

# The Graphic Laboratory of Popular Science

## Treatment of Chicago's Sewage

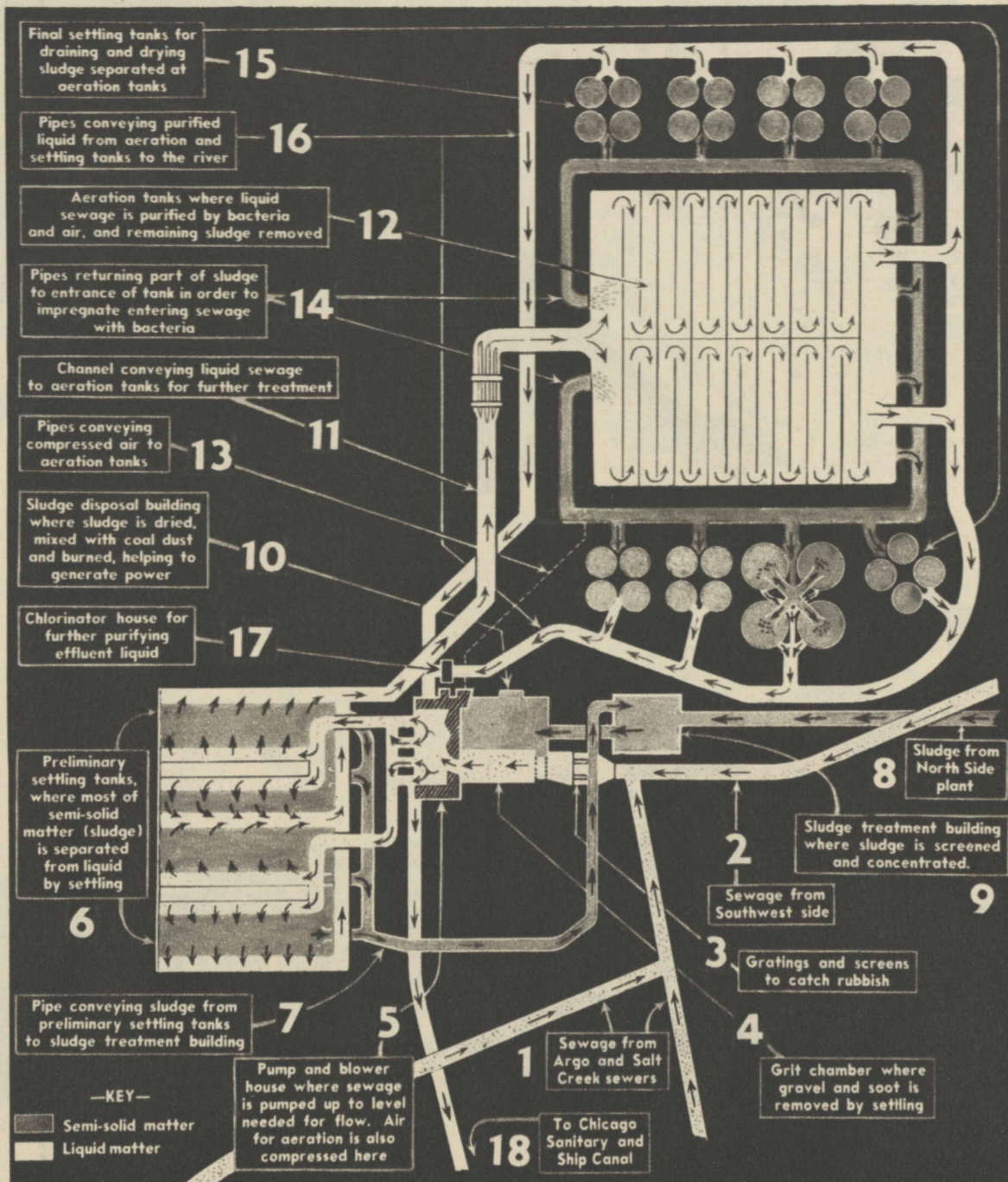
By GUY MURCHIE JR.

THROUGH the 1920s the city's population continued to grow, passing the three million mark. The sanitary district's dilution system continued to function, too, but once again sewage disposal began to slip behind the amazing population rate. The sewers could convey all the sewage into the rivers and canals all right, but the amount of lake water needed to properly dilute the sewage after it got into the rivers and canals was increasing. Presently complaints began to come from other lake cities that Chicago was diverting so much water from the lake that the lake's water level was sinking. At the same time protests were heard from the river towns to the southwest that Chicago was flooding them with half-raw sewage.

The justice of either of these accusations was questionable, but the Supreme court in Washington decreed that by the end of 1938 Chicago must reduce her withdrawal of water from Lake Michigan to 1,500 cubic feet a second, or about one-fourth of what she needed for proper treatment of sewage by dilution.

And so the sanitary district's engineers got busy to find a way of complying with the order. As a matter of fact they had been busy right along, for they had foreseen this very problem and had been experimenting for years as to the best way to solve it. Obviously some system of sewage treatment must be adopted to largely purify the sewage before it reached the rivers and canals, because these waterways would no longer have enough current to do the job.

This artificial sewage treatment would have to be done in centrally located plants, the engineers decided, and therefore many miles of new big sewage tunnels would have to be dug along the river banks to intercept the sewers then emptying into the rivers and to convey the sewage to the plants. The digging of these new intercepting tunnels, some of them as much as twenty-four feet in diameter,



Simplified diagram showing principle of operation of new southwest sewage treatment works.

of the sanitary district its four great modern treatment plants are undoubtedly the most remarkable. They are in effect sewage laundries, but, unlike other laundries, they cannot send their dirt down the drain. They are the drain. Their work of disposing of about 95 per cent of the city's sewage impurities may not impress the casual reader, but if he will consider how he would dispose of a gallon of sewage without throwing it away he can get a better appreciation of the district's task in disposing of about a billion gallons of sewage every day of the year.

There are seven minor treatment plants besides the four big

ones operated by the sanitary district in different parts of the city, but let us inspect the main north side treatment plant to get an idea of just what happens to the 200,000,000 gallons of noxious liquid that that particular plant has to cope with daily. The working of the new southwest plant is described in the diagram above. When the sewage of the north side arrives at the treatment plant it is in a huge tunnel lined with concrete and about thirty feet underground. It first passes through a grating or coarse strainer which is designed to remove any boards or large objects which might injure the pumps it must go through later.

Then come the pumps, big centrifugal pumps which pump

it up to the level necessary for letting it flow through the treatment processes by gravity. After this it passes through a screen of relatively fine mesh which serves to weed out the smaller jetsam. An attendant watches this screen to remove objects that collect there. His job may sound unappetizing, but actually it is one of the most exciting and glamorous jobs in the entire sanitary district. One night not long ago a hundred-dollar bill drifted along on the seamy tide to be picked off the grating by the wide-eyed watchman, and several times lesser bills have appeared, to say nothing of jewelry and other booty. If you are a prospector, however,

off as a thick, soupy slime, sometimes called sludge.

Having got rid of the heaviest third of its impurities, the sewage now enters the heart of the plant, where the real cleansing work is done—the aeration tanks. These tanks are 420 feet long, and the liquid is slowed down so that it takes about five hours to pass through them. The bacteria now get their chance to disintegrate the sewage under the most favorable conditions. Bacteria are pumped in among the sewage in the form of half-disintegrated sludge, which is the solid matter that is separated from the sewage after the aeration process, and most of which matter is piped back and reintroduced at the entrance of the aeration tanks to prime the new sewage with plenty of bacteria. Thus the sludge keeps circulating in what some of the engineers call a merry-go-round, distributing bacteria to the new sewage each time around, until finally drawn off. As the bacteria-laden sewage mixed with sludge passes slowly through the aeration tanks it is given quantities of oxygen in order to stimulate the microbes to high activity. The oxygen rises up through the fifteen feet of liquid in the form of tiny bubbles, the aeration tank being equipped with porous plates at the bottom, through which compressed air is forced.

By the time the liquid sewage reaches the end of the aeration tank 92 per cent of its impurities have been separated from it or disintegrated by the bacteria, and the particles of sludge suspended in it are easily removed by settling or filtering, whereupon the relatively pure water is ready to overflow into the river. So little purification remains to be done that the river can safely accomplish it in a very few miles. Medical authorities say that there is no actual menace to health in the unpleasant odor caused by the river's present semi-stagnation.

As for the sludge, as fast as it is drawn off the tank bottoms it is pumped to the disposal plant along with the solid matter obtained in the preliminary settling tanks. Here it is dried and burned. But sludge disposal is not as simple as that sounds, for how are you going to dry a vast daily swamp of slimy sludge? How are you going to keep its odor from nauseating



General view of southwest sewage treatment works, capable of handling 600,000,000 gallons of sewage a day.

or big enough to swallow a double-deck bus, with room for another double-deck bus on its top, has been going on for the last seven years and is now virtually complete. The district has built more than 166 miles of these intercepting sewers, and today they prevent all but a tiny portion of the city's sewage from reaching the rivers or canals until it has been treated.

Despite these intercepting sewers carrying the wastes of the city to treatment plants, the decreed reduction of water flow out of Lake Michigan has slowed up the river enough to make it semi-stagnant and to create an obnoxious odor even from the almost purified sewage that goes into it.

Of all the remarkable works

ones operated by the sanitary district in different parts of the city, but let us inspect the main north side treatment plant to get an idea of just what happens to the 200,000,000 gallons of noxious liquid that that particular plant has to cope with daily. The working of the new southwest plant is described in the diagram above. When the sewage of the north side arrives at the treatment plant it is in a huge tunnel lined with concrete and about thirty feet underground. It first passes through a grating or coarse strainer which is designed to remove any boards or large objects which might injure the pumps it must go through later.

Then come the pumps, big centrifugal pumps which pump

# Mostly About Dogs

By BOB BECKER

## Fashions in Dogs Hard to Explain

ASSIGNING reasons for the popularity or the lack of favor of certain breeds of dogs is as difficult as explaining the rise and fall of miniature golf. Many of the breeds have gained wide favor because they have fallen into the hands of American celebrities who focused attention on them. On the other hand, many other breeds have been associated with certain well known people for many years and they're still not well known to the general public.

If you examine the history of certain breeds you'll find that they sort of skyrocketed to fame and popularity after they were recognized by the American Kennel club. As soon as they were given an official O. K. by the organization they started on the road to success. Others are in America for a long time, maybe twenty years or more, before they catch on with the public.

The average dog owner is apt to be startled when he looks over the list of more than 100 breeds now recognized by the American Kennel club. He's startled because he can't believe there are that many! Years may go by before he is able to see in fairly good-sized dog shows just one representative of some of the breeds. And more years may go by before he finds any of these rare breeds kept as a pet in a home.

A good illustration of the way some of the old breeds recognized by the A. K. C. fade out of the picture is the Maltese. (It's a spaniel, not a terrier.) We saw one of these clever little dogs in Florida several years ago. It was the first pet dog of this breed that we ever saw anywhere in the United States. And we haven't seen one since then. Not even the 1939 Westminster show in New York had a Maltese entry. This is a very old breed of dog, smart, active, friendly, and not hard to keep. (It's been known for twenty-eight centuries.) It's ideal as a small companion dog. Yet the Maltese is unknown today, an almost forgotten breed.

One of the slowest movers in the race for popularity has been the Bedlington terrier. The first specimen of this breed was registered in America in 1886. In 1926, after forty years in this country, the yearly Bedlington registration was only ten dogs. (Compare this with the 1938 registration of 16,844 for the popular cocker spaniel.) After 1926 the Bedlington gained slowly.



Wallace Beery is one of many dog lovers among the moving picture stars. He is shown here with one of his Irish setters.

But it wasn't until about five years ago that this breed went into high gear. Last year 157 specimens were registered, and 1939 may see another big increase. The public is beginning to talk about "the dog that looks like a lamb" or "the dog with the sheep's head." If they keep on with this talk more people may buy Bedlingtons!

The boxer has been a slow starter in this country, but after doing little for years it's now going places. This breed came to the United States around 1904. In 1926 (after twenty-two years in this country) it could muster a yearly registration of only eighteen dogs! This figure alone tells the story of how this unusual looking breed failed to catch the eye of the dog fanciers. Then in 1933 the boxer got under way. Registrations jumped from twenty-one to seventy-four. Since then it has



The bull terrier is a dog of great strength, agility, and courage. This head study is of Colmore Lady.

and get it. It is by this time an innocuous and almost odorless substance.

The latter method of sewage disposal is less efficient than the aeration-coagulation method used at the other plants, and it was originally undertaken as an experiment. In fact, all of the sanitary district's treatment processes have been worked out by experiments, largely in the district's own plants—for artificial sewage disposal on the scale required in Chicago is something new in the world, and the sanitary district has had few precedents to go by. The truth is that the bounty of Lake Michigan enables Chicago to use much more water, and therefore produce much more sewage, than any other city.

Perhaps you have wondered about the control works so conspicuously installed by the district last year at the mouth of the Chicago river, and seeming to block it. This is a navigation lock 600 feet long, through which ships can pass at any time, but which provides a water-tight gate to prevent the escape of any river water into the lake.

been moving at almost the same speed. Go to a dog show and you see handsome imported and American-bred boxers getting much attention. Some of them have been winning working group honors. Some have gone best in show. The public is getting more interested in them. Good kennels specializing in the breed have helped.

No better example of how a breed rises to the top and then fades can be cited than the pug dog. A great favorite in the gay nineties, when it was *the* dog, the pug went down hill fast. Kennels quit breeding them. Nobody wanted them for pets. For a while you saw few if any in dog shows. Now that smart little breed, after being threatened with oblivion, is beginning to come back. A handy size, hardy and intelligent, there is no reason why it shouldn't win more friends.

The Pembroke Welsh Corgi is an example of a new breed that came up fast. Only in this country five years, it had 135 A. K. C. registrations in 1938. The Corgi doubtless will get more attention in England, too. It's the mark of royal attention now that England's two little princesses are devoted to a Corgi, their favorite dog pet.

So there is no telling what may happen to a breed in America. The public is fickle. A breed that is king this year may be just an also-ran, unwanted, bringing no prices, and having little popularity, possibly within a decade. On the other hand, the Boston terrier enjoyed a long period of public favor and still is popular, although it has had to yield first place to the cocker spaniel.

It was made necessary by the Supreme court's decree (already mentioned) ordering the slowing up of the river's current and making it liable to reverse its flow after a hard rain.

The sanitary district's lock and dam at Lockport, Ill., also exercise control over the river's flow, and the dam provides power to work the district's pumping stations as well as to light some of the streets and parks of Chicago and suburbs.

Total cost of Chicago's artificial treatment system for sewage comes to about \$162,697,000, or \$34.75 for each person served, and the yearly operating cost will remain at about \$1.17 a person. This is not very burdensome when you reflect that the scourge of typhoid fever has virtually disappeared from Chicago. From 5,600 deaths by typhoid per 100,000 people each year of the decade before 1855, the rate since 1930 has fallen to only one death per 100,000 people every three years.

This is the third and last article of a series on Chicago's system of sanitation.



For attractive offers of dogs, turn to the Dogs, Cats, Birds, and Pets columns in the want ad section of today's Tribune.