Carbonic Acid Gas to Fertilize the Air
By Dr. Alfred Gradenwitz

Of the principal constituents making up the body of a plant is carbon, representing about one-half of its organic substance. The opinion that this carbon is derived from the soil has long been abandoned, modern investigation having shown atmospheric carbonic acid to be absorbed by the leaves of the chlorophyll or green matter of the leaves and decomposed into its elements in the carbon, in conjunction with the root sap and atmospheric moisture, being

Whereas atmospheric air at present is relatively poor in carbonic acid, of which it contains only about .08 per cent, it is considered that increasing its carbonic acid content and thus producing conditions resembling those of antediluvian ages. In order to enable such a process to be carried on like a common line, a cheap source of carbonic acid had, of course, to be provided.

This was found by Dr. Fr. Riedel of Essen on Ruhr in the combustion gases escaping from all factories, but most abundantly from blast-furnaces, and which so far had been allowed to flow out into the atmosphere without serving any useful purpose. He accordingly set to work designing a process, or for which patents were obtained and which was put to practical tests on a large scale. Three greenhouses were at first erected, one of which served as testing room, while the two others were used for checking purposes. The testing room was supplied with purified and burnt blast-furnace exhaust gases through a line of punctured piping traversing the whole greenhouse in a forward and backward direction. The gas supply was started on June 12th, that is to say, at a time when plant growth was on the best.

On account of the careful cleansing and complete elimination of constituents such as sulfur, the gas found to exert no harmful effects. On the contrary, even a few days after starting the test, there could be observed in the testing room a more luxuriant vegetation than in the checking houses. The leaves of the tastor-oil plant in the greenhouse supplied with gas were found to reach more than one meter in span, whereas the largest leaf of the checking houses was only about 58 centimeters in width. Plants submitted to the influence of carbonic acid gas also showed a marked advance with regard to their height. With the tomatoes planted in another part of the greenhouse a crop was grown from which were obtained 25 kilograms of fruit. The weight of the same number of fruits in the testing room being 81.3 kilograms, that is, 175 per cent more. With the cucumbers planted at the same time a somewhat smaller difference was noted, the yield in the checking houses being 138 kilograms. In the testing house, however, the yield was 70 per cent. An interesting phenomenon noted in connection with this was that, while the cucumbers in the checking houses would exhibit bright spots, those in the testing house, on account of the more plentiful formation of chlorophyll were of a dark green color throughout.

Experiments in the open air were made simultaneously with these greenhouse tests, a square plot of ground being enclosed by punctured cement pipes from which a continuous supply of exhaust gases was escaping. The wind, mostly striking the ground at an angle, would drive the carbonic acid in a variable direction.

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Mechanical Stevedore That Handles Bananas
By Thomas Ewing Dahney

A NEW application of an old principle — which is all that invention has — has met the high cost and scarcity of labor on the wharves of New Orleans, and enabled that port to expand its trade in its most important article of import — namely, bananas. This is a handling device which removes the labor of unloading from shipside to the cars at an estimated saving of 2½ cents a box. New Orleans imports 20,000,000 bunches of bananas a year, this means a gross saving of $500,000. Add to this the saving in time and the fact that there is less damage to the fruit by the mechanical than by the physical method of handling, and the annual saving will not greatly miss the million mark.

About 600 shiploads of bananas are brought to New Orleans a year. The average ship carries 35,000 bunches, which are under present conditions unloaded in about seven hours. Three machines of the type shown in the Scientific American of Oct. 29, 1967, lift the bunches out of the ship and deposit them on the wharf. These machines consist of 50-foot structural towers, with a base 14 by 28 feet, set upon eight wheels resting upon two transverse rails at 14-foot gage. This tower is fitted with a main boom and a plumb marine leg which reaches into the hold of a ship; the bananas are raised in a continuous belt of pockets held between two parallel frame chains which traverse the marine leg, main boom, auxiliary boom and tower, and that moves 125 feet a minute. The bananas are finally deposited at the foot of the tower and then lifted upon the back of laborers, who carry them to the car a couple of hundred feet away. But the bus is too fast for the stevedores. Even with 1,000 men working, the greatest number that can be economically employed on the wharves, it is not possible for the machines to work more than 40 minutes in each hour.

To avoid this 33 per cent loss in time — and because of the rapidity with which bananas ripen, especially in the summer, every minute is worth money. Mr. Steckler, an engineer of the Board of Port Commissioners of Louisiana, set his inventive brain working, and worked out the mechanical means of conveying the bananas from shipside, after they have been delivered on the wharf by the elevator, to the cars. He has tried it out and it has proven a success. Every banana handled in New Orleans is to be equipped with the device as soon as it can be manufactured.

The essential features of the device are an overhead monorail of medium design,

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Wire Rope at Panama

The value of wire rope in constructing the great ditch to connect east and west at Panama can hardly be overestimated. Not only were the powerful "muscles" of the giant shovels and material handling cranes wire rope, but a big factor in the disposition of immense quantities of soil and rock was also wire rope.

To unload the "spools" trains, steel rails were hoisted from end to end by steel cable, pushing the wire rope material off one side. Great was the friction on the cable that smoke was usually seen at intervals along the top of the train where the steel cable was cutting its way into immense boulders picked up by the powerful shovels.

Careful analysis has shown the average steam required for one of the 150 trains operating at the Panama Canal is 25 grams an hour.

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