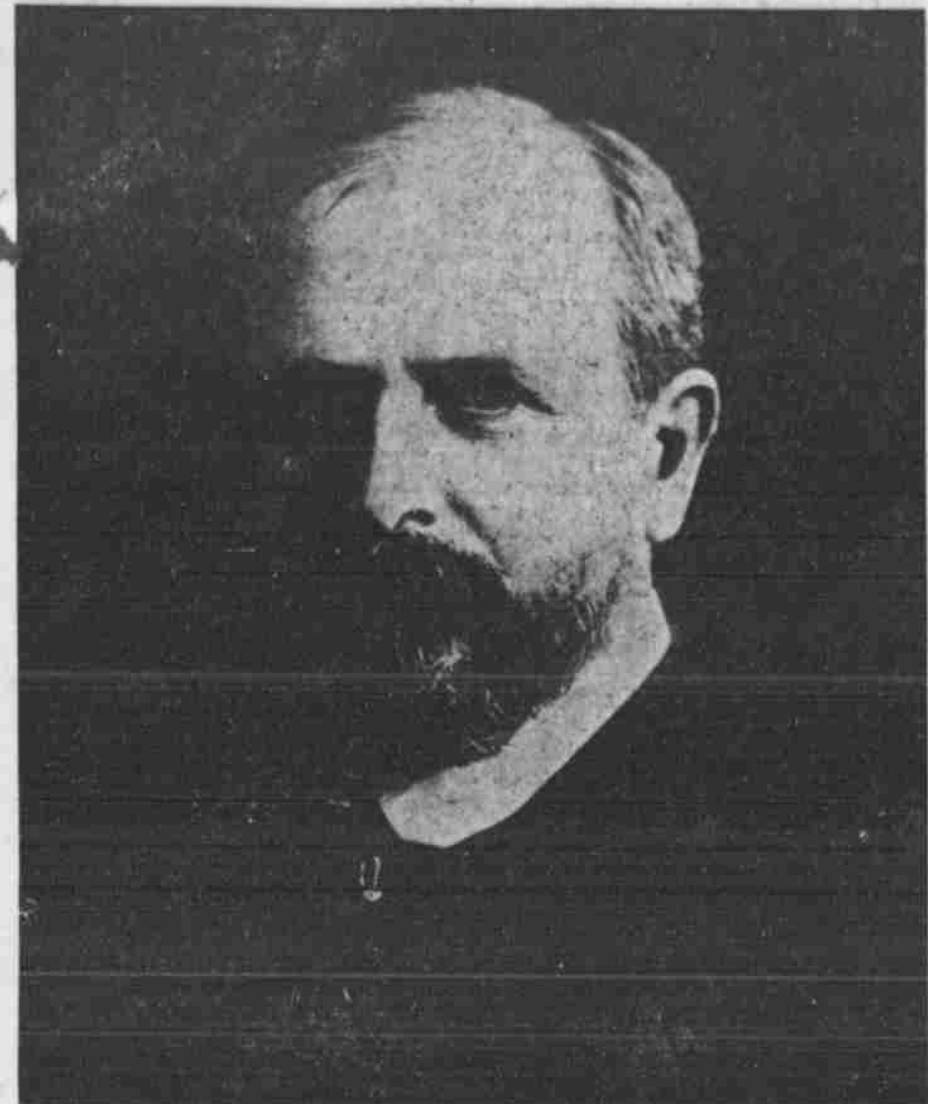
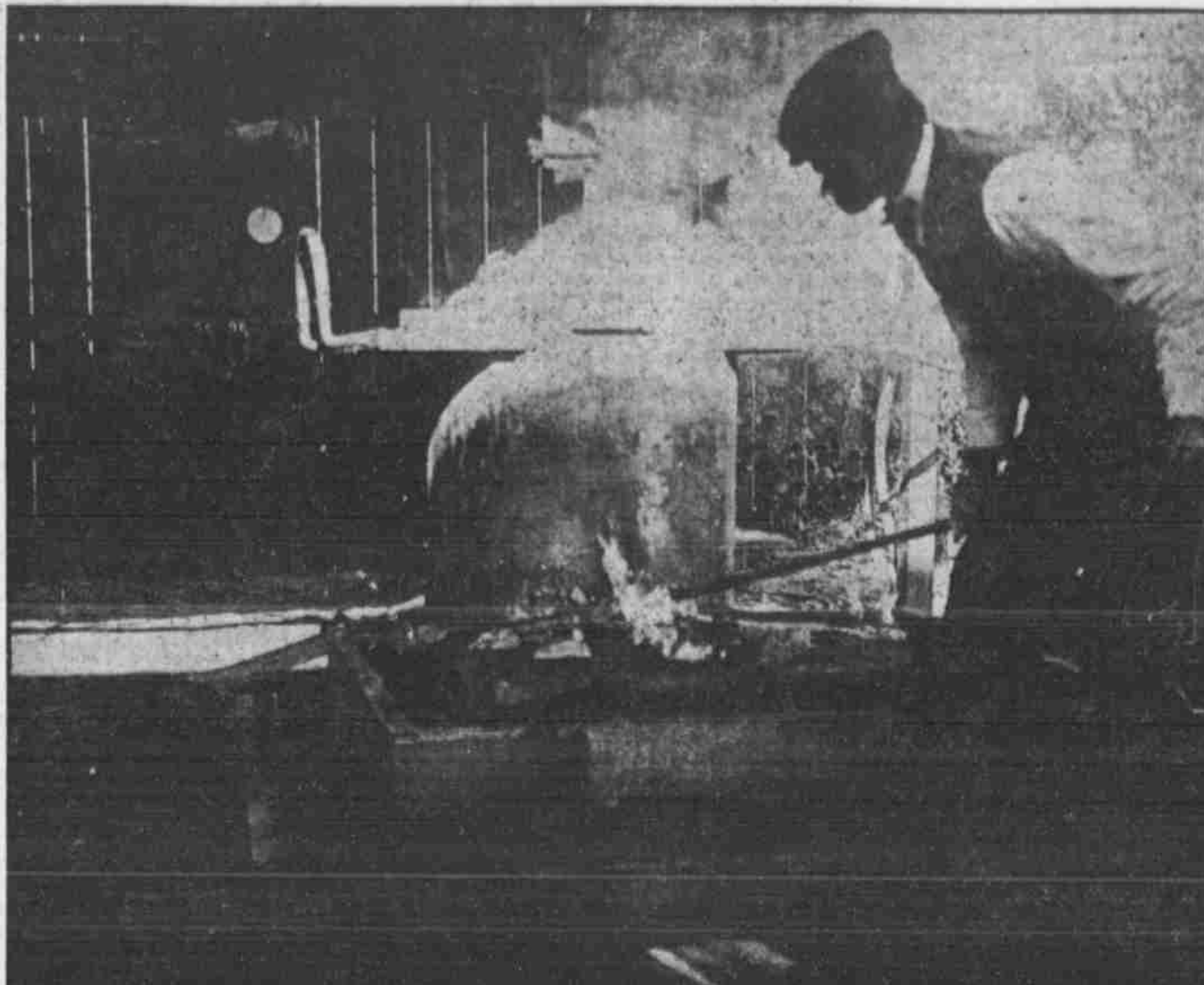


Discoveries of Geological Survey Adds Millions to National Wealth



DR. DAVID DAY.



UNCLE SAM'S ELECTRIC FURNACE SMELTING BLACK SAND.



FIRST STEEL ININGOT CAST FROM BLACK SAND-BY STRANGE CHANCE IT ASSUMED THE FORM OF THE CHINESE CHARACTER FOR GOOD LUCK.

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WASHINGTON, D. C., July 19.—(Special Correspondence of The Bee.)—Within the last year experiments have been made which will revolutionize placer mining all over the world and add millions to the wealth of the United States. They may build up a manufacturing industry on our Pacific slope and populate regions in the northwest which are now as wild as any part of the Rockies. Based upon them, gradations are already forming and they will give small or large fortunes to a great number of people. I refer to the experiments which, at the direction of congress, the geological survey has made and is making as to the minerals found in black sand.

Every miner knows what black sand is. It is the heavier particles which come from the wearing away of rocks containing certain minerals. All sand comes from rock and the greater part of it from quartz. The quartz sands are white or light brown in color. They are found on our Atlantic shores and are scattered here and there all over the country. There are many of them in the west, but there, mixed with them and often in great beds apart from them, are found deposits of black sand. There is so much of this black stuff along the Pacific coast that the seashore is dark and not white when viewed from the ocean. This is the case from Cape Flattery on Puget sound down to San Diego. As one comes closer shore he often sees great masses of black rocks and headlands, the latter made up of layers of black and white sand, one running through the other somewhat like marble cake. These headlands sometimes result from the dropping of the shore, through an earthquake somewhat like that of San Francisco.

This black sand is also found along the big western rivers. The Columbia has many such deposits, and the Snake river is especially rich. Black sand is to be found in every mineral region, and it is more or less connected with every placer mine. When Director Walcott began to investigate the subject, he sent out letters to eight thousand placer miners scattered all over the United States, and asked each to send him a little bag of this black sand with which he was working. More than a thousand of the miners responded and the samples came from thirty-five different states and territories, including the "palachians and the Rockies and all parts of the Pacific coast even to Alaska. The samples were analyzed and assayed for the gold and platinum they contained, and also for the numerous other minerals in them which our scientists thought might be of industrial value. As a result of the assays and the experiments made in the reduction of these sands, at the Portland exposition, it is known that they can be made of enormous value to the country, and that they may bring in millions of dollars of a product every year.

David Day and King Saul. "I am like Saul the son of Kish. I started out to hunt my father's asses and lo! I found a kingdom." Dr. David T. Day, the chief of the mining and mineral resources division of our geological survey, might well have made the above remark as to his work in the black sands, although he did not. I called upon him at the survey the other day and had a long chat with him about his experiments. He has been chief investigator of the black sand minerals and the principal discoveries are due to him.

Dr. Day is one of our best known geologists. He has been connected with the survey for almost a quarter of a century, and has been in charge of the government mining exhibits at our national expositions from the world's fair at Chicago to Portland. It was at Portland last year that the most important of the black sand experiments were made.

In my talk with Dr. Day I asked him how the investigation originated. He told me it was through a search for platinum, a metal which I have referred to above as Saul's father's asses, and in the hunt for which he discovered vast quantities of magnetic iron, chrome iron, and rare minerals valuable in the arts. Chrome iron is used in the manufacture of paints, chrome steel and bichromate of potash. Zircon is valuable in making incandescent gas and electric lights, and monazite and other metals for the same purpose. In addition to them Dr. Day found titanium and, other things of which I write further on.

Hunt for Platinum.

The beginning of the hunt was for platinum and it was the direct outcome of the Japanese-Russian war. The chief platinum mines now known to the world are in the Ural mountains, on the border of Siberia. It is from there that the most of the world's supply comes, and the supply is controlled by a trust which furnishes our American markets with platinum at its own prices. When the war broke out our manufacturers were greatly alarmed, and they sent in petitions to congress to have the geological survey look up platinum in the United States.

The city were left in condition which admits of easy repair. Quite a number of these buildings were in course of erection when the fire came. Work is progressing on all these buildings now, and in several instances the unfinished structures are being pushed to completion so fast that they will be occupied about the time that has been specified before the fire. Among this number is the big nine-story building on the corner of Stockton and Geary streets, opposite the California building, the new home of the California Promotion committee. This great building will be ready for occupancy by October 1. The Monadnock building on Market street, the Chronicle building and the Call building, the Merchants' Exchange, the Kohl building and the Hobart building are already occupied with work going on over the heads of the tenants.

One of the most noticeable features of the reconstruction of San Francisco is the rapidity with which the great office and mercantile buildings of the city are being put in condition for occupancy. It may be mentioned in this connection that nearly all of the class "A" buildings of

It was known that the metal existed in small quantities in many localities, and the object of the petitions was to have America furnish its own supply of this metal and thus beat the trust. The geological survey asked for an appropriation, and got it, but they worded their request so that the work covered all the metals in the black sand.

Worth More Than Gold.

The results of the investigations have shown that we shall supply a large part of our own platinum and that our miners in some localities will make a great deal from this metal in addition to the gold which is almost always found in connection with it. Platinum is a silvery white metal, as hard as iron, and very malleable. It is with one exception the heaviest metal in nature, and still it is so ductile and workable that wires have been made of it which are one-twelve-hundredths of an inch in diameter.

This metal is of great value in the arts. It will not amalgamate with quicksilver, and it is about the only metal which can be used in carrying the electric current through the glass of the incandescent lamp. Every electric globe or bulb has two fine platinum wires running through the glass by which the electricity goes to the filament within. It is used in all kinds of electrical machinery. It is also used in dentistry, and especially for the pins which attach a brand new porcelain tooth to an old snag of a root.

Platinum is used in laboratories for crucibles and other utensils, as it is not attacked by acids, and it is also alloyed with many other metals for various purposes. It has at times been used in Russia for the coinage of high values of money, and, indeed, it is almost always worth more than its weight in gold. It is now bringing upwards of \$30 per ounce. Dr. Day tells me that there is a regular search going on along the coast of Oregon

for a hidden treasure of platinum, somewhat the same as the hunt for Captain Kidd's pirate board off the coast of the Atlantic. As the story goes, this treasure is contained in six pop or ginger bottles, which have been filled with platinum and tightly corked. They were buried in the sands, and there are various traditions as to where they are hidden. A bottle the size of the ordinary cigar filled with platinum is worth at least \$100, and these six bottles contain about \$60,000 worth of this most precious of the white metals. Just where they lie no one has yet been able to ascertain and the hunt goes on.

The average placer miner of the west has long known of the existence of platinum in black sand, but he has never made much effort to save it. This has been owing to the ignorance regarding the metal and its value and also to some unsuccessful attempts to dispose of it. Not long ago a miner from Oregon sent to the east three skins of the sea otter and twenty-five pounds of platinum. He got something like \$1,000 a skin for the otters, but only realized \$1 a pound for his platinum. How he was defrauded I do not know, but at the present prices his platinum should have brought him about \$6,000.

Platinum and Gold.

By the use of the separating tables employed by Dr. Day for getting the metals from the black sand, the grains of platinum and gold are taken out at a cost of a few cents per ton. The platinum which has formerly gone to waste can now be saved, and it will form an important by-product of most placer mines. When found it remains in the sluices with the gold and other heavy materials. In panning, it will even stay behind the gold in the pan. It is known by its great weight, its white color and its resistance to nitric acid. In general, platinum grains are smaller than gold grains and large nuggets are rare. The new experiments with the tables to

be used for saving the ore will result in an enormous increase of gold from certain of our placer mines. So far the most of the gold saved has been by means of mercury in sluice boxes. The dirt containing the gold has been washed into these boxes and saved with quicksilver. A great deal of the gold, however, our geologists now find, has never been touched by the quicksilver. It has been coated with copper or other metals which resist the action of mercury and has been thrown away as waste.

Saved 75 Cents; Lost \$50.

Dr. Day showed me a little bottle containing what looked like grains and scraps of copper, which he told me were grains of almost pure gold. Said he: "The man who owned the mine from which this gold was taken was saving 75 cents for every ton of dirt washed, while he was throwing away \$50 worth of gold as refuse copper. When specimens of the waste were sent to me I thought they were copper. I tested them with nitric acid with no result. I then treated them with hydrochloric acid, and they began to look a little more like gold, and when I showed them to my assistant he said at once that they were gold and he took them and melted them down into a gold button, which was worth \$50 an ounce."

"There is a great deal of gold in the black sand that has never been gotten out," continued Dr. Day, "and there is much black sand, containing quantities of gold, which has not been worked because the proportion of sand was so great that it was hard to handle and the miners preferred to go to other places where the sand was less in quantity, even though it contained less gold. By running the black sand over the Wilfley, Plinder and other tables we find that we can save from 35 to 38 per cent of the gold and platinum, and at the same time separate the other metals so that they can be reduced."

"The gold and platinum are by no means

the only values in the black sand," continued Dr. Day. "There are also metals of industrial worth containing enormous possibilities. A great part of the sand is made up of magnetic iron, which by a little electric furnace made last year we are able to turn into excellent steel. All along the Pacific coast from Puget sound to the southern end of California this black sand exists in great quantities. It lies in deposits back from the coast, on ledges and headlands, and is washed up by the sea at every high tide, being rolled over and over and thrown out upon the beach. In that sand, if it were separated from the other minerals, there is enough iron to fill Lake Superior and make it solid iron ore. This is on the estimate of working sands that contains only 10 per cent of magnetic iron and some contain far more. Suppose we had 500 furnaces situated along that coast, and that each should handle but 100 tons of ore a day. Altogether they would handle 50,000 tons per day, and at 30 days to the year have an annual output of 15,000,000 tons, or about one-third as much as the iron product of the whole United States. That would make the Pacific slope one of the greatest industrial centers of our country, and also the workshop for China, Japan and the remainder of the orient. Indeed, the steel tracks for China's new railroads may yet come from the black sands of the Pacific."

Smelting by Electricity.

Dr. Day tells me that these iron sands can be turned into steel by means of electricity at a lower cost than ordinary iron. It can be smelted with coal. Only a very small amount of coke is needed and the electricity does the work at 50 cents less per ton. This is very important to the Pacific coast, as it is now producing some of the cheapest electricity known to the world. It furnishes it in many places at lower rates than at Niagara, and at as low as 7 or 8 per horsepower per year. This

means that the Pacific slope, with the many streams running down its mountain sides, is just as well off as though it had vast deposits of smelting coal, and that electricity is to make the iron used by the west in the future.

Uncle Sam's Furnace at Portland.

During the Portland exposition Uncle Sam, at the instance of Dr. Day, put up a little furnace there to experiment on these sands. The Canadian government had sent a commission to Europe to report on what is going on there in the reduction of iron by electricity, and it was on the basis of that report that the furnace was made. The man who did the work was an expert named Wilson of the Wilson Aluminum company, which has taken out patents for certain electric furnaces. Mr. Wilson arrived in Portland last October, and at the end of one week he had made a furnace and was producing steel from these sands. His furnace turned out good steel in fifty-pound lots the day it began to work, and it had a capacity of a half ton of steel a day. It was, of course, small and experimental, but it worked right along without a hitch. It was run for a month for \$1,000, and this included the original cost of construction and all labor and cost of operation during that time. To show how quickly it could be worked, Dr. Day and a party started at 2:30 one afternoon, with everything cold, and within less than three hours they had made a quarter of a ton of steel. The sand used for making that steel was from bags brought from Monterey bay, just below San Francisco. The sand was taken from the bags, run over the concentrating tables to get out the gold and other minerals, then dried and the magnetic iron in it taken out and run into steel. At the same time the gold in the sand was melted into a button, and all was done before 5 p. m. If electrical furnaces were established on Monterey bay they might now be furnishing the steel for the rebuilding of San Francisco.

Dr. Day tells me that Uncle Sam's little furnace could be run at a profit for smelting certain kinds of steel, and that for \$50,000 two furnaces could be put up, one for smelting and the other for refining, which would make money right along, day in and day out.

Opportunities for Farmers and Miners.

These new discoveries as to the separation and saving of the metals in the black sands will result in the building up of a part of Oregon which is now so wild that elk roam the woods and that one can buy a bear skin there for 50 cents or a dollar. This is what Dr. Day tells me he paid for skins in those regions. Much of the land is good for farming, but now inaccessible by railroad. Some of it lies along the beach and some on the rivers where there is black sand. In the future the farmers may own their own concentration tables, which they can use for the separation of the metals. They can pile up their iron ore, and in time it will be taken out by the railroads. For a thousand dollars a mining proposition of this kind can be established.

FRANK G. CARPENTER.

(Continued on Page Eight.)

San Francisco's Business Men Defeat Disaster

SAN FRANCISCO, JULY 2.—(Special Correspondence of The Bee.)—Fourteen weeks have passed since the great fire, and San Francisco is being rehabilitated with a speed that is going to astound the world. The Board of Supervisors and the Board of Public Works have decided that sufficient time has elapsed for the property owners to have the streets cleared of debris, and after giving ample notice have taken the matter into the city's hands and will clear the rubbish, making the cost a lien on the property. The work is now well advanced and several of the down town streets have been put in passable condition and the work of rebuilding greatly facilitated.

One of the most noticeable features of the reconstruction of San Francisco is the rapidity with which the great office and mercantile buildings of the city are being put in condition for occupancy. It may be mentioned in this connection that nearly all of the class "A" buildings of

the city were left in condition which admits of easy repair. Quite a number of these buildings were in course of erection when the fire came. Work is progressing on all these buildings now, and in several instances the unfinished structures are being pushed to completion so fast that they will be occupied about the time that has been specified before the fire. Among this number is the big nine-story building on the corner of Stockton and Geary streets, opposite the California building, the new home of the California Promotion committee. This great building will be ready for occupancy by October 1. The Monadnock building on Market street, the Chronicle building and the Call building, the Merchants' Exchange, the Kohl building and the Hobart building are already occupied with work going on over the heads of the tenants.

Army of Men at Work. The 25,000 men now at work on reconstruction will be increased to twice that

number within sixty days. If the calculations of contractors are correct and then the process of rehabilitation will proceed with a rapidity that will be marvelous. Already the Examiner is preparing to work three shifts of men on its building, which will be erected in record time, and then the three morning newspapers will be back in their old homes on Newspaper Corners. The Bulletin, the evening paper, which was first to print in the city after the fire, has let contracts for its new home on Market street, just above Newspaper Corners, and expects to have it finished by the beginning of the new year. These newspapers going back to their new homes so early indicates conclusively that Market street, that great thoroughfare which extends straight through the city from the Ferry station, is to be as it has always been, the main business artery of the city.

One feature which indicates the thoroughness of the reconstruction work is the fact that it is not confined to any one part of the burned district, but is going on in all parts of the city. Not only is this true of the business section, but in the residential portion as well. Cottages are springing up where once fine houses stood, but these cottages are so placed as to permit the erection of large houses on the same lot, the people having a home while their more pretentious houses are being erected. The time for the erection of temporary structures without permit from the Board of Public Works has expired, and now all buildings erected in San Francisco will have to undergo examination in plan and specification before they can be put up. This means that from now on only the better class of buildings, and especially those that are permanent, will be allowed. A different atmosphere seems to have come with July, and while heretofore there has been an element of uncertainty, owing to delay on the part of insurance companies, now everyone appears to know just what he is going to do and is doing it as hard as he can without waiting for his insurance. The result of this changed feeling is that contracts are being let for good and substantial buildings on the old locations, and before the winter rains set in most of the business firms will be housed and ready to do business as of yore.

Handling Relief Work.

In the disbursement of public funds amounting to many millions of dollars, and especially where that fund has come from millions of people, and is to be used to relieve the temporary distress of hundreds of thousands of people, it may be taken as a foregone conclusion that many a captious critic will be dissatisfied and much misunderstanding engendered in the minds of those whose ready response brought prompt preventive to suffering after San Francisco's great fire.

The congress of the United States appropriated a large sum for immediate relief and this was disbursed through the army officials quickly and efficiently. Thousands of people were clothed and fed and housed

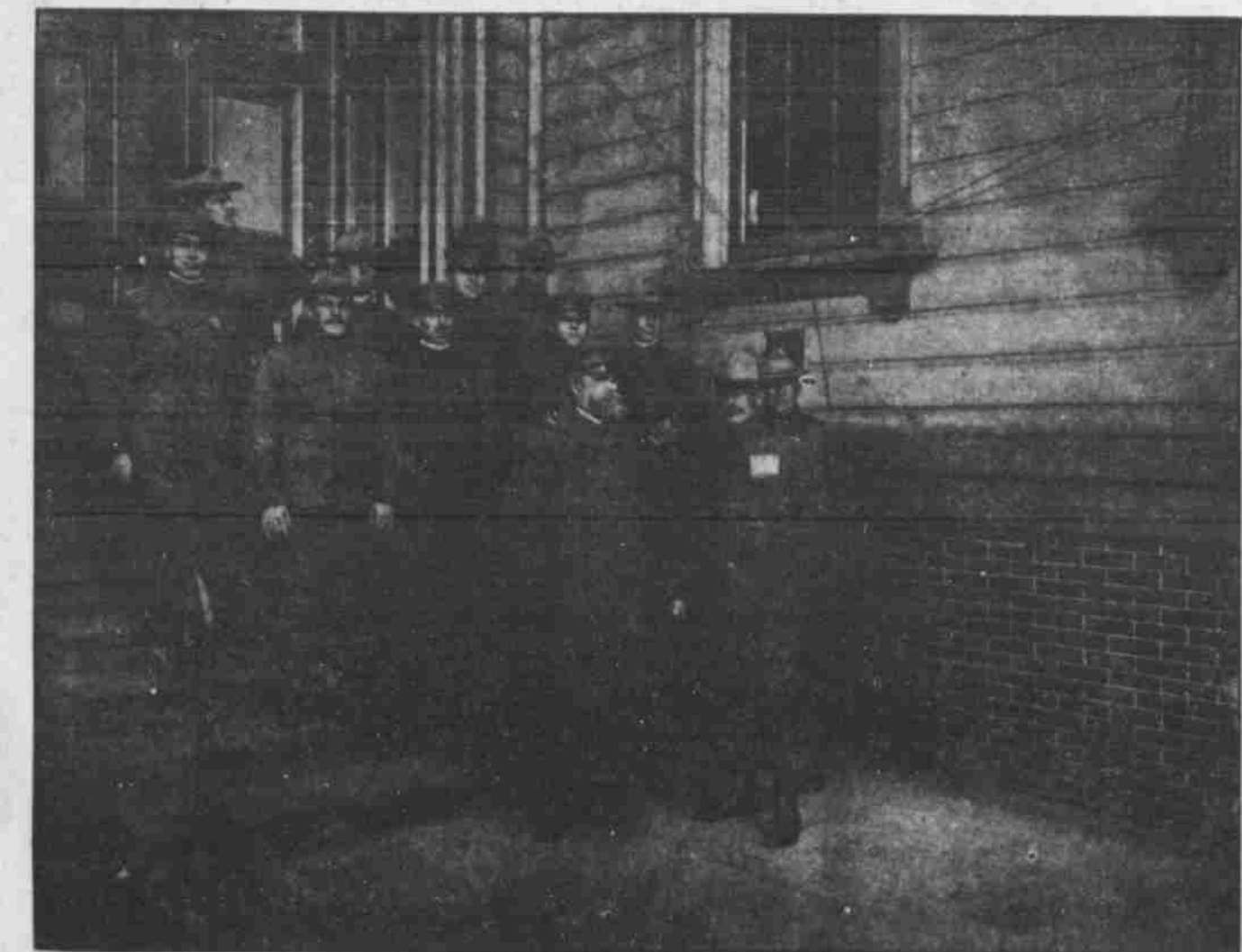
during the early days. But even this splendid work, hampered as it was by the hundreds of unforeseen difficulties and delays owing to railway congestion, was not without its adverse criticism. Major Devo, Major Krauthoff and Captain Ferguson worked through the first three days of relief with no rest and without removing their clothes, night or day, until the system was in perfect working order and the supplies were being distributed without a hitch. Two hundred thousand people, thrown suddenly from comfortable homes onto the charity of the nation, were cared for so well that a mother and child went hungry or suffered for lack of clothing.

Millions from Donations.

But there were other millions of dollars from other trainloads of supplies coming from all parts of the country, sent without stint through that one touch which "makes all the world akin." The distribution of this vast fund of money and supplies was a

task so stupendous as to seem appalling, and naturally the mayor of the city was expected to see to it that the distribution be accomplished in such manner that the best use would be made of the supplies so that the greatest good could come to the greatest number.

In this crisis Mayor Schmitz called into consultation fifty of the representative citizens of San Francisco and appointed them as a relief committee to aid the administration in all matters pertaining to the welfare of the municipality. The citizens' committee was appointed at 3 o'clock on the afternoon of April 18 and held continued session, being compelled to move five times in twenty hours owing to the encroachment of fire. Being composed of men of national reputation in commercial and financial circles, it was a body eminently fitted to supervise all relief measures, assuring by their high character the absolute certainty of a proper distribution



GENERAL GREELY AND HIS STAFF AT HEADQUARTERS IN SAN FRANCISCO MAY 13, 1906.



CLASS A BUILDINGS IN SAN FRANCISCO.