphur			٠	٠	٠	•	٠	٠	٠	•	0, 105	10	0,60	Let.	court.
Phosphor	118 .										0.051	40	trace	bei,	eent.
Insoluble	н.,	,					•				- 16. B I	to	2.75	per	cent.
Thanhun	mnd	L	0	t]	14	۱Ľ		d	Ð	h	eterio	118	Imput	ities	s al sent.

The above samples roughly represent generally the other nugnetite deposits of this province, lying in abundance along the sinuous coast line of her fjords and many inlets, and so affording the easiest of access for assembly from the mines to any given central smelting alte.

The prolonged mooted question of securing an adequate supply of hematic, limonite, bog, wal, or other inferior peroxide iron ores, to mix with the superior magnetites in order to reduce the mean average of the otherwise high melting-point temperature of the whole charge in the furnace, has now been absolutely eliminated, since these additional inferior peroxide iron ores are unnecessary in the Duplex process, as well as being not so low in presphorus contents as are the purer magnetites of his her france in the furnace charge link depreciated the splendld high quality of the local pig-iron, produced from magnetite iron ore alone.

By using elect 'cal smelting, instead of an expensive installation of blast furnaces with their accessories of not stoves to heat the blast, blowers and other necessary parts, the magnetites have been more quickly reduced into superior pig-iron with the simple addition of limestone flux and charcoal fuel, while by this process the sulphur present in the ores has been completely volatilized during the first fusing.

Today, throughout Europe and on this North American continent, the costly erections of the now ont-of-date blast furnace process are rapidly being superseded by electrical smelting, while the costs of this latter system are decreasing total expenses incurred by at least five dollars (\$5.00) per ten of pig-fron produced.

THE HISTORY OF THE COMPANY

In March, 1917, the Vancouver Magnetite (FeaO α) Iron & Steel Smelting Company, Limited, started experimenting on the hon ores of British Columbia at Ronaldsay, Howe Sound, with a firm belief that the Iron ores of this province could be smelted with a suitable process and made into high-grade pig-Iron. The company took over by lease, wit', option of purchasing, an old plant at Ronaldsay and started with the construction of, and operating with, a "Swansea" furnace, opening up an iron mine in the Lillocet district. The company was the first to ship 100 tons of iron ores over the Pacific Great Eastern Railway, then by barge to the plant at Ronaldsay.

WORKS AND SITE

The site on which the Ronallsny works are situated was most carefully chosen on account of its many advantages. It carries at present an area of one mile square, comprising 640 acres, with one mile of waterfront, facing a fine deep-water bay, well protected at all tides from all winds.

Timber and water are abundant for domestic uses and general utility. This site was held by lease up till 1919, with option to purchase at a remarkably low price, considering its many advantages and water power included. A large three-storey rock plant is latil, having bins constructed to store a thousand tons of ore, with large Samson rock crusher (26-inch jaw) and a smaller Samson rock crusher (26-inch jaw). In connection also are elevating belts, trommels, heisting machinery, fire protection system, and all the requisites, with the 5½-foot Pelton wheel timentioned above) for power to run a complete plant, with wharf, blacksmith shop, offices, mess, bunkhouses (50 feet long), stable, storehouses and suillelent buildings tor present use.

The furnace is built of common brick, lined with Clayburn fice brick, 12 is a good though small furnace of the Swansea type, constructed with a main smelting shaft, connected by an archway through the front wall with a fore-hearth. It carries a temporary iron stack, 36 feet high by 21 inches dinneter to be rebuilt permanently, connecting with a main stack to serve all units. The inside measurements of the mulu smelting shaft are: Walls, 7 feet high: feed door, 35 by 18 inches, 48 inches above smelting floor, built in back wall: an arch connecting with fore-hearth through the front wall, 14 luches at butt, 22 inches it the spring, and 48 inches while, being 24 inches long through front wull of furnace shaft. Ontside measurements: Built on a foundation going down 7 feet deep into the ground, the outside walls stand 13 feet high; sides, 6 feet wide; front and back, 8 feet across. The fore-hearth: Extra construction on front of main shaft measures, outside, 36 inches; sides, 24 inches thick, like these of furnace; front wall, 18 inches thick for 8-foot wide front. On the Inside it is 18 Inches wide, stretching from side to side, holding in this measurement a well for the molten metal, 12 inches wide and 12 inches deep and 48 Inches long, containing four cubic feet in capacity. The whole furnace on the outside is well braced by rallway iron and buckstays. There are many other technical details that could be mentioned, but all minutely described in my former detailed report. That description includes account of oil burners, apparatus and accessories, blast blowers, steam boiler, pipes and appliances, and all the items of a complete smelting plant.

Its duty during every twenty-four hours consists of the smelting of one hundred and twenty (120) long tons of total charge (when the alterations mentioned in my former report are completed), and carries 50 tons of iron ores, averaging 50 per cent, metallic iron and better, producing therefore twentyfive (25) tons of pig-iron per diem.—Ronald Campbell Campbell-Johnston, mining and metallurgical engineer.



B. C. IRON ORE EXPERIMENTS TO 3TART—TEN THOUSAND TONS WILL BE TAKEN FOR FURNACES HERE

Hon, Wm, Slaan, on the Floor of the Honse, Asking the Legislature for Anthority to Secure Ore

Ample Supply Believed to be Available for Productio. of Pig-brou

One Plant Located on False Creek, the Other In 19 7 Sound

(Province, March 14th)

As another step in the direction of encouraging the development of the magnetite iron deposits of British Columbia and the establishment of an iron and steel industry—those preceding having been the offer of a bounty or a pig-iron produced in the province, and the obtaining of a report from Dr. Alfred Stansfield, professor of metailurgy, McGill University, on the commercial feasibility of treating the iron ores of the province by means of electro-smelting—lion. Mr. Sloan, Minister of Mines, is today asking the British Columbia Legislature for authority to take from any of the iron properties of the proving a quantity of ore, not to exceed 10,000 tons aggregate, for experimental uses. There are at present two small for accessituated near Varicouver and owned

two small Diraces situated near Vicientiver and owner by two distinct and enterprising companies, which are prepared to take advantage of the terms of this legisintion. Brief reference to the proposal has already been made in The Province. The cost to the government will be \$50,000, it is stated.

Large Scale Expectations

From this it will be seen that both these comparine confident, or at least very optimistic, in regard to the practicability of treating the iron orces - British t'olumbia and producing merchantable pig-iron at a cost that will permit the meeting of local and perhaps outside burket requirements. They claim bey have the plants necessary for satisfactory experiment, and it is Mr. Sionn's intention to do what can be done to assist them in making the attempt.

If they are successful he thinks it not too extravagant to hope that from their stoud beginnings will spring industries which will exploit the iron onresources of the province on a larger scale and eventually lead to the establishment in the Canadian Northwest of the network of allied industries which follow the production of iron unit steel on a large scale. And Mr. Sioan makes it clear is a ony other companies prepared to undertake still experiments in British Columbia also will be accorded every possible consideration.

In support of the efforts he is making to assist and encourage those who are disposed to enter into the utilization and the development of the iron ore deposits of the province. Mr. Sloan points to the history of the industry in Nova Scotia. From a little forge shop with a capital of \$1,000 and ten employees it had developed into a great Chnadian industry, and one of the most notable industrial enterprises on the American continent. In view of this experience he thought that he was justified before the members of the legislature, and would be backed up by the country generally, in extending all assistance possible to companies which were prepared, no mutter on how small a scale at the start, to demonstrate the practicability of producing high-grade pig-iron from the raw material now lying undeveloped in large quantitles in British t'olumbia.

EXTRACTS FROM BULLETIN No. 2, 1919, BRITISH COLUMBIA DEPARTMENT OF MINES

As mentioned above, the development of electric reducing has been most murked during the last few years in Sweden. At present some fourteen high farnaces are in operation, and the total output represents about 140,000 tons of pig-iron per annum. This pig is of the highest quality that can be made, and it commands, therefore, high prices. It is mostly used in Sweden for producing high-grade steel, but a certain amount is also sold to the Sheffield market. There are, further, many more installations contemplated, and it is safe to say that wherever there is cheap water power the OLD BLAST FURNACE will be replaced by electric producers. I have thought for a long time that greater economy could be obtained by separating the two stages of the smelting process and carrying them out in separate furnaces .- Alfred Stansfield, D.Sc., A.R.S.M., F.R.S.C., Professor of

Metallurgy, McGill University, in his report to the Hon, Wm. Sloan, Minister of Mines, British Columbia.

Electric vs. Open Hearth Steel

It is a proved fact that properly made electric steel is far superior to open hearth steel, and that the best makes equal and in certain cases excel crucible steel. Electric tool steels have made their mark and are here to stay. High-sueel steels, allow tool and plain carbon tool steels are heing made which compare well with the best cruchlle grades. Electric alloy die blocks are glving exceptional service and promise to put the cheaper grades off the market. Some automobile manufacturers and makers of automobile parts are specifying electric steel for drive shafts, gears, and in a few cases for dron forgings. This last field is still in its infancy, but there the need for high-grade steel is very urgent. A large number of failures in drop forglngs are due to dirty steel and segregations found in the open-hearth forging steels, -Chemical and Metaliurgical Engineering.

Economics of Electric Iron and Steel Production in Scandinavia

By Joseph W. Richards

During a tour of Scandinavia this summer 1 was particularly interested in inspecting electric pig-Iron furnaces, In which 1 have been interested for a great many years, and had the opportunity to see eleven out of the twelve furnaces which are in operation. The first plant visited was at Trollhattan, where the original Jernkontoret furnace of 1912 is still in operation. Mr. E. Nystrom is in charge of the plant. A second has been built alongside of it. Both are being run very steadily and uniformity on a medium-grade iron ore, making a pig-iron which is going into commercial use, using only charcoal as a fuel.

This may be said about the use of the electric furnace as compared with the blast furnace in Sweden: At the present time charcoal is cheaper than coke, and therefore it is cheaper to run with charcoal; the electric plg-iron furnace thus has the advantage of working at its best, under conditions where the blast furnace can hardly compete with it. Pig-iron produced by those furnaces is costing in Sweden about \$5 per ton less than their own blast furnace plg-iron.

l hardly think that any more blast furnaces will be built in Sweden. Possibly a few may be in certain localities, but wherever water power is available for producing electricity, certainly the electric pig-iron furnace can operate more cheaply in Sweden than the blast furnace can.

The next plant visited was at Domnarivet. They have four furnaces, three of which were in operation. The fourth was idle on account of shortage of water power, it being the dry season. These furnaces show very plainly the successive development of the electric furnace.—Chemical and Metallurgical Engineering.

MARKETS

(From Seattle Post-Intelligencer, May 4, 1919)

There is at present a market on the Pacific Coast, including South and Central America, for more than 2,000,000 tons of pig-iron and finished products, of which 600,000 tons of steel, merchants' bars, small angles, concrete reinforcing bars and plates are used on the Pacific slope of the United States. Col.

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David Carnegle said in his address to the Canadian Manufacturers' Association in Toronto, January 28, 1918:

"Canada has increased her steel production from one million tons before the war to 2,500,000 tons. The l'nited States steel production has increased from 32,000,000 to 50,000,000 tons, and Britain's from 7,500,000 tons to 12,000,000 tons."

IRON AND STEEL INDUSTRY FIRST NECESSITY

By Ronald Campbell Campbell-Johnston

"The necessity has imperatively arrived to immediately develop a provincial iron and steel industry within our gates. This has matured more suddenly than otherwise because the l'nited States has, from now on, placed an emhargo on its own exports of every kind of pig-iron or steel billets, including their linished products, except permitting the completion of those lew contracts already entered into for ship plates and some sundrics promised formerly. No other country is able during the war, and for many years after its final collapse, to supply Canada with pig-fron or steel ingots, especially also the heavy manufactured resultants, but rather others are earnestly looking to Canada to supply their urgent needs from her abundant storehouses with unlimited amounts, both of ingots of steel and the finished goods."

MARKET

Immediate local demand, 50 tons per diem.

Future demand for renewals for three transcontinental railways, mining, logging, shipping and railway machinery.

GOVERNMENT ENGINEER

Letter from Wm. M. Brewer, resident engineer:

"I have been authorized by the Honorable the Minister of Mines to carry out the provisions of the act entitled "The Iron Ore Supply Act,' and shall be obliged if you will kindly inform me how soon you will he ready to receive shipments of magnetite, in what quantities, and what facilities, if any, you have for unloading from scow or steamer."

From a letter received from C. Price Green, Commissioner Canadian National Railways, April 25, 1919:

"We are anxious to have any information on this subject that you feel you are at liberty to communicate. I have given considerable thought to the question of the iron and steel industry at the coast, although the Information we have is somewhat uchulous, and perhaps it is only by the establishment of industries such as you propose that this can be brought about.

"I do not know whether you have seen a speech of the Hon. L. C. M. S. Amery, under-secretary of state for the colonies, in which he said: 'Nova Scotia, jutting out into the Atlantic, and British Columbla. overhanging the Pacific, form an incomparable foci for the world's industry and commerce, from the viewpoint of future economic strategy. Canadians have at their hack the raw materials and the market of half a continent, and in front their own empire, whence to draw tropical raw materials and find an outlet for their surplus manufactures." From C. Price Green, Counsissioner, May 12, 1919:

"I shall he glad to hear from you further, as I feel very interested in this development, which I believe to be one of the most important moves in British Columbia, and the forerunner of big things."

Hon. J. A. Calder, Minister of Immigraticn, in his address to the Canadian Club, said:

"You have enormous resources in British Columbia but you lack something. There has been something wrong for twenty-five years. 1 don't know where the trouble lies, but when you come to consider the resources you have and the fact that you have only a population of 350,000 to 400,000, there is something radically wrong, and unless business men and thinking men waken up and take this problem up, goodness knows where you are going to end."

IRON BROUGHT MANY MILLIONS

By M. J. Carrigan, of Seattle Chamber of Commerce, in his speech delivered at the Vancouver Mining Convention:

"Shipbullding has brought in the past two years \$250,000,000 to the Pacific Coast; a perfect torrent of gold has been thrown at us. Is it to be sidetracked?

"Now, Hon. Mr. Sloan, your Minister of Mines, states that there is sufficient iron ore right in this province to warrant the construction of a large furnace. Gentlemen, If this convention hit a high spot it was yesterday morning when Mr. Sloan made that admission.

"I know we have the iron ore in this province. I was secretary-treasurer of a company which spent \$80,000 in real money in British Columbia prospecting for iron.

FINEST PIG-IRON IN THE WORLD

"There are ore bodies in this province running so high that the average blast furnace man will not believe they exist. The frondale furnace produced the finest pig-iron in all the world, except that from one small Swedish furnace, and that was just as good, and that pig-iron was made from your ore.

"The hope of the iron and steel industry and the shipbuilding industry lles In British Columbia.

The finest pig-iron in the world, made by the Vancouver Magnetite Iron & Steel Smelting Company Limited, July 19, 1919, at their experimental plant, Burnaby, B.C., hlgh grade No. 1, was made from the magnetic iron ores of British Columbia, and can be seen in the company's offices at 210-411 Carter Cotton Building.

The iron ore is first run through electrical furnaces at a temperature above 2,780 degrees Fahrenheit, upsetting the magnetite protoxide and reducing it to sponge iron; then It is run into the reducing baths and slowly reduced to the finest No. 1 pig-iron, which will compete against any iron in the world.

As soon as our smelters are in operation and the manufacturers can obtain plg-iron at reasonable price, the same as the iron men in the east, then Vancouver will start to be a manufacturing centre, but not until then.

It is the intention of the company to commence erecting its first unit as soon as possible, turning out pig-iron on a commercial basis.

E. H. GARY, BEFORE THE SENATE COMMITTEE AT WASHINGTON

Mr. Gary states that the net profits of the United States Steel Corporation in recent years are as follows:

	9	l	4		•												\$ 58,267,925
I	9	l	5		•	•	•	•	•								107,832,016
)	l	6	•	•	•	•	•	•				•				302,149,767
)	l	ĩ		•	•	•	•		•							253,608,200
)	l	8		•	•	•	•	•	•		•					167,562,280

These figures speak for themselves. Iron and steel have made more money for the investor than any other investment. Co-operation will make Vancouver another Pittsburg.

COMPANY'S SITE

The company at the present time is negotlating with several firms for a site near Vancouver. As soon as these preliminary details are completed they will commence the construction of their first unit, to turn out pig-iron commercially for the market.

SOUTHERN CALIFORNIA IRON & STEEL CO.

OPEN HEARTH STEEL FURNACES, STEEL ROLLING MILLS HOLT. NUT AND RIVET WORKS

Office and Works: (th and Mateo Streets

A. C. Denman, Jr., Pres. and Gen, Mgr.; E. G. Pratt, Vice-Pres.; S. K. Rindge, Freasurer: A. W. Grier, Secretary; Geo, B. Stephens, Snperintendent; G. H. Pettengill, Asst. Supt. and Pur. Agent. Los Angeles, Cal., September 6, 1919, Vanconver Magnetite from & Sleet Smelting Co.,

Vanconver, B. C.

Gentlemen: Last June in one of the Seattle papers we noticed an article stating the fact that you were experimenting wilb the reduction of from ore by the use of what is known as the "Fleet" furnace, and that the Government of Brilish Columbia is watching the test and had contributed a certain amount of money for such a purpose.

Being somewhat interested in the reduction of Iron ore on the coast, would appreciate a line from you stating whether or not your experiment has proven satisfactory, and if there is any information that you think would be of interest and you would care to divulge to us in this connection, would be very glad to have same.

Hoping to hear from you in the near future in regard to this, we are,

Yours truly,

SOUTHERN CALIFORNIA IRON & STEEL CO.,

By A. C. Denman, Jr.,

President and Gen. Manager.

VALENTIN ELCORO

FARRICEANTES OF TODA CLASE OF CARROS

ARMADIRAS METALICAS BESTRERIA LAMINACION TORNILLERIA Y FUNDICION

Mexico, 29 de Noviembr de 1919.

Vancouver Magnetite Iron & Steel Smelting Co. Ltd., 815 Rogers Building.

Vancouver, B.C., Canada,

ACD B.

Dear Sirs: We wrote you last on the 25th Oct ber, and up to this date we have no news from you. We suppose our letter went astray.

In view of the encouraging news you communicated to us in your favor of the 14th last, we want to trouble you with some more data about the Fleet process. As previously stated, our

more data about the Fleet process. As previously staled, our iron ore contains 4 per cent, sulphur and we want to know whether with this ore we can produce sleet ingots of a good quality, the amount of electric current necessary per ton, char-coal, and price of a furnace to produce ten tons of ingots per day. If you control the Fleet process and it is convenient for the treatment of metals we could combine to exploit it advantageously in this country. We would suggest the installation of a small demonstration plant in this city as a practical way to develop the business. We have the proper place for it and we would take a share of the expenses if your proposition would be convenient for us. As to our standing, we can give you the best of references. best of references.

Hoping to hear from yon, we remain,

Very truly yours, (Signed) HYES DE VALENTIOR ELUBY,





