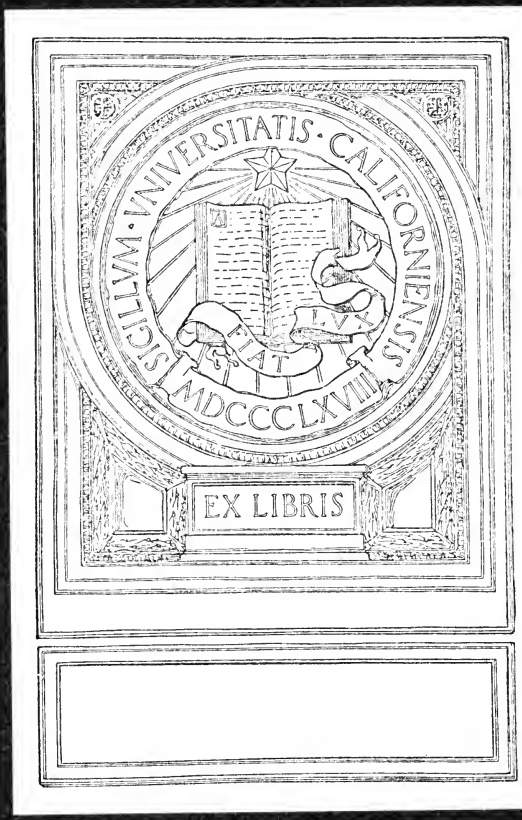
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REPORT

—OF—

COL. JAMES L. TAIT,

COMMISSIONER OF INDUSTRIAL RESOURCES,

OF THE

STATE OF ALABAMA,

TO THE GOVERNOR.

MONTGOMERY, ALA.:
W. W. SCREWS, STATE PRINTER.
1871.

REPORT.

MONTGOMERY, ALA., Dec. 21st, 1870.

To His Excellency,

ROBERT B. LINDSAY,

Governor of Alabama:

Having received the appointment of Commissioner of Industrial Resources, vacant on the resignation of Mr. Keffer, in April last, I have the honor to report for the information of the General Assembly the various duties in which I have been engaged in furtherance of the objects aimed at in the establishment of this department.

Deeming it a matter of great importance in view of the speedy completion of Railroad enterprises, especially in the mineral region of the State, that a collection of minerals illustrative of our mineral resources should be made, I directed my attention thereto, and now have at my office for public inspection and information, a large collection of such minerals collected by myself and at my own expense, there being no fund appropriated for that purpose by the Legislature. I have directed the attention of the public to these working fields of investment and development frequently during my incumbancy of this office, in the public newspapers, and have through the same medium invoked correspondence and specimens from every mineral locality. As an evidence of the interest that has been manifested by the people of the State in this matter, I have had more than one hundred communications relative thereto, and invitations to visit numerous localities for the purpose of examining mineral deposits, most of which I have been obliged to forego, as I had no means at my dis-

posal to pay the expenses of such visits. I have sent numerous copies of reports made by myself, on the coal and iron deposits of the Warrior and Cahaba Coal Fields and Red Mountain, to various sections of the United States and to Europe, and I have reason to know that these reports have been the means of directing considerable attention to the Mineral Resources of Alabama; and will yet, I am persuaded, yield important results.

As a practical Chemist, I have established a Chemical Laboratory at my office in the Capitol, to which I have invited the people of the State to send specimens of minerals and soils for analysis, free of expense, and I am happy to say that numbers have availed themselves of my knowledge and labor in this regard.

I have also in the interests of Agriculture examined the Marl of Alabama, in various localities, ascertained its properties, and recommended its liberal use on the poor and worn out lands in the State.

I have also deemed it my duty to make extended enquiries in regard to the practicability of immigration into the State, and the information I have obtained, and the conclusions at which I have arrived, relative thereto, will be found under the appropriate head in this report.

I now beg to discuss the subjects at some length in the following detailed examination to which I invite the attention of the General Assembly:

THE MINEEALS OF ALABAMA.

Copper occurs in several of its ores, as copper pyrites, peacock or variegated copper, and black oxide of copper. It has also been found in small quantities in one or two localities as native copper. The counties of Talladega, Baker, Coosa, and Tallapoosa, seem to have this mineral in notable quantities, but as no mining to any extent has been carried on, and as copper rarely shows to advantage at or near the surface, there is little data to guide us as to the probable yield of these deposits,—judging, them, however, by the experience at Ducktown in East Tennessee, which is a part of the same mineral range, I have no doubt

whatever, but that valuable discoveries will reward the mining engineer, who makes this valuable mineral in Alabama a speciality.

An English company has invested at Ducktown 500,000 dollars, and although mining at considerable disadvantage, and having the serious drawback of being forty miles from the railroad, they are producing annually two millions pounds of refined copper, are deriving a good profit therefrom, and are giving employment and support to upwards of 500 people.

Lead is also found in several localities in the State, in the form of galena or sulphide of lead, and as a carbonate. No attempt up to the present time, so far as I am aware, has been made to mine it systematically, and no development of any considerable value consequently, has been arrived at, but the fact that it exists at the surface, and that baryta and fluor spar, especially the former, is found in considerable veins in many places, would indicate that there is abundance of that valuable material in our limestone districts. Several exceedingly pure specimens of galena have been examined by me, and one probably weighing 20 pounds was shown me in the neighborhood of Elyton, and as the formation in that section would indicate a lead district, I have great hopes that a good search in that locality will reward the seeker.

Plumbago or black lead, in an impure form, is found in many districts, but the most promising I have yet seen is on the lands of Col. George, lying on the east side of the Coosa river, in Coosa county. That gentleman has taken the trouble to separate the plumbago from some of the crude material taken out of the vein, and I have now here before me a small quantity that may be examined by any one desirous of doing so. This valuable material is now so much in demand, for a variety of useful and scientific purposes, that any considerable quantity of it pure, would prove to be literally a mine of wealth to the possessor. I have up to the present time, however, seen none such in Alabama, but I have strong hopes, that by following downwards the veins to some depth where the indications are

stronger, the pure mineral may be developed. If this should be the case in the future, the discovery will be hailed by every civilized country as a valuable contribution to science and art. I wish in this connection to say that a highly carboniferous shale, is found in certain districts, which has been mistaken for plumbago. It will when first taken out of the ground, and still comparatively soft, make a mark similar to black lead, but as its general properties are quite unlike that mineral, and as its value is comparatively trifling, I wish here to caution those who may be deceived thereby.

GOLD.

Of the precious metals, gold has been found in numerous places, and in some cases, in workable and paying quantities in the State. It is generally obtained disseminated in quartz, and in some cases, in the sand beds of streams, arising from the disintegration of the original rock in which it was held. No large deposits have yet been discovered, such as has been common in California and other territory of the west; nor does there appear at present any indications of unusual richness in any of the existing localities. Gold is much more disseminated over the face of the Globe than most persons are aware of, but its great value is derived from the fact, that it is usually found in such small quantities, and associated with and embedded in such hard matrix, that under ordinary circumstances, the cost of mining and washing it out, is nearly equal to the value of the mineral when obtained, leaving little profit to the minor. I am not prepared therefore to recommend the working of these deposits, unless where special circumstances warrant it.

SILVER.

While on the question of the precious metals, I may take notice of silver, but I merely do so to say that notwithstanding the numerous rumors of silver having been found in certain portions of the State, I have never obtained a single sample of any of its numerous ores as

found in nature, although I have done my utmost to try and trace to their source many of these rumored indications. The Indians are said to have had silver in their possession and to have known its value in the State, but the fact that there is no well authenticated case of discovery since, although diligent search has been made by many, is an evidence to my mind that either it was obtained elsewhere, by these nomadic tribes, or that some other mineral, such as zinc, may have been mistaken by them for the more precious metal, especially in the newly melted state. I do not mean to say that silver may not be found, I merely state the facts in relation to this matter as at present existing.

There are various other minerals, such as zinc, manganse ore, iron pyrites, and others that my time will not permit me more particularly to discuss, which have been also found in a greater or less quantity, but as I propose at some length to take notice of our great deposit of marble, marl, iron, and coal, which have a high economic value, and are so largely abundant in our midst, I must defer to some future time lesser mineral deposits, which are not so available at present. As the business of lime manufacture is a valuable industry of the State, it is I think unnecessary for me to give it more than a passing notice. We have such an abundance of the material that the whole Southern States could be easily supplied with it, and I have reason to believe that in several localities, it has become a large and remunerative branch of business.

MARBLE.

The marble deposits of Alabama are so numerous and so well defined, and their value so well understood, that more than a passing glance at them in the present case would be superfluous. In examining many specimens that have been handed to me, I can, without hesitation, affirm that not even the far-famed Parian and Carrara marbles, can excel them, in the fineness of their crystaline structure, the beautiful polish of which they are susceptible, or the exceeding purity of their faultless color. In other

specimens, their variegated colors have been so exquisitely blended, by the master hand of nature, that no mere description can do them justice, and I trust at no distant day many stately structures of this handsome and durable material, may be found gracing and adorning our strikingly situated Capitol, adding another feature to its already acknowledged beauty and importance.

MARL.

The marl of Alabama has a basis of lime, and contains in notable quantities, carbonic acid, phosphoric acid and potash; properties of the highest fertilizing character on worn-out sandy lands; also on stiff clay soils it is especially valuable, because it yields the elements of which they are found to be deficient for the abundant production of crops; the lime also combining with the silicious or sandy soil, renders a portion of it soluble, and thus enables the tender roots of the plants, to take up the soluble material as nourishment. We have thus in this natural fertilizer, a large amount of the plant nutrition of guano, and this too in such great abundance, that no planter in Alabama, however limitted his means, but may have at a comparatively small cost any quantity desirable. In various sections of the United States, farmers are availing themselves largely of the advantages of this valuable material, and in every case where it has been liberally used, the most beneficial results have been obtained.

In the State of New Jersey, it has become not only an important branch of industry, with something like five to six millions of dollars invested in its prosecution, but it has transformed the worn-out and waste lands of that State into model farms of fertility and productiveness. Deeming it a matter of considerable importance for the agricultural interests of Alabama, that we should have some knowledge of its operation there, I visited the Agricultural College and State experimental farm of New Jersey, and from what I saw and heard, was convinced that wherever used, these marls had increased the productiveness of the lands in a two-fold degree. Dr. Cook, the

accomplished State Geologist, and who has also charge of the Agricultural College and model farm of the State, describes the importance of this marl in the following terms: "Much as this fertilizer has been used in the State, its real value is not yet fully appreciated. It needs a little time to get its full benefit, but when once fairly in action on a farm, its fertility is almost inexhaustible. It gives lasting fertility to the soil, while all other fertilizers are soon exhausted, and the soil worn out. I have yet to see the first field that has ever been well marled that is now poor. One instance I know, where poor sandy land was marled more than thirty years ago, and has ever since been cultivated without manure, and not otherwise well managed, and the land is still in very good condition." Now, what gives special value to the statements of this gentleman is, that he is no mere theorist, but a practical agriculturist, and has experimented himself with the fertilizer of which he speaks.

In corroboration of his statement in this regard, I have visited the model farm under his charge, and can bear testimony to the high state of culture and the great fertility which it exhibits. I may also state that some time since, when examining one of these deposits of marl in the neighborhood of Evergreen, I was struck with the fertility of a section of land near the deposit, and was informed by the proprietor that it was the result of marl applied fifteen years ago, by his father, as an experiment, and not since renewed. In New Jersey, this marl has been applied so liberally that all the worn out lands of the State have been entirely recuperated, and there are probably no lands in the United States more productive or profitable. On an examination of the marl there and here, I am of the decided opinion that ours is the more valuable of the two, and I trust we shall soon have a recognition of the fact in its liberal use. When we consider that it takes the same labor and expense to cultivate a poor soil as a rich one, it is surely all-important that the land should be made as rich as it is capable of, and more especially when it can be done at a trifling cost. If the money now expended on

high priced guano, and other artificial fertilizers, was employed in developing this great natural fertilizer, of which probably millions of tons are scattered broad-cast over a considerable area of this country, there is no reason why we should not add at least one-third more to our agricultural products; and the necessity will still further appear, when we consider that acre for acre, Alabama shows the lowest rate of production in cotton but one of all the cotton-producing States. I hope some of our enterprising agricultural friends will make the experiment, and if they do so fairly, I have little doubt they will arrive at the same conclusions and reap the same benefits as the farmers of New Jersey. Regarding this valuable deposit as only very slightly, if at all, less valuable than the coal and iron deposits of the State, I am especially desirous of directing attention to its great importance.

THE COAL REGION OF THE STATE.

The area of the coal lands of the State is, in round numbers, 5,500 square miles, known, respectively, as the Warrior, the Cahaba, and the Coosa coal fields, of which the first alone contains 5,000, the remaining 500 being divided between the two latter. No language that I could employ, could possibly do justice to the immense value of this great natural deposit of mineral wealth, the surface of which, up to the present time, has not even in its length and breadth been surveyed, and yet which, by its position near the surface, its quality, and the facilities which now exist, and which are being yearly added to, in the shape of railroad communication, render these coal fields a most inviting field for investment, and will be the means, at no distant day, of inducing a continuous flow of labor and capital to this almost unpeopled section of the State. While the gold of California and Australia, the silver of Nevada and Colorado, and the diamonds of South Africa, may be more attractive to those who do not look beyond the surface of passing events, it is after all the black diamond, less attractive though it appears, that has proved itself to be the most valuable jewel in the diadem of civili-

zation, and has done more to promote the comfort, the enterprise and the wealth of nations, than all the precious metals and rarest gems in the history of the world have ever accomplished. Alabama I regard one of the richest States of the Union to-day, not because she has gold, or silver, or diamond deposits, however valuable these may be, but because she has in untold plenty that without which no nation can be great, viz., the twin powers of coal and iron, which are rapidly placing a belt of steam and a band of iron around the circumference of the globe, and that are as rapidly developing the commercial, manufacturing, agricultural and mechanical greatness of every civilized nation. If one pound of coal can raise, as it is clearly shown to do, steam power equal to the capacity of a man's daily labor, what must be the latent energy of the millions of tons of that mineral, which lies scattered within easy reach of the surface, over 5,500 square miles of this favored land. In this view of the case, the miner who excavates two tons of coal *per diem* increases the working capacity of the State enormously, when the product is applied to the generation of steam. If this is so, we have no numbers to compute, we have no capacity to grasp, the unlimited wealth and power that is slumbering in our midst, and that only requires in a moderate degree energy, capital and skill to develop. But let us go a step further, and see the commercial value of our coal area. In an examination of a portion of the Warrior coal fields, adjacent to two of our leading lines of railroad, I came to the conclusion, by actual observation, that five seams of coal were easily traceable at the surface, showing an aggregate thickness of nineteen feet four inches. Assuming this to be the limit of our coal strata, it would show an aggregate amount of nineteen millions of tons for every square mile; and if we further suppose that only one half of the area is productive, the sum total would figure up fifty-two billions two hundred and fifty millions as the product of our coal fields. If, further, we were to attain to a mining capacity equal to the State of Pennsylvania at the present time, it would take two thousand years to exhaust the

supply. But we are not for a moment to suppose that this estimate, enormous as it appears, tells the whole story. Let us look at the coal development in other States on this continent, and in Europe, where coal mining has advanced farther than we have any experience of here. The coal strata of Nova Scotia and New Brunswick shows an aggregate thickness of forty-five feet, as discovered up to the present time. Missouri shows upwards of fifty feet, Kentucky nearly sixty feet, and Pennsylvania, which has developed this great branch of industry more largely than any other State on the continent, has eighteen seams in working operation, showing an aggregate thickness of one hundred and twenty feet. The Pittsburg seam is known to extend over an area of one hundred and twenty-five miles long by one hundred miles broad. The Mammoth seam, in the same State, also occupies nearly as extended an area, and is thirty feet thick. In England and Wales more than fifty seams are at present known to exist; the thickest yet discovered is of an average thickness of thirty feet, and lies at a depth of two thousand feet. In France and Belgium, where coal mining has been also carried on to a considerable extent, and at considerable depths, extensive deposits exist, and in more than one case seams have been found to measure upwards of sixty feet. I might multiply cases indefinitely, but I think enough has been said to show that mere surface indications are nothing as compared with what we may in the light of experience expect, when deep boring has been tried here as there. It is by boring more or less deep that others have arrived in other fields at these enormous results, and it is therefore not too much to expect that the future will develop equally great results in Alabama coal fields, when the strata has been examined at lower depths than is at present practicable to us. All experience teaches us that there are no limits to coal seams but the limit of attainable depth. Coal can be found in coal areas as far down as mining operations have been, up to the present time, carried, viz., three thousand feet below the surface. In Alabama, however, the dip of the seams is in most cases

so gradual and unimportant, more particularly in the Warrior coal fields, that probably for a generation to come, mining will be carried on at inconsiderable depths, and consequently the expense in this direction will be reduced to a minimum. In considering the value of coal lands, let us suppose that an acre will yield one hundred tons per annum, and this is a very moderate computation; let us suppose further, that twenty-five cents per ton is charged as a royalty for proprietary interest; we have then twenty-five dollars per acre per annum, which at ten years purchase would show a value of two hundred and fifty dollars for every acre of coal land in the State. In Pennsylvania, where the value of these lands is better understood, four times that amount, I am quite satisfied, could not purchase them; and nowhere in Great Britain could ten times that amount buy a single acre. The fact is, that the mere surface or agricultural value of land bears no proportion to its mineral value, and the sooner we are alive to this fact, the sooner will the development of these mineral regions of ours be an assured fact.

As an illustration of the value of coal lands in Pennsylvania, I read recently a paragraph taken from a leading paper published in that State, in which was asserted, that Simon Cameron, the well known politician, purchased some twenty years ago 100 acres in which coal was subsequently discovered, and he has now for some years been deriving therefrom a revenue of 30,000 dollars per annum. I myself know an instance, where a mining company in South Wales, England, are paying a yearly rent of 85,000 dollars for the privilege of mining less than 200 acres of coal lands, and this, too, with the great disadvantage of mining, at from one to 2,000 feet below the surface. Coal mining, unlike agriculture, is not affected by the seasons, it is therefore more certain as an investment, and more reliable as a source of labor, and profit. It accumulates wealth more rapidly, gives more employment directly, and indirectly, than almost any other pursuit, and also adds greatly to the demand for agricultural products where carried on. If Pennsylvania is yielding 25 millions tons of

coal per annum, there is no reason why Alabama should not, with greater advantage, produce 10 millions; this would give at least employment to 100,000 men directly, and with their families support at least double that number; and if we add the 50,000 that would be required to support them with food and other necessaries, we should have at least a quarter of a million of people added to the population of the State, from this source alone. But this is not all; every one knows that a large and important industry permeates with its beneficial influence, every interest of the community. Our railroad system would be greatly benefitted; our commercial, manufacturing, and mechanical interests, would all feel the effects of such an impulse; and every profession and trade in our midst, would feel its benefits, either directly or indirectly. In making these statements, I am drawing no fancy picture; we have experience of older countries and States to verify, and more than verify every calculation I have made, and every view of the subject I have advanced. Would it therefore speak well for the intelligence, the enterprise, or the forethought of the people of the State, having such unlimited resources within their reach, to allow others to come in and grasp the prize which God and nature has endowed them with, as a heritage? But the question comes up, where are we to find markets for 10 million tons of coal per annum, even if we were in a position to supply it; and again, is there no danger that our supply would largely exceed the requirements of this section of the country. In this connection, let us examine the probable sources of demand, and first, we will take the probable railroad demand. An experienced railroad engineer of this State, says, in one of his reports: Coal as a fuel for railroad engines, is destined to save millions of dollars. It has been found by actual experiment, that the cost of running a locomotive with coal, is less than one-half the expense of running with wood as a fuel. Experiments have been made on the Illinois Central Railroad, and the New Jersey Central Road, and on other important lines, all over the Northern States, even where coal costs six dollars per ton, and upwards, and even then with wood,

estimated at two dollars per cord, the saving in expense is equal to one-half. From a calculation made by an experienced railroad Superintendent in the Northern States, he estimates that if all the railroads would use coal instead of wood, the saving would be ten million dollars per year, or one per cent. on the cost of railroads of the United States. The following report of the Baltimore and Ohio railroad, where the cost of fuel is about the same as is paid by railroads here, is, I think, conclusive on this point: The report says, "Much attention has been paid to the introduction of coal and coke, as fuel for the passenger engines, and especial attention is requested to the report of the maker of machinery on this important subject." The results have proved highly satisfactory; the engines operating very economically, and efficiently. Experiments with fuel, made with the same engines, running with mail and express trains hauling in each case, five cars, resulted as follows: With wood $7\frac{3}{4}$ cents per mile, with coke $5\frac{1}{2}$ cents per mile, with coal a fraction over $3\frac{1}{2}$ cents per mile. The cost of running an engine from Baltimore to Wheeling, 397 miles, tested respectively with coal, coke, and wood, resulted as follows: Wood cost $29 56, coke cost $21 22, coal cost $13 64, a saving as between coal and wood of nearly $15\frac{1}{2}$ per train, or 55 per cent., and this, too, with wood estimated two dollars per cord. The report then concludes: The great economy to be thus effected, must attract the attention of managers of railroads generally, and add largely to the consumption of bituminous coal; the very coal I wish it to be understood, that we have here. If we add to this exhibit the detention of trains in wooding, the loss of speed and power in slackening and gaining headway again, and and the expense of wood hands; this statement would show a still further advantage, on the side of coal. With these facts before us, can there be a doubt that every railroad in the whole Southern country, including the projected line of the Great Southern Pacific, will be customers to an enormous extent to the central coal fields of Alabama? But there is still another more important, and yearly increasing source of demand, which bids fair to tax all our

energies for its supply. I mean steam navigation, not only on our rivers, but for our extened sea coast. It is unnecessary for me here to state that steam is much more quickly raised by coal than wood and that equal bulks of coal and wood are in favor of the former fuel, as at least three to one for steam purpose. This question of bulk alone in steam navigation would settle the question irrespective of cost, because the wood space taken up in a steam-ship with fuel the less capacity remains for freight, but when to this is added upwards of fifty per cent. as a money value, it is not difficult to perceive the advantage of coal for river and coast navigation, over the more costly and bulky fuel. Now, let us see what the extent of this demand is, and what it may become? I need not remind you that sailing ships are fast disappearing from the ocean highways, before the swift and capacious steamship, as the old stage coach and canal boat, are disappearing before the swifter and surer railroad train. Ocean navigation by steam, has become a necessity of the times, and is an accomplished fact. It is equally necessary that these steamships should have deposits of coal at convenient points. A glance at the coast line of the United States, and also at the geological map of this continent, will show us, that the coal fields of Alabama, are nearest to all the South Atlantic ports of the United States, all the shores of the Gulf of Mexico, and West Indies, and the vast eastern coast of South America. Commodore Maury, no mean authority on this subject, thus speaks of the commercial mportance of the Gulf of Mexico, which, from its position in relation to us, ought to be beyond competition our market exclusively for coal. The river business he says, drained into the Gulf of Mexico and Carribean Sea, greatly exceed in extent of area, and capacity of production, the river basins of the Mediterranean. The countries in Asia, Africa, and Europe, which comprise the river basins of the Mediterranean, are in superficial extent, but little more than one-fourth the size of those, which are drained by this sea in our midst. The Gulf of Mexico is the Mediterranean of the New World, and nature has laid it out on

a scale for commerce, far more grand than its type of the old,—that is, about forty-four degrees of longitude in length, by an average of seven degrees of latitude in width. Ours is broader, but not so long; it is therefore more compact. Had it been left to man to plan the form of a basin for commerce on a large scale, a basin for the waters of our rivers, and the products of our lands, we could not have drawn one better adapted for it than that of the Gulf of Mexico, nor placed it in a position half so admirable. The Mississippi and the Amazon, are the two great commercial arteries of the continent; they are fed by tributaries with navigable length of channel, more than enough to encircle the Globe, and when we consider that this mighty commerce of which the talented Commodore so eloquently, truthfully, and graphically speaks, must be carried on by steam navigation, and that our coal supply is their nearest point; is it not a just conclusion, that the demand upon our coal fields must be constant and enormous from this source alone.

Again, in a military report to the government of the United States, by an officer of experience, we find the following statement pertinent to the same subject:

"Considering that war steamers would enter largely, if not exclusively, into our naval forces in the Gulf of Mexico, it is important that convenient depots of coal should be established there. Depots could be made at Bahia Honda, and at Key West. At Tortugas, a three years supply for thirty steamers should be constantly maintained; this alone would be, at a moderate estimate, nearly eight millions of tons for one depot. Tampa Bay would probably afford the requisite depth of water for heavy steamers, and convenient sites for the depot and its defense. Thus held, it would give also protection to vessels seeking refuge from an enemy. A coal deposit would also be established at Pensacola and Mobile Point, under the protection of Fort Morgan. Another depot of coal would afford great facilities to steam operations, if established at Ship Island. A depot at Fort Jackson would also be necessary to enable the steamers descending from Memphis, to take in a full

supply of coal before proceeding to sea." Here we have seven large depots of coal in the Gulf of Mexico, deemed necessary for war steamers alone, and one of these depots would require about eight million tons for a three years supply at a moderate computation. Five hundred commercial steamers would be none too many, for the extended line of sea-coast that Alabama should supply with coal, and at least five million tons would be required by this branch alone.

But there is still another great source of demand for the coal of Alabama, which, although important in itself, will develop a great additional industry in our midst, second to none in the benefit it will confer, or the wealth it will distribute. I allude to the manufacture of iron in the State. It is here, that in natural advantages, we stand unrivalled by any State of the Union. Possessing as we do a ridge of iron ore one hundred miles long, with an average thickness of little less than fifteen feet, skirted along its whole length by one of our most important railroads, no where more than a mile distant, we have an inexhaustible supply that may challenge the world to equal. Nor is even this our only supply of this valuable mineral; we have large deposits of brown hematite also, scattered along our coal region, scarcely inferior in quantity, and equally rich, if not superior in quality to the first mentioned deposit. In addition to this, we have interstratified with our coal, the celebrated black band iron ore, which supplies to Great Britain almost exclusively her immense demands. The great value attached to these iron ore deposits, arises from their close proximity to the coal beds. Iron ore without coal, would be of comparatively little value, because in order to make it available for useful purposes, it must be reduced, or in other words, made more or less pure by the process of smelting. This can be done with charcoal, but the value is so enhanced with that fact, that we could not successfully compete as regards cost, with coal smelted iron. It is for this reason, among others, that the British iron competes successfully with all other manufactured iron as to cost, because their abundant coal production enables them to smelt iron cheaply, and thus overcome the

cost of transportation to the markets of the world. Now what they have done and are doing, we have also the natural advantages to do, and we have the further advantage over them in the fact, that our iron ores have a higher per centage of pure iron than theirs, as thirty per cent. is to forty-five. That is to say, the principal ores of Great Britain yield on the average only thirty per cent. of iron, while those we have here, range from forty to fifty-five per cent. Another advantage we have is, that a large portion of our ores, are at or near the surface, and can be mined at comparatively small cost, while theirs being interstratified with the coal, and in most cases, at considerable depths, would at least double the cost of production, and thus more than equalize any benefit they may have from cheaper labor.

I make these comparisons, not from any spirit of jealousy or rivalry, but simply because if I can shew that we can compete as regards cost, with Britain, in the manufacture of iron, we can have nothing to fear from any other quarter. Great Britain can produce pig iron at about fifteen dollars per ton ; if, then, we can here manufacture it it as cheaply, we need fear no rival on this continent. From a careful examination, I have come to the conclusion that this can be done, and on submitting my estimates to the managers of two iron manufactories, the one in Tennessee, the other in Alabama, they agree with the conclusions to which I have come. If we can then produce pig iron at fifteen dollars per ton, we can produce railroad iron at fifty dollars per ton. I may here mention, that I have a detailed estimate of cost prepared for both classes of iron, that I will be happy to show any one who wishes to examine this subject more thoroughly.

I have taken some pains to ascertain what pig iron and railroad iron is produced at in Pennsylvania, at the principal iron works there, and I find that the profitable production per ton of pig iron would average at least twenty-five dollars per ton, and railroad iron sixty-five dollars per ton. I do not know what the aggregate amount of railroad iron brought into the State, within the past two years may be,

but it must be very considerable, and the fact that we are paying to others, fully a third more than it can be made for here, is something at least to be surprised at. Alabama should supply all iron, including railroad iron, to Florida, Mississippi, Louisiana, and Texas; the West Indies, Brazil, and in fact, all South American States, because she is the nearest point of supply, and if we do not do so in the future, it will not be for want of ability to distance all competitors, but because we are not equal to the advantages we possess, nor have the energy and the enterprize to make these natural advantages our own.

In concluding this part of the subject, I may explain that it was my intention only to give a sketch of the mineral resources of Alabama, not a complete delineation of them. In the limit of a single report, such a broad field of inquiry as is here presented, not even a volume could embrace all the facts, but if the mere sketch which I have now given, should serve the purpose of directing the attention of earnest men to the subject, it will produce all the effect that I can reasonably desire. I may further add that I have purposely abstained from theorizing on the subject, mentioning only facts either observed by myself, or that have come from what I regard as reliable sources. I have also endeavored to fortify my opinions by the statements, experience, and conclusions, of eminent men who have written on kindred subjects. I look upon their statements as particularly valuable in the present case, because while they strengthen our position, such was not their intention; they therefore come before us as disinterested witnesses in the case. There is no doubt, that within the boundaries of Alabama, we have mines of wealth in our mineral deposits, about which there can be no controversy; but there is one thing we lack, and without which no natural resources however vast, and no lands however fertile, can be of any avail; I mean the labor and the capital that must develop them. I believe I am correct in stating that there is not another State in the Union that has done so little to encourage immigration as Alabama; and I believe further, that every State but this has an organization more

or less complete and operative for that special purpose. I have put myself in communication with all the Southern States in this matter, and many of the Western States also, and I find that all of them have bureaus of immigration at home; and many of them, especially the Western States, have agents abroad encouraging and directing immigration, by every means in their power, to their respective States. They reason thus, and I think their reasoning conclusive: If we can induce, by a wise expenditure of ten thousand dollars yearly, one thousand immigrants to make their homes in our midst, we add one hundred thousand dollars to the wealth of the State; and this is found to be practically the case. Every immigrant has at least a productive power of one thousand dollars, and this is the reason why the Western States are increasing so rapidly in population and in wealth, and are destined at no distant day to become the controlling power in the political and material destinies of this continent. If they had any material advantages that the South does not possess, it would be our wisdom here to bow to the inevitable necessity of the case; but it is far otherwise. We have a superior climate to theirs, a soil unrivalled in its fertility if properly cultivated, and enriched, and we have in our mineral wealth an element of greatness which, like a slumbering giant, lies powerless until the hum of busy industry shall habilitate it with life and power. It is a fallacious opinion, entertained by some, that our climate is not suited to white labor. Why? what have we in the whole northern portion of this State but white labor? If white men can and do work on the levees of New Orleans, they surely can much more stand the climate of the upland mineral regions of Alabama. It is our duty and our interest to tell the immigrants that come to these shores, that the summer of the West is hotter than ours, while the winter is longer and far more severe, and that the alternations of heat and cold are far more trying to European constitutions there than any they will find in the Southern States. I think this question of immigration is the overshadowing one of the present day for us. Without increased population, what are

railroads or steamboats, or any system of internal improvement? They are simply as the husk is to the kernel. We may talk till doomsday about our mineral resources, our fertile soils, our fine climate, our natural advantages; but without the bone and muscle that raises from the dark recesses of the mine, and from the generous and fruitful earth, their garnered wealth, we can expect no advancemen in the path of progress. The Bureau of Statistics at Washington has published recently a most valuable report on this important subject, which places in a clear view and on reliable data, the value of immigration to the United States. The following extracts from it are worthy of our most serious attention. The report says:

"The unexampled development of the Northwestern States is largely owing to the influx of skilled and common labor during the period of the two last decades. Within the past few years especially, owing to the completion of the railroad to the Pacific, and other great works of internal improvement in the western portion of our domain, and to the changed system of labor in the Southern States, extraordinary inducements for immigration have been presented, and the subject, always interesting, now possessess a peculiar claim on public attention. During the entire period from 1820 to 1870, the increase of each year over the one immediately preceding it, if uniform, would average 13 per cent. The aggregate number of immigrants who arrived between October 1st, 1819, and December, 1870, was 7,553,865, and if the 250,000 estimated as arriving previous to the first named date be included, the total number of aliens who have been permanently added to our population by direct immigration since the formation of the government, will reach 7,803,865. Referring to the money value of an immigrant, it may be stated that the sum of one thousand dollars has been usually regarded as the average worth of each permanent addition to our population; but Mr. Knapp, one of the Commissioners of Immigration of the State of New York, who has given much consideration to the subject, assumes the average value to be one thousand one hundred and

twenty-five dollars. At this rate, those who landed upon our shores during the year just closed added upwards of three hundred and eighty-five millions of dollars to our national wealth, while during the last half century, the increment from this source has been six billions two hundred and forty-three millions eight hundred thousand dollars. It is impossible to make an intelligent estimate of the value to the country of those foreign born citizens who brought their educated minds, their cultivated tastes, their skill in the arts and sciences, and their inventive genius. In almost every walk of life their influence has been felt, alike in the fearful ordeal of war, but more eminently in the pursuit of peace. In our legislative halls, and in the various learned professions, the adopted sons of America have obtained eminence. Their work also appears in the form of productive fields reclaimed from the wilderness, buildings and fences erected, agricultural implements and stock accumulated, and mineral wealth developed. Being the result of voluntary industry and self-imposed economy, it is an increase directly to the State in which they settle, conferring that highest form of wealth, a sturdy, intelligent and independent yeomanry, the very balance-wheel of national machinery." Now this picture—a picture and yet a reality—presents only its dark side to us. Of the 380,000 immigrants from Europe that reached these shores last year, with their estimated added wealth to the country of three hundred and eighty millions of dollars, probably not one hundred persons came to Alabama; and the reason is obvious: while other States are straining every nerve, and making use of every legitimate means within their reach, we are, up to the present time, taking no means to divert even the smallest rill of this mighty living stream that is flowing into the West with its burden of labor and wealth. Immigration must be invited here. It must be sought out at its source, and encouraged to come by every argument and every fact that we can place before it. This being done, we may reasonably hope to have at least a share of the benefits so eloquently and truthfully portrayed in the report from which I have quoted.

If the State would give five thousand dollars per annum, and the leading railroad companies, who are also largely interested in this matter, would make up among them five thousand dollars more, a permanent and effective organization could be secured, that would not only operate here at home, but secure at least two leading agencies abroad, at the principal shipping ports, whose business it would be to supply such information and give such advice as to induce immigration to the State. If this was done, I am persuaded that in a year or two we would be reimbursed one hundred fold all that we expend in this important work. Our State Agricultural and Mechanical Association might also do much in establishing a central depot at the fair grounds for the reception of immigrants until they could be permanently located. Each county association could also lend a helping hand in their respective sections; and the proprietors of uncultivated lands should, by a liberal and wise arrangement, alike profitable to themselves and the immigrants, help on in the great work.

But not alone do we require labor; we also want capital, without which our progress would be slow and our efforts unimportant. Two conditions are required to be clearly shown before obtaining it, viz., that the investments are safe, and that they will be profitable. Capital is habitually cautious, and no capitalist will embark his means in an uncertain project, if he so understands it. Now, I think in our mineral resources we can show clearly those requisites which capital demands before investment. Coal and iron lands have everywhere been considered both safe and profitable, and the working of them, when properly conducted, has been a source of wealth not only to the proprietors, but also to the countries where they have been developed most. In inviting capital, therefore, all we require to show is, that we have in abundance these sources of wealth which are acknowledged by all, and if we do so where capital is abundant and cheap, our success in this particular will be assured.

J. L. TAIT,

Commissioner of Industrial Resources.