OPINIONS OF BUSINESS MEN.

THEY TELL OF THE INCREASING PROSPERITY OF MANUFACTURE UNDER M'KINLEY.

WARNINGS AGAINST THE MENACE OF BRYANISM.

Many prominent business men of this city, whose large commercial interests and knowledge of the present conditions of trade throughout the country entitle their opinions on the political situation to thoughtful consideration, have expressed themselves strongly and forcibly in favor of the policy of the Republican Administration of the last four years and as unqualifiedly in favor of the re-election of President McKinley. The incalculable injury which threatens the country's vast industries and business enterprises of every description, in the event of Bryan's election, is clearly set forth in some of the interviews and letters sent to The Tribune, which are here given.

IRON AND STEEL TRADE BOOMING.

ARCHER BROWN TELLS OF THE ENORMOUS EXPORT TRADE DURING M'KINLEY'S ADMINISTRATION.

Archer Brown, resident partner in New-York of the well known firm of pig iron manufacturers, Rogers, Brown & Co., when asked by a Tribune reporter as to the bearing of the political campaign upon the iron industry, said:

"The record of the iron trade in the United States during four years past has no parallel in the industrial history of the world. When the country hesitated between McKinley and Bryan, in October, 1896, we touched the low water mark. In that month we produced about 600,000 tons of pig iron, or at the rate of 7,000,000 tons a year. More than half of the blast furnaces, rolling mills and steel mills in the country were idle. There were those who believed we had reached our maximum in metal manufacture, and that we must continue to concede to Great Britain and Germany the right to supply the markets of the world. Prices for most iron and steel products were at the lowest point ever known in this or any other country. Pig iron sold at $6 to $7 per gross ton at Birmingham, Ala., and Bessemer pig at about $9 in Northeastern Ohio. Thousands of men were working in ore mines and coal mines at less than $1 per day wages. In Alabama, the average was under 90 cents. Even in the Lake Superior ore region men could not earn enough to live on and gradually drifted off into other employments. Worse than this, tens of thousands of men, who from 1890 to 1892 were profitably employed, had no employment at all.

A SORRY PICTURE.

"On the side of the manufacturer and capitalist, the picture was even worse. Not one blast furnace company in ten of those that kept running were doing more than getting back a new dollar for an old one. A dividend was a thing almost unheard of. Securities of leading companies dropped to nominal figures or were unsalable at any price. The list of bankruptcies of mining companies, rolling mills, car works, steel works and blast furnaces was something appalling. It was rather against the commercial credit of a man to be known as interested in iron properties.

"Bad as things were, timid people were alarmed to hear from Bryan and Democratic orators that if McKinley were elected and the gold standard firmly established, the disasters of the past would be nothing to those that would follow. McKinley was elected and the four years which have elapsed have seen a revolution in the iron and steel manufacture—not in the direction of greater disaster—but in the direction of the greatest prosperity it has ever known. The change began the very month that the result of the election was known, and while the improvement has not been uniform through the four years, each year has witnessed steady improvement, and the last six months have touched high water mark.

"Let me give you some figures that will illustrate: In 1896 we produced 8,623,127 gross tons of pig iron. In the first half of 1900 we produced 7,648,563 tons. In the four years our gain was nearly 100 per cent. In 1896 Great Britain produced more than the United States. Their production has remained almost stationary, while ours has doubled. In 1896 we produced 3,919,903 tons of steel of all kinds. In 1899 our product was 7,586,354 tons, as against 1,825,084 tons produced by Great Britain. Turning to stocks of iron on hand, in October, 1896, we carried unsold iron at furnaces amounting to 1,001,574 tons. That was about two months' production at the then current rate. June 1, 1899, we had on hand 382,662 tons, or about eight days' supply at the current rate of consumption.

"But tonnage figures do not tell the whole story. Prices in October, 1900, have declined greatly from the high point of last year, but are still materially above the distressing period of 1896. We had too much prosperity last year, resulting in an abnormal demand for iron so far in excess of the capacity of mills, furnaces and mines that prices were forced up beyond reason.

WAGE EARNERS GOT THE BENEFIT.

"Wage earners profited by this everywhere, but consumers of iron suffered, and the advance culminated when they would no longer pay market prices. The rapid decline of this year has brought prices down again to a normal level, but the wage reductions have been very small. Here and there 10 per cent has been taken off, where 30 or 40 per cent had been put on. If markets do not further decline under threats of change of our industrial and financial system, further wage reductions will not be necessary, and hundreds of thousands of wage earners in the iron and steel trades will be enjoying a prosperity that they could hardly have dreamed of in the Bryan campaign of 1896.

"The history of the quadrennium proves how closely the interests of the workingmen and their employers are allied. If any voters who derive their living from the vast industries connected with ore mining, coal mining, and iron and steel making, are tempted to change their votes for McKinley of four years ago, because of expansion or trust issues, they ought to brush up their memories and recall what they were earning before the McKinley Administration came in.

"But the brightest and most significant feature of the iron and steel trade is in connection with our export trade. Our good friends among the free traders used to complain of a tariff which gave the growing American industries some protection against the iron and steel makers of the old world, who thought it to be their proper mission to supply us with steel rails, structural steel and other forms down to pocket knives. But see what has been the outcome. It is like a story in the 'Arabian Nights.' In 1890 we bought imported iron and steel to the value of $44,540,413. We exported $27,000,000. A net difference of $17,500,000 in American dollars sent abroad. Five years later we imported $25,772,136 and exported $35,071,563. The tide had turned, and we took $10,000,000 from the foreigners instead of paying a large sum.

"Beginning with the McKinley Administration our exports of iron and steel ran up with tremendous rapidity, as follows: 1896, $48,670,218; 1897, $62,737,250; 1898, $8,771,550; 1899, $105,689,077. Imports ran down near the diminishing point. The increase in exports since 1895 has been over 500 per cent. Judging by business current in July and August, and the prospects ahead, it looks as though the coming year the export figures in this field alone would be $150,000,000, and we shall import less than $10,000,000 worth. The world at large, therefore, will be paying something like $140,000,000 net yearly to our iron and steel workers.

EIGHTY PER CENT TO AMERICAN LABOR.

"How is this enormous sum distributed as between the workman and manufacturers? I venture to say that over 80 per cent of it goes to the wage-earners and less than 20 per cent to all other interests. It must be remembered that in the last analysis the cost of iron resolves itself almost wholly into wages. So-called raw materials are all wages except what they yield to the owners of the mines as they lie in the ground—in other words, royalties. These royalties, together with the cost of transportation (part of which, however, is wages) and final profit in manufacture is about all there is in the cost of iron and steel outside of what is paid the miner and mill and furnace workers. It does not take a very profound thinker to make up his mind who has been enjoying the chief benefits of the great revival in iron and steel that came in with the defeat of Bryan in 1896.

"Looking to the future, I speak the sentiment of manufacturers in all sections of the country when I say that if there were a good prospect of the election of Bryan in November next, there would be such a paralysis of the industry as would throw out hundreds of thousands of men, and reduce heavily the wages of those left with work. This is not because of any political views or prejudices of iron makers, for there is nothing so cold and free from sentiment as pure business. But it is because the iron trade the world over is linked with financial conditions. When capital is timid and draws back, work stops on bridges, water works, railroads, new buildings, etc., and mills close because they do not have the demand. When the money conditions are sound new enterprises go forward and the mills and furnaces are called on for their full output. It is because no one seriously thinks that radical changes are to be introduced into our National policies that business is going along very well."

A BANKER'S VIEWS ON BRYAN.

THE DEMOCRATIC CANDIDATE'S ATTITUDE TOWARD HIS MISGUIDED FOLLOWERS.

F. C. Hollins, of the banking firm of F. C. Hollins & Co., of No. 11 Wall-st., speaking of the menace of Bryanism, said:

Whether the great prosperity following the election of William McKinley in 1896 was due to the renewal of confidence in a Republican Administration or not, the fact remains that the country at large has prospered beyond the most sanguine expectations. Whether a man be a Republican, a Democrat or an independent, he has reaped benefit from the circulation of money which has flowed through business channels of all kinds. The cry of "imperialism" raised by the Democrats, mugwumps, Socialists and Anarchists is simply a cloak to cover an attack upon the present Administration. It does not mislead intelligent men. It does, however, influence a class of narrow minded people unfit to cope with an emergency, who are easily influenced by a few leaders, who themselves are not only influenced by selfish motives, but play upon the sympathies of the weak minded to further their own ends.

While parties may be opposed to expansion, it must be borne in mind that this country has reaped great benefit therefrom. The large expenditures of money by the Government in the prosecution of the Spanish war was the means of setting every wheel of industry in motion. It opened up new fields of operations for enterprising men, particularly the young men. The Army has given employment to those who gladly embraced the opportunity to enlist their services in behalf of their country, not only as a means of employment, but with a view of rising from the ranks as well as seeking advancement in life in new countries awaiting the brains and energy of the young and ambitious. How many young men not having the means to leave home, where they were a burden to their parents, welcomed the opportunity to join the Army? How many have not only distinguished themselves in battle, but, with the experience obtained and their ideas expanded, have returned to their native land and obtained remunerative employment?

William Jennings Bryan, the Democratic, Populist and Socialist candidate, having been a failure all his life, realized that he is gifted with a flow of language which brings applause and a following of unthinking, shallow and ignorant people. He immediately turns his gift of oratory to his own account. He collects money for his lectures and speeches, taking money from the pockets of his poor, deluded followers and putting it in his own. He rants in favor of 16 to 1, the odds being 16 to 1 in his favor all the time. This "patriot," who himself has been a failure, is undertaking to lead this country out of the prosperity it has enjoyed into a state of chaos, to be disentangled by himself, assisted by his followers, who themselves have been failures in life, read out of their own party, despised by Republicans and distrusted by Democrats. Bryan could not be induced even by the Democrats in convention to give up his theory of 16 to 1. It is his stock in trade.

In so far as the people are concerned there can be but two legitimate parties. One is a party of intelligent, broad minded people, who govern the country by wise measures. In this party are found patriotic, successful men in life, loyal to their country, with intelligence and courage to cope with great emergencies. The party representing this class of people is called the Republican party. The class of people representing the second party are those who lack the intelligence that makes successful men. Their theories are impracticable and inconsistent, as has been demonstrated at the expense of the people at large. This party is called the Democratic party, and the difference between intelligence and ignorance is the difference between Republicanism and Democracy.

The re-election of President McKinley in November means a renewal of prosperity. No man with ordinary common sense desires a change at this time, nor does he wish to be classed with a party led by a patriot of William Jennings Bryan's description.

LABOR AND CAPITAL WELL EMPLOYED.

A LARGE INDUSTRY FOR THE MANUFACTURE OF BEET SUGAR STARTED IN THIS STATE.

O. F. Thomas, of the brokerage firm of Thomas & Post, expressed himself as follows:

"American industries were never more active and thriving than at the present time. American labor was never better employed nor better paid than it is now. American capital, legitimately invested, never secured better returns than it can to-day under the McKinley Administration.

"What promises to be the starting of a large industry in this part of the country to make sugar from beets is the Empire State Sugar Company, of Lyons, N. Y. It has a capital of $400,000 stock and of $400,000 6 per cent bonds, which are redeemable at 110. The business of the company is the manufacture and sale of beet sugar. The plant, the biggest in the State, is now in operation, and has a capacity of 6,600 tons of beets daily, and has under contract with the farmers 5,000 acres of beet land in Wayne County."

The management is in the hands of men of ability and conservatism, among them being O. F. Thomas, the president and a director, who is also president of the Bank of Wayne, of Lyons, N. Y. E. M. Post, of the firm of Thomas & Post, is also one of the directors, and William Bilchbelt, of Lyons, N. Y., is a director and general manager. The sugar output, reckoned on a 15 per cent basis, gives the company a surplus which will not only pay the interest on the bonds, but show a large dividend earned on the stock. Mr. Thomas continues:

"Governor Roosevelt, Lieutenant-Governor Woodruff, State Senator Raines, Judge Davies, Attorney-General, and C. A. Wieting, Commissioner of Agriculture, have visited the plant, and speak highly of the future of beet raising as a permanent industry of the State. The appropriation for the State bounty on the output of the company has already been made by the Legislature, which speaks well for the interest the Republican administration takes in the farmers to encourage beet raising, which, with their assistance, will not be an experiment, but the chief industry of the State, and will not only insure the farmers a living, but a permanent income."

MANUFACTURE OF CONDENSED MILK.

A PROGRESSIVE STEP BY A REPRESENTATIVE CONCERN IN THIS LINE.

In these days of trusts and combinations it is pleasing, says "The American Grocer," to learn of a genuinely progressive step by a representative concern in an important line of business. The first organization of Gail Borden's valuable invention took the title of Borden's Condensed Milk Co., and some years later a new organization was formed to take its place, which has been long and favorably known as the New York Condensed Milk Company.

The Civil War precipitated upon the company very heavy demands for its product, and the Northern armies were supplied as extensively as manufacturing facilities would permit. It was a happy day when the Southern soldier was lucky enough to get access to a Union supply train, and thereby obtain what was eagerly sought for by all the soldiers, namely, Borden's Eagle Brand Condensed Milk.

During the late war with Spain among the first food supplies to follow the American troops, whether in Cuba, Porto Rico or the Philippines, was Borden's Eagle Brand Condensed Milk, and the Red Cross outfit was not considered complete without a liberal stock of the Eagle Brand Condensed Milk and Peerless Brand Evaporated Cream. These popular brands of milk have been the standby of the Army and Navy, and constitute to this day the most valuable food products which the soldier in the field or the sailor at sea can obtain. Since the days of Dr. Kane all the exploring parties and expeditions have deemed their most important item of food to be taken with them the Eagle Brand Condensed Milk. Lieutenant Peary only recently testified very highly to its value, and his present expedition was well supplied with this indispensable article of food.

During the forty years of constantly increasing business the methods of the company have commanded not only the highest respect of the jobbers, retailers and consumers, but of its competitors as well. The fame of the Gail Borden Eagle Brand has become world wide, and represents the highest standard in this line of goods. We are pleased to observe the aggressive reorganization of the company under the title of Borden's Condensed Milk company, capital $20,000,000. This entire amount of stock was taken by the stockholders of the old company, except a portion which was set aside to be sold to some of the prominent and most valued employes of the company. The increased capital insures the company being able to take care of its business upon a scale of confident expectation that has always placed this concern so far in advance of its competitors.

Constant additions to its manufacturing facilities have been made year by year to keep pace with the increasing demand. New factories have been added, until now the company operates fifteen, among which are some that outrank in size, capacity and actual product manufactured therein any other plants of similar nature in the world.

CONFIDENCE HERE AND ABROAD.

PROSPERITY ATTENDING THE PRESENT ADMINISTRATION'S POLICY OUTLINED BY W. L. ELKINS, JR.

William L. Elkins, jr., vice-president of the New-England Gas and Coke Company, recently expressed himself to a Tribune reporter as follows: "Being interested in manufacturing companies whose business it is to build different classes of large machinery, also in other manufacturing companies making coke and producing byproducts from coal, and in the management of gas and electric companies throughout the States, it has been my purpose to study the effect of the general condition of the country upon the different enterprises in which I am interested, and which have to do with so many of the great masses of the people.

"Prosperity, no doubt, breeds extravagance, but possession of that which enables a man to live regularly and contentedly and properly maintain his family stimulates the wage earner. Consumption means production, which, if it means anything, means prosperity to the country. I have seen the effect of want of confidence of the people under Democratic administrations and the threatened Bryanism of four years ago. Can any right minded, well meaning American want the situation not only temporarily repeated, but continued for a period of four years at least?

"I have just returned from England and the Continent, and I assure you that the feeling is one of intense admiration for Mr. McKinley and his Administration for the last four years. We have their confidence, and they are largely dependent upon us. Will we therefore elect Mr. Bryan, and thereby, I believe, throw ourselves into bankruptcy and disrepute throughout the world, paralyze our industries and place this country, which has never known such prosperity as it has experienced for the last four years, into a condition of idleness and distress? Certainly not. This, however, would be the inevitable result should Mr. Bryan succeed in November, and it would be a lamentable condition, from which it would take us years to recover."

PROTECTION AND RECIPROCITY.

CHARLES A. MOORE TELLS OF THE PROMISING CONDITIONS OF TRADE.

Charles A. Moore, of the well known firm of Manning, Maxwell & Moore, railway and machinists' tools and supplies, said: "Our industrial and agricultural conditions are more promising than they have been for many years, probably more so than they have ever been. Prosperity abounds everywhere throughout the Republic. It is the imperative business of those opposed to this financial heresy to prevent the triumph of the parties whose union is only assured by adherence to the silver issue. The Republican party remains faithful to its principle of a tariff which supplies sufficient revenues for the Government and adequate protection to our enterprises and producers; and to that reciprocity which opens foreign markets to the fruits of American labor and furnishes new channels through which to market the surplus of American farms. The time-honored principles of protection and reciprocity were the first pledges of the Republican victory to be written into public law.

"Relative to our own business, we have just sent to the trade copies of our new illustrated catalogue of machine tools and attachments, containing over seven hundred pages of imperial quarto. This book, as its title indicates, illustrates only metalworking and woodworking machine tools and their attachments. Owing to the greatly increased scope of our business, we have found it advisable to separate the metal and woodworking machine tools and their appliances from what are termed general supplies. In our previous catalogue they were combined. We are now compiling a very complete illustrated catalogue of railway, steamship, machinists' and contractors' tools and supplies, which will contain about eight hundred pages of imperial quarto.

"We have followed in this catalogue the same general method of designating by figure numbers the articles illustrated as we did in our previous catalogues. The purpose of this is to enable our correspondents, in transmitting orders or inquiries, to use the figure numbers, rather than the titles of the tools. This catalogue is also supplied with a telegraphic code, by the use of which telegraphic and cable communications may be greatly condensed."

HIGH PRICED LABOR EMPLOYED.

A NEW INDUSTRY STARTED ON THE EXPECTATION OF M'KINLEY'S RE-ELECTION.

"It is a well known fact that during the last four years business interests have increased more than 25 per cent in volume," said Samuel A. Clark, treasurer of the American Wood Fireproofing Company, of No. 11 Broadway, who represents one of the newest and what promises to be one of the most representative industries, involving many thousands of dollars, and in which the most skilful and highest priced labor will be employed. These industries are organized only under a favorable Administration, and many new enterprises have been started on the expectation that the present Administration will be continued.

"Throughout the three epochs into which the career of mankind in this world has been roughly divided, the stone age, the bronze age and the iron age, wood has easily held second place as a material of general utility. For ages it was almost the only fuel in use. Nowadays, however, inflammability is its most serious shortcoming, for no satisfactory substitute has been found for wood in sundry departments of housebuilding, shipbuilding and for the construction of furniture.

"The American Wood Fireproofing Company by an ingenious process is able to render wood absolutely incombustible, and this without injury to the strength, texture, color or grain of the wood. In fact, the treatment acts as a preservative and an absolute preventive of dry rot. Briefly the process is this: The wood, of whatever shape, size or variety, is loosely packed in strong airtight steel chambers, where it receives the fireproofing chemicals, which, under pressure, are forced through and through after a vacuum has been applied, thus preparing the wood. Wood so treated cannot maintain combustion. Under the long continued action of a blast torch it chars at the spot where the flame impinges, but is absolutely inert. Nor is this property diminished by long continued exposure to the elements or by immersion. Even small slivers of the fireproofed wood, after having been under water for several days and then dried, continue to resist the action of flame as at first.

"The above tests are mentioned in the recent official report of the Underwriters' Bureau of Fire Protection Engineering, at Chicago, in which they recommend the use of this wood to all the underwriting insurance bureaus of the United States, the above mentioned bureau testing and reporting officially on matters of this kind for the general information of all insurance companies.

"A board of officers of the United States Navy appointed by the Secretary indorsed, after months of examination, this fireproofed wood for use in interior fittings on warships. It is equally adapted for the fittings of fireproof vaults and buildings, and is now being used in finishing a building at the New-York Navy Yard, where high explosives are to be carried."

DANGEROUS TOOLS TO PLAY WITH.

ANTI-IMPERIALISTS WARNED AGAINST THE FINANCIAL HERESY OF THE SILVERITES.

To the Editor of The Tribune.

Sir: As you are aware, I have been for the last fifty years actively connected with the business development of our entire country, not only as a merchant, but also in railroad affairs. With the practical experience I have gained I am astonished at the attitude of the so-called anti-imperialists of our Eastern States. They should be called anti-progressionists. Having lived their little day they forget that our country is moving forward with the cumulative force of 80,000,000 of people.

Less than fifty years ago the first land grant road was opened in Illinois. Now, there is an empire beyond the Mississippi River in lands supposed then to be uninhabitable by white men. If these theorists knew more they would recognize that it is not within the power of the East to attempt to dictate to the necessities of our countrymen of the West. Room and markets they must have, and any educated merchant knows that the Government must play a large part in giving the markets of the world to its people.

Of their willingness to condone the financial heresy of the silverites I will say nothing except to hope that they will realize before it is too late that it is not the part of wisdom to play with edged tools. If the views of the Bryanites should prevail I can see nothing but disaster to the well-being of all, but especially to the wage earner.

Yours very sincerely, FREDERICK STURGES.

New-York, Sept. 23, 1900.

HIS SENSE OF RESPONSIBILITY.

From The Washington Star.

I am feeling all a-tremble!
Though I'm trying to dissemble,
I'm convinced that all my efforts are in vain.
My brain is growing torrid;
There are wrinkles on my forehead,
As I sit and think and think with might and main.

I'm a factor in this Nation
That is leading all creation,
And I feel a lump that rises in my throat,
When I shudder and remember
That once more it is September,
And that pretty soon I've got to go and vote.

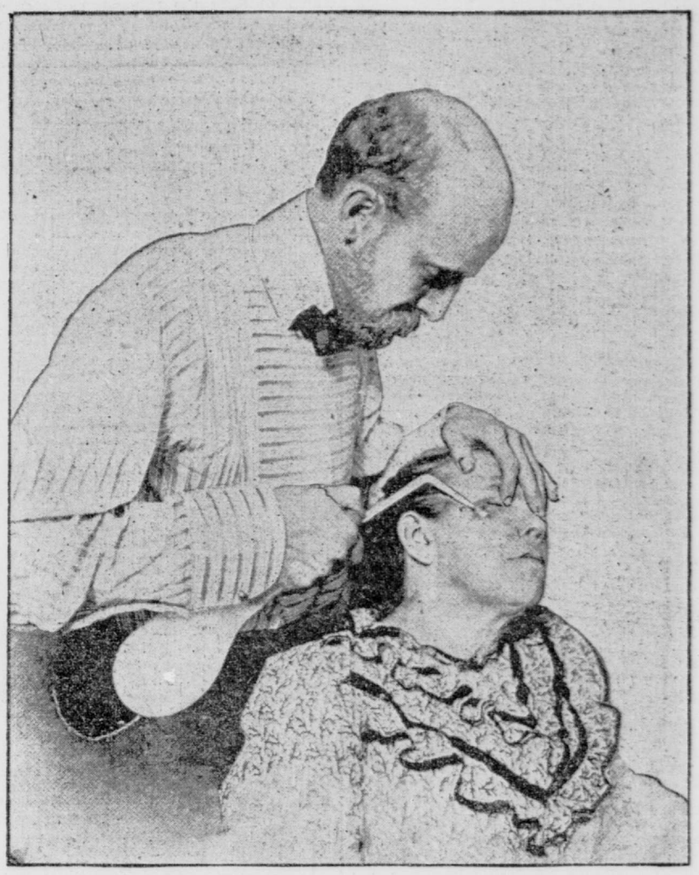
Liquid Air.

USES OF LIQUID AIR.

THE VAST POSSIBILITIES OF THE NEW FORCE.

IT PROMISES TO BECOME A COMPETITOR OF ICE, STEAM, DYNAMITE AND ELECTRICITY.

A new force is looming up on the mechanical horizon; a new factor is entering into industrial problems. If a prophet of some thirty or forty years ago—about the time electricity began to seriously excite public interest—had undertaken to cast the horoscope of this wonderful mechanical and chemical agent and to formulate his prognostications in the shape of figures, attempting to convey to the human intelligence some sort of definite and adequate idea of the commercial value of applied electricity to the world of finance, commerce and industry at the close of the present century, and had he set out in formidable array summations and conclusions even approximating the present magnitude of this great interest, he would have been deemed a visionary of the very first magnitude, if not indeed a crank worthy of legal restraint. Had such an enthusiast found believers among moneyed men, causing the investment by the latter in the infant enterprise, such investors would have been the financial colossi of to-day. In fact, those who did timidly hazard a few dollars, and who stuck by their judgment, have profited a thousandfold.



PHOTOGRAPH SHOWING TREATMENT OF CANCER OF THE FACE BY LIQUID AIR SPRAY.

The patient's recovery has been complete.

The electrical interest soon differentiated into separate branches. Each of these swelled, broadened and increased as it progressed, soon outstripping the parent interest. Among these offshoots may be mentioned the electric telegraph, the Bell telephone, the electric illuminating interest, electricity as a secondary motive power, etc., each of which interests has rapidly advanced in financial importance up into the tens—yes, hundreds—of millions of dollars. With such notable and universally known precedents as the foregoing, may it not be permissible to offer some practical facts and figures with respect to the important place liquid air will occupy in the world of industrial activity in the near future? More or less has appeared in the last several years in our illustrated monthlies of a descriptive and entertaining character, but little of a practical nature has been written, because until comparatively recently the application of liquid air to utilitarian purposes was largely in the experimental stage.

PROFESSOR TRIPLER'S LABORS.

For about sixteen years Professor Charles E. Tripler, the pioneer of liquid air as a vital economic force, had labored assiduously and quietly in the effort to liquefy economically the atmosphere and develop and test its practical applicability to various purposes and requirements, and his final complete success was only attained at the additional cost to him of a handsome personal fortune. The field for this new and wonderful element was so wide and its profitable uses so varied that many expensive experiments were necessary and a great variety of mechanical devices, and securely to protect such discoveries and devices it became necessary to incur very heavy legal and Patent Office expenditures in the effort completely to cover and protect them in this and all the leading civilized countries of the world. Work of this kind requires not only time, great patience and a superior order of intelligence, but large outlays of money as well.

A point was reached last spring when it was deemed expedient to complete the organization of a company for the purpose of developing and exploiting the liquid air industry in all large centres of population in its several cardinal adaptations to commercial uses, but with especial and immediate reference to its great value (1st) as a motive force and (2d) as a refrigerant.

Liquid Air.

Besides these two leading fields of utilization—each practically limitless in its scope and profit possibilities—there are the minor (but by no means unimportant) uses of liquid air; (3d) as an explosive (in combination with hydro-carbin); (4th) as an aid in surgery; (5th) in its profitable application to metallurgical processes. Doubtless many other, only less important, uses will be discovered in due course. But the limits of this article will not admit of more than a cursory review of the situation and immediate future of liquid air as adapted to purposes of refrigeration and as a secondary power. (The reader will understand that a secondary power is one produced by another or primary power, as is electricity. A steam or other engine is required to produce electricity. The liquefaction of air is likewise secured by mechanical means. It has been accomplished by chemical processes, but at a prohibitive cost.)

It is not intended here to give a history of liquid air from its discovery to date, or to treat at length the multiplicity of its adaptations to various human needs, comforts and luxuries, but rather to state the present status of liquid air as a motive or propelling force and as a refrigerant, and then indulge in a few figures and statistics based on fully demonstrated facts, that the reader may arrive at a reasonable and reliable conclusion as to the changes it will work in and the benefits it will confer upon the economic and industrial world. The efficiency and cheapness of liquid air as a secondary power has been repeatedly demonstrated. The particular form of engine most chosen for such demonstrations has been the automobile, which is universally acknowledged to be the coming vehicle, having before it a field, popularity and sphere of usefulness far beyond that of the bicycle, in the manufacture of which so many millions have been made.

TRIPLER LIQUID AIR AUTOMOBILE, SHOWING FRONT AND SIDE VIEW, RUNABOUT PATTERN.

ITS ADVANTAGES FOR TRANSPORTATION.

It is generally admitted that the horseless carriage, truck and wagon, like the bicycle, have come to stay. Within a few years it is probable that the trolley car and the automobile alike will not only be seen upon the streets of our cities, but will be operated almost everywhere in the rural districts of this country. Up to this time the great difficulty that the builders of automobiles have had to contend with was the securing of a satisfactory power.

The storage battery machine, which, taking everything into account, is probably the best one yet devised, has to carry such enormous weight (from 1,200 to 1,600 pounds in batteries alone) that the vehicle, to carry two persons, weighs upward of 3,500 pounds. That is to say, a vehicle to carry 400 pounds of freight must also haul 3,500 pounds of dead weight. A wagon of this weight cannot be run for more than twenty miles on paved streets, and it is quite out of the question to operate such vehicles upon country roads, or where there are small or broken stones, as the rubber tire, with the tremendous weight upon it, is at once punctured or destroyed. For the same reason they are not practical for heavy trucking, wherein lies by far the most important and lucrative field for the use of automobiles.

The steam locomobile, while not so heavy as the electric machine, has other very serious objections. To make the steam, a gasolene apparatus is necessary, with its noxious odors and grave dangers from explosion, as well as the tremendous heat generated immediately under the seat of the wagon.

This field seemed to offer such large opportunities for a satisfactory and economical vehicle that the Tripler company inaugurated a thorough and comprehensive system of experiments about three months ago, with a view of providing a light, safe and simple horseless wagon. The result has been most satisfactory. They have been running an automobile on the streets of New-York for more than a month, and there is no doubt that up to this time no other power is comparable to liquid air for use in automobiles and all other horseless vehicles. Its superiority consists in the following:

First—The extreme lightness of the machinery, and consequently of the vehicle, since all the machinery, including the power, will not weigh more

Liquid Air.

than 200 pounds, as against 1,200 to 1,600 for the electric automobile—admitting of its use on all kinds of roads and for heavy trucking, as well as for light pleasure traffic.

Second—With the weight mentioned a liquid air machine will run more than fifty miles without recharge, as against twenty miles for the electric machine.

Third—It is absolutely safe and perfectly noiseless, and it is the most economical power that can be used, costing less than one cent a mile to operate a light runabout.

Fourth—Its machinery and operation are so simple that any person can run it.

Fifth—It is absolutely odorless and cleanly and generates no heat. With liquid air as the motive power an automobile can be constructed on as delicate and dainty lines as a carriage for horses.

Taking into consideration all these facts, the opinion is justified that within three or four years liquid air will be the only power used for horseless carriages and vehicles of every nature.

VAST OPPORTUNITIES OFFERED.

One hesitates to hazard a forecast as to the growth and financial importance of this branch of the liquid air interest. An observer in the congested district of this city, with its almost inextricable mixup of vehicles of every sort, each with its driver and horses, can easily paint a mental picture of the same locality and circumstances with the substitution of the silent, powerful and perfectly controllable force of liquid air for horses, and then multiply the picture by the number of all the commercial centres in the world, and he will then be able to grasp only in part the importance of this force in this one application.

When one comes to the matter of refrigeration, statistics and figures and estimates may be hazarded, with the hope of a somewhat nearer approach to accuracy. Refrigeration may be divided into a number of separate classes, each having its special domain, covering a large field of its own. Among these may be mentioned transportation refrigeration (and this into its subclasses of fruits, meats, perishable goods—as eggs, butter, etc.); hotel refrigeration, comprising not only the cooling of its stores of provisions and liquors, but its public and private apartments; saloon refrigeration, a by no means inconsiderable matter, if one observes occasionally the ice wagon driving up to the back door of a saloon and unloading block after block of ice, and then consider the hundreds of thousands of saloons with which our country is afflicted (or blessed—according to the point of view taken); butcher refrigeration, comprising the keeping cool of the contents of the large iceboxes (or more properly, rooms) to be found in all butcher shops (not to speak here of the vast superiority for this and all other purposes of this pure, dry cold over the wet, sloppy cold produced by evaporating ice); packing house refrigeration; an interest so colossal as to require no further reference here; auditorium refrigeration, embracing the cooling of all public assembly rooms, theatres, courtrooms, jails, to which might be added the cooling of mines and subterranean excavations for public works. Each division enumerated above is a great interest in itself.

It is computed that the annual outlay for refrigeration alone reaches the stupendous sum of $150,000,000. The Tripler Company claims to be able to save one-half of this large sum, which alone is many times its total capitalization.

Coming down to a branch of refrigeration of which the general public knows most—to wit, household refrigeration—what are the facts? The population of the United States is now known to be in excess of 75,000,000. An average of five persons to a family is a large one, making 15,000,000 families.

THE SMALL COST TO FAMILIES.

Perhaps only two-thirds of these use ice at all, and instead of taking an average figure for the consumption of ice by these ten million families, it is fair to take the smallest amount that can be reasonably assumed as the daily expenditure for ice, or 10 cents. (New-Yorkers will appreciate the conservatism of this figure). At the present price of ice this would not buy more than 20 to 25 pounds. It has been proved definitely that the cost to manufacture liquid air may be reduced to one and one-fifth cents a gallon. In using it for the purpose of domestic refrigeration, one gallon is the equivalent to 80 pounds of ice. The assumption is made that each of these families uses a gallon of liquid air a day, instead of 10 cents' worth of ice—thus getting from two to three times the value for a small part of the cost. They might pay for the liquid air five cents a gallon instead of the 10 cents they pay for ice. But that gallon of liquid air is shown to cost but one and one-fifth cents. Two and one-half cents would be more than double that cost. Thus, on each of the 10,000,000 families would be made two and one-half cents a day, and yet confer a boon upon them.

There are 365 days in the year, and on the assumption that ice is not needed for more than two hundred days, it appears that 2½ cents multiplied by 200 days multiplied by 10,000,000 families, would give a total profit from this one of the many uses of Liquid Air, of the sum of $50,000,000, or five times the total capitalization of the company. It is apparent that this cannot be accomplished by a single organization in one locality, but a thorough organization of local sub-companies all over the United States is contemplated, which will be a matter of the near future. As the parent Tripler Company will retain a large interest in all of these subsidiary companies, it will be seen that from this one single item of the use of Liquid Air in the daily necessities of life, a profit may be anticipated annually which will exceed its total capitalization.

A few figures on the subject of brewery refrigeration (a gigantic interest of itself) would be equally entertaining, and, as "all roads lead to Rome," so they would only furnish another evidence of the almost incalculable profits inherent in the development of the Liquid Air enterprise—a matter of the very near future.

VALUABLE AS AN EXPLOSIVE.

Explosives.—While it has been demonstrated that with Liquid Air as an ingredient, a powerful explosive can be produced at a small cost, yet this is a subject which will require considerable time and a great number of experiments to perfect its development. It does not generate noxious fumes or gases, and it is the safest explosive known. There will be no danger from charges which fail to explode, as is the case with other explosives, since the Liquid Air charge evaporates and loses all of its explosive power within ten or fifteen minutes, and hence the miner would not have to risk his life in extracting the charge which failed to explode, as is necessary when dynamite or other explosives are used. A comprehensive system of experiments in this line has been planned, which will be carried out as rapidly as circumstances will permit.

Chemicals, Paints, Etc.—In the manufacture of paints and colors, drugs and chemicals, and in the purification of liquors is found a most important field for the use of this peculiar fluid.

Medicine and Surgery.—The progress made in the use of Liquid Air for medical and surgical purposes may be best appreciated by reading a treatise upon the subject by Dr. A. Campbell White, of No. 542 Fifth-ave., New-York City, who has been using it for some time at the Vanderbilt Clinic (Columbia College). With Liquid Air Dr. White has succeeded in curing many forms of malignant diseases, such as cancer, erysipelas, and many other skin diseases; while as a local anæsthetic its value is almost inestimable.

AT THE PARIS EXPOSITION.

With reference to the exhibit at the Paris Exposition he said: "In conjunction with the Rand Compressor Company we secured a most eligible site at the Exposition, and erected there two fine liquefiers, which are operated by the Rand compressor. While the Exposition authorities were not able to furnish us power for nearly two months after the formal opening, we have been in operation now since the early part of July, with most gratifying results. Before we started up our engineers in charge had to submit to the jeers and criticisms of European scientists, who took pleasure in calling us Yankee fakirs and stating on all occasions and everywhere that we couldn't make Liquid Air. Within fifteen minutes after steam was turned on we were pouring out Liquid Air by the gallon and distributing it freely to the crowds that surrounded the works. From that time to this it has been almost impossible for people interested in other matters and other exhibits to get through the aisles near our exhibit. Thousands crowd there constantly to witness what they seemed to consider the wonderful production of these Yankee fakirs. Our Paris exhibit is a great success, and we hear it stated by many that it is attracting more attention than any other half a dozen things at the Exposition. We trust that we have convinced the scientists of Europe, as we had at one time to convince our own Patent Office, that there is such a thing as Liquid Air, and that we can produce it in enormous quantities and at a very low price. It is an amusing fact that when Professor Tripler made his first application for a patent on a process for liquefying atmospheric air, about eight years ago, it was denied upon the ground of its absurdity."

The Grand Prix d'honneur was awarded to the Tripler Liquid Air Company at the Paris Exposition.

Sub-Companies.—The Tripler Liquid Air Company will occupy the position of parent company to the Liquid Air interests of the world, organizing and equipping subsidiary companies in all large centres of population in the United States and the leading foreign countries; furnishing to each sub-company its liquefiers and patented processes under royalties, and taking a certain proportion of the capital stock of all subsidiary companies; hence sharing to that proportion in the profits of such companies, much as the main Edison Electric Illuminating Company has a controlling interest in all its subsidiary companies, and as has also the Bell Telephone Company and other companies controlling sole processes.

A FRENCH COMPANY ORGANIZED.

The Tripler Company has already organized a number of subsidiary companies, with negotiations in progress for others, among the latter of which may be mentioned the French company, with a capitalization of 25,000,000 francs.

It is characteristic of this country to be the pioneer in giving to the world the blessings of Liquid Air, as it has been in taking the initiative in electricity and other inventions, discoveries and improvements in the course of the last half-century. But it is not believed that the developing of this great interest will require the slow successive stages that have been characteristic of its predecessors. Unquestionably, then, Liquid Air has come to stay, bless and enrich the most highly favored of earth's peoples.