

# RADIO

## HOW THE STORAGE BATTERY OPERATES

### Operator Must Guard Against an Excessive Rate of Charge or Discharge

It is possible to form the plates of a lead storage battery by immersing lead plates in a 20 per cent solution of sulphuric acid and continuously going through the charging and discharging process. However, this is a long and tedious process to get oxide of lead on the positive plates by means of numerous charging and discharging cycles. The oxide, which is the active material, is manufactured chemically and applied to the plates.

The body of manufactured plates is cast from lead in such a manner as to leave the surface honeycombed. In this honeycombed surface of the plates is forced a paste, formed by sulphuric acid and lead peroxide, which is the active material. The active material in a lead storage battery is the lead peroxide on the positive plate, the sponge lead of the negative plate and the sulphuric acid electrolyte.

When a storage battery is discharged, that is, while a current is being drawn from it, a chemical action takes place in the battery. The lead peroxide on the positive plate and the sulphuric acid of the electrolyte react to form lead sulphate and water. Acid is more dense than water, so that when fully charged the electrolyte has a density of 1.275 to 1.300, which means that the electrolyte is 1.275 to 1.3 times as heavy as an equal volume of water. As the battery is discharged and water is formed by the chemical action, the electrolyte becomes less dense. Finally, when the density drops to 1.00 to 1.150, the battery reaches a point when charging is necessary. Thus the density of the electrolyte is a measure of how much energy a fully charged battery has.

The voltage of a battery is also an indication of the degree of charge. A fully charged battery should have an open circuit voltage of .22 volts per cell.

The voltage per cell should not be allowed to drop below .15 before recharging.

When a storage battery is put on charge, a direct current is forced through the battery. The chemical reaction that takes place during the charging process is just the reverse of that which takes place during the process of discharging. That is to say, the lead sulphate and water formed during the discharge are converted back into lead peroxide and sulphuric acid. The formation of sulphuric acid during the charging process causes the density of the electrolyte to increase. The density of the electrolyte of a fully charged battery is between 1.275 and 1.300, while the open circuit voltage per cell is about .22.

Of course, a storage battery is not 100 per cent efficient, which means that the total ampere hours delivered to the battery during the charging period will always exceed the total ampere hours drawn from the battery during the discharge period. The voltage per cell and the specific gravity of the electrolyte are the criteria of the degree of charge in the battery. However, due to the fact that some of the lead sulphate is not readily converted into lead peroxide and sulphuric acid, it is necessary at times to give the battery an over charge. That is, the charging current should be allowed to flow after the battery has reached the charged condition, until after several hours of constant charging there is no increase in the voltage per cell or the density of the electrolyte.

The value of the charging current is determined by the manufacturer and should not be exceeded. An excessive charging current will cause an increase in the rate of deterioration of the plates. Every time a battery is charged or discharged a certain amount of active material on the plates crumbles and drops to the bottom of the cell.

Assuming the same operating conditions, the life of a storage battery is a certain number of charges and discharges. An excessive rate of charge or discharge will cause the battery to heat, buckle the plates, and result in an abnormal amount of crumbling of the active material. In the extreme case of a short circuit, the plates of the battery might be buckled to such an extent that an internal short circuit is formed in the battery. To guard against short circuits it is well when using a lead plate storage battery to install a fuse in both battery leads right near the terminals of the battery. Don't make any conditions worse by placing a pair of pliers or a screw driver across the terminals. This will eventually ruin the battery.

The water will evaporate out of the electrolyte of a battery and should be replaced. Always add enough distilled water to keep the electrolyte at least a quarter of an inch above the

plates in each cell. Should it be necessary to clean out the cells at any time, measure the specific gravity of the old electrolyte. By doing this no false readings of electrolyte density confound the tester as to the condition of the newly cleaned battery.

When using a storage battery in connection with a radio receiver allow the battery to stand a time just after being charged before it is placed in use. Otherwise the unstable condition of the voltage will cause disagreeable noises in the head phones caused by the varying amplification of the tubes.

### GROWTH OF RADIO INDUSTRY

Between Two and Three Million Fans Have Bought and Installed Receiving Sets.

A little more than a year ago many of the old established manufacturers of radio apparatus were wondering how they would dispose of their stock. Many dealers were just raking a bare living at selling radio apparatus. Just about 300,000 radio amateurs scattered throughout the United States constituted the field for sales of radio goods and apparatus.

Since then a great change has taken place. Radio has come upon the country as a tide. Old apparatus, instruments manufactured under patents 15 years old, ordinary double slide crystal detector sets were becoming immensely popular.

It is said that there are almost 600 incorporated manufacturers of radio apparatus in the United States today. It is impossible to estimate the number of dealers. There are some two or three million fans who have bought and installed radio receiving sets.

These sets receive music and other broadcast matter from some 600 or more broadcasting stations located in every state in the Union. Every state but one has one or more stations, and some states have as many as 21.

With the establishment of more solid radio regulations, with the advent of fair competition and intelligent manufacture of radio apparatus of good design the instant radio baby is growing lustily.

Select Receiving Set Carefully. When making a purchase, ask the dealer to show you the inside of the set. If all connections are not soldered the wires will become loose and reception will be impossible. Paste or acid, if spread carelessly over the wiring, or dirt inside the receiving box will cause trouble. If things have been allowed to get into the telephone receiver, the attraction of the magnets will gradually cause them to make their way through the insulation and render the phones worthless. Watch out for these difficulties and avoid the disappointment that comes when a radio enthusiast gets all set for listening, but can't.

### Schools Compete in Radio

New Jersey public educational institutions have hit upon the idea of competition among the various schools and grades in the construction of radio phone sets. Thus far more than 4,000 complete sets, some of them of the more complicated nature, have been turned out in the schools. The authorities say that boys are learning more through wireless about electricity, circuits, batteries, the telephone and other than any textbook could ever teach.

### Reason for Short Wiring

The reason that you are urged to use short wiring and right-angle turns in connecting a set is a simple one. Every wire carrying an electric current has a magnetic field; if two wires are placed near each other they will absorb current, but if placed at right angles they will oppose each other which is just what they should do. If you run the wires long, they will, of course, meet with other long leads, and there will be adverse induction.

### Wireless Invades Arctic

Wireless has invaded the Arctic territory, a powerful radio station having been established on the Norwegian island of Jan Mayen. It communicates with Norwegian, English and Swedish meteorological stations and was designed for service to sealing and whaling vessels that put in at Jan Mayen.

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Includes a special Murdock Headset  
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### WANTED THAT CARD TABLE

Boy Was Taking No Chances, Even Though He Was Bidding Against Himself.

He was the most persuasive auctioneer the Woman has ever seen—or heard. There was such a compelling tone to his voice, such a pleading note when the bidding lagged, that the Woman was almost inclined to offer a bid or two herself. And that she certainly had had no intention of doing when she had scrambled on a sudden impulse to the alluring invitation of the red flag that announced "Auction today."

The bidding seemed to be going slowly and the auctioneer leaned far forward, exhorted, carefully and pleading with evanescent fervor. Item number 76, a folding card table, was put upon the stand and a nervous tow-haired youth in the second row bid \$1.

"One dollar I am bid. Do I hear two? Will any one make it two. A folding card table in first-class condition. It folds, ladies and gentlemen. A bargain! Will any one say \$2?"

I was beginning to wonder whether I could in some way use the table myself when the tow-haired youth spoke again.

"Two dollars," he said.

The auctioneer looked at him scornfully. "Your bid is \$1," he said.

The boy's face grew very red under his tow hair, but he stuck to his guns.

"I know, but it's \$2 now," he replied firmly.

"Sold," the persuasive auctioneer announced promptly amid general laughter, in which even the boy joined. —Chicago Journal.

### NO HOPE FOR THAT CLASS

Witty Individual Put Reckless Drivers Beyond the Possibility of Eternal Salvation.

Speeding motorists have inspired many village scribes to eloquence in the signs warning against extravagant use of gasoline in passing through their localities. A sign in a Jersey town reads: "Perpetration reads: 'Drive slow and see out town; drive fast and see our jail.'—An American variation of the Russian proverb that 'They drive farthest who drive slow.' But the prize warning to speeders is that which confronts the motorist on approaching a little Connecticut village. The Salvation Army, in its practical work of propagating the faith along the highways and byways, had painted a Biblical paraphrase on a road sign to the effect that 'Jesus is powerful to save all.' Underneath in fresh letters was added, 'except reckless drivers.'—Wall Street Journal.

### Lafayette's Home a Club

Lafayette, we are here again! The chateau de Chavagnac in the Upper Loire, birthplace of the illustrious marquis which the family was unable to retain, has become the property of a group of Americans. Numerous repairs and improvements have been made and the old place is now a club for American visitors.

There is a splendid view from the terrace of the chateau and the air is fine and fresh. Visitors will find comfortable equipment, spacious grounds, a golf course, tennis courts and other athletic features. Also they will have the satisfaction of observing beneath the eaves of which sheltered the infancy of the hero whom they so ardently admire. From Le Petit Parisien, Paris. (Translated for the Kansas City Star.)

### The Way They Are

In one of the big city railway stations two men labor through the hours to remove wads of chewing gum travelers have tossed on the floor.

They are tolerant, these tollers. They do not denounce an uncontrolled and ill-used humanity which makes such toll necessary. Patiently they scrub away, freeing the floor of gum so that it is in a suitable state for the application of mop and cleaning fluid.

"No," they say, pausing a moment in their diligent scraping. "No, we ain't got anything against 'em, they're like that. Just exactly like that. That's the way they are."

### Color Grades for Honey

Samples of honey are being received by the United States Department of Agriculture from beekeepers in all parts of the country in connection with the work of establishing reliable color grades for extracted honey. A new type of spectrophotometer will be used in this work, which will be done by agriculturists of the department in co-operation with the division of grades and standards of the bureau of agricultural economics. It is also planned to use the honey examined in other investigations. The pollen content of the honeys will be identified by the microchemical laboratory of the bureau of chemistry.

### BIG STATION FOR HOLLAND

During the late war Holland was cut off from all direct cable communication with her colonies. In order to avoid possible repetition she is to establish a very powerful radio station at Kootwyk equipped with apparatus to teach as far as Java, 7,500 miles.

### NOT A HERO TO OLDTIMER

Veteran of Hannibal Could Not Be Forced to Admit Greatness of Mark Twain.

A scribe in search of Mark Twain material was pestering some of the graybeards of Hannibal. He found one who confessed to being a few years older than the famous humorist. In their boyhood days they had attended school together, forged about on Pirates' Island, climbed Holiday Hill and pushed big stones over the brink, and carried out pretty faithfully the program as described in "Tom Sawyer."

But while the visitor was asking questions he noticed the old timer was not impressed. So he asked: "Tom Sawyer was a great book, don't you think?"

"I reckon so—I never read it."

"And everybody says 'Huck Finn' was a masterpiece?"

"Uh-huh!"

"And 'Tom Sawyer,' the visitor said, 'was practically a story of Hannibal—you certainly liked that?'"

"Oh, I guess it was all right for kids," admitted the boyhood chum, "but grownups don't see so awful much in it from what I hear."

"Don't you think Mark Twain was a great man?"

"They say he was," evaded the old timer. "But I beat him once in a speltin' match."—Kansas City Star.

### PROTEST MADE BY MUSCLES

Important Parts of the Human Body That Occasionally Cause Trouble by Going "On Strike."

When the brain calls upon any particular group of muscles to perform the same action over and over again they are apt to show their dissatisfaction by declaring a strike.

A typical case in point is "tennis elbow," from which complaint most ardent devotees of the game have suffered at some time or other.

The symptoms vary from mere stiffness of the elbow joint to severe cramp, culminating in some instances in temporary inability to use the arm for any purpose. Sometimes, too, there is a painful swelling of the forearm.

A kindred complaint is "tennis leg," which affects in a somewhat similar manner the muscles of the calves and the knee joints. Another example where the leg muscles are the victims is afforded by "riders' sprain," a complaint to which polo players are found to be peculiarly liable.

Then, again, there is a complaint which is called "golfer's side," brought about through straining the abdominal muscles. —Cleveland Plain Dealer.

### Modifying Goldfish

Many of the grotesque forms which mark some of the popular types of goldfish are the outcome of centuries of laborious work by the patient, persevering and ingenious Japanese, in taking advantage of some curious freak of nature. It is a well-known fact that fish eggs are given a jarring at a certain stage, or, more specifically, about the "eyeing" period, monstrousities may be produced. This occurs frequently among brook trout, the most common irregularities being humpback and looped. It is said that when the Japanese discovered this peculiarity they selected from their golden camp a pair of the most pronounced monstruosities, similar in form, reared them and bred from them. The most marked of this progeny were again selected and bred, and this process continued until a desired type was produced and fairly fixed by hatching without the jarring. Thus were produced the fringed tails, the balloon shape, the telescope, and some other of the outlandish forms seen in aquariums.

### Severe Chinese Punishments

It is enacted in the laws of China that "if a man, in the strength of his power or credit, steal the wife or daughter of any freeman, he shall be imprisoned for the usual time, and then put to death by strangulation." The poor man so sinning is beaten and imprisoned only. The heaviest punishment that can befall the woman is castration and sale. And in no instance can she be sold but to a man who binds himself by the most sacred of all Chinese oaths to treat her kindly. In some provinces she may be sold, not by her husband, but by the judge before whom her offense is proved.

A Chinese who forgives a wife who has not kept her marital vows, receives 20 strokes of the bamboo. A man who convives at his wife's frailty is most severely punished.

### New Use for Filter

The Buffums are great tourists. During the summer there isn't a week-end they miss going out in their little open car. They never miss a bet. There isn't one of the better-known week-end resorts they fail to visit. But as soon as the cold weather comes the car is drained of water and the storage battery is put in the cellar until spring.

Neighbors of the Buffums have noticed Mrs. Buffum making frequent visits to the garage of late, bearing covered dishes and paper packages of food. One neighbor was finally constrained to find out what these processions meant. Mrs. Buffum explained: "Our house is so hot," she said, "that we needed more ice than in summer, so I'm using the car as an icebox. And I'm saving the price of five gallons of gas a week on my ice bill."

### She Was Misunderstood

By ELLA SAUNDERS

(© 1922, Western Newspaper Union.)

This is the story of Madge Evans, one of those girls who don't run true to type—God pity them!

You can picture her, with her dark hair and strange eyes, with the far-away look in them, playing by herself when she was a child; then, at school, walking alone when the girls went home in pairs. No one took much notice of her.

What was she thinking of? She was no embryo genius. Just solitary. Her parents were ordinary people, but they had three other children, and so they did not bother to understand her. Her brothers and sisters were afraid of her. She had queer fits of temper. Her she gave away everything she owned. And that was odd for a small town.

She went to a business school and became a stenographer with a law firm. Young Rawlins made her his private secretary after awhile. Then, suddenly, she left. Rawlins had been persecuting her. But everybody said it was the girl who had been in fault for encouraging him. You see, one who it is not of the herd the herd tramples on.

She got another position in the bank, and one day five ten-dollar bills were missing. No one ever found out who had taken them. But suspicion fell upon Madge Evans, because she colored and became sullen under cross-examination.

Taken then? The girl didn't know what dishonesty meant. Still, she was not of the herd. She was dismissed on some pretext at the end of the month. After that she was disgraced in the town. People shunned her.

Charles Lathrop was a newcomer. When he arrived to take up the local branch of his insurance company Madge had been living at home, helping her mother for three years. She and her mother did not get on together, and she was unhappy. The scandal about the bank had died down. Young Lathrop got to know Madge. They seemed to like each other. Sometimes they were seen walking together. Then tongues began to wag.

After a while the story of the bank got to young Lathrop's ears. He traced it to its source in Miss Hepzibah Gleeed, the old maid who lived in the cottage under the elms. He went to see her, but he did not see her; he found a written retraction from her.

Tongues buzzed more than ever at that. It was clear that they were more friendly than they ought to be. Why didn't they get married, even if Mr. Lathrop had a widowed mother to support and was waiting for a message of salary?

Mr. Rawlins was a little intoxicated one day and began talking reminiscences in the country club. Madge's name came up. He dismissed the girl with a sneer. Mr. Lathrop overheard. He demanded an explanation.

"What's your right?" demanded Rawlins.

"This," said Lathrop, knocking him down.

After that tongues buzzed like hornets in an empty garret. They were watched, spied upon. Their friendship, harmless as it was, proved impossible. Madge Evans had promised to wait any number of years for him. But the Lathrops began to be cut by the townsfolk, and Lathrop's mother, a querulous old invalid, was in despair. She was always pouring poison about the girl into her son's ears.

Then Lathrop was moved to a larger town. He was to get an increase of salary. He had an interview with Madge before he went. People saw her radiant face and hated her the more. After he had gone she became an outcast from the community.

Weeks went by, turned into months. Gradually Madge ceased to smile, one day, a letter came. No one ever knew what was in it, but a week later they read the announcement of Lathrop's marriage in the county newspaper.

After that Madge got a position in New York, going in on the train every day and coming back in the evening. A little later her mother died. She had no ties in the village.

That was a month before young Rawlins disappeared with those trust funds. His father paid; covered up the scandal. He returned two months later, and it was pretended he had an attack of mental aberration from overwork. He is now a respected citizen, and has a wife and five children.

Madge? Oh, she disappeared at the same time Rawlins did, but no one bothered to wonder what happened to her. If ever Rawlins' conscience wakes him, he takes out his bankbook, or looks at his blooming wife presiding over his table.

But I saw Madge on Broadway last week. At first she denied herself. Then she looked at me with haggard eyes.

"Coming back to see the old town?" she asked. "Say, if I came it would be to get under the hide of some of those suckers there."

Which was not the kind of speech she used to use before the trust funds episode.

Then the Lady Shut Up. "Do tell us, professor," exclaimed the gushy female, "about those shocking natives you met in the South seas?"

"Gladly, ma'am," replied the professor. "I have witnessed better manners among half-naked savages on a coral reef than I've seen in the banks of wealth and fashion."—Birmingham Age-Herald.

### TABLE MANNERS IN ARABIA

As Might Reasonably Be Expected, They Are Primitive in the Extreme.

Manners vary according to time and locality, so they say. For instance, in Arabia a young woman's table etiquette is judged by the skill with which she scrapes the dish with her finger and conveys the results to her mouth. American relief workers, writing from Ismid, Turkey, give an account of a family luncheon party of a half-dozen Armenian girls who had been rescued from Arab harems that is a most enlightening glimpse on manners of the Near East.

"It was during some games we held that the girls who had been in captivity among the Arabs acted on the native customs of their former masters. They ate without fork or knife or spoon from a common dish placed on the ground in their midst. One girl showed us how the Arabs eat hot food. With her finger tips she smeared the food around the edges of the plate with a circular movement, blowing her fingers from time to time. When the dish was well smeared, she scooped up the food with the same circular movement and carried it into her mouth. She can eat thick soup thus, and more quickly than you could with a spoon. The soup running down her wrist was licked off hurriedly and another scoopful taken, for there was a circle of girls around the dish, and the slow ones lose out."

### BEAUTY THAT IS PERENNIAL

According to Medical Writer, It Can Only Be Destroyed by Incorrect Mode of Living.

There is a beauty which cannot be destroyed by time. Like Venus, it is perennial, youth carried through middle age and the later years of life. Wise women are commencing to learn that year by year they are making history and writing it in themselves, in the pose of the head, the contour of the body and above all in the revealing presentation of the face. C. Ward Crumpton, M. D., writes in the Health Builder. The telltale years will tell their tale with inexorable certainty. It may be of wholesomeness, even temper, good digestion and trained nerves and these will show in the beauty tempered, matured and refined by time instead of made gross. The radiance of wholesomeness may rival the brilliance of youth. Or, instead, the history written may be revealed in a leathery facial hide, hardened by alcohol, tanned by cigarette smoke and discolored by the unbuffered toxins of dinner, large and late, wrinkled into permanent ripples, the traces of a thousand nervous storms and sagging under the fat of a thousand excesses. No amount of application from without can change the exhibition of the unwholesome realities within.

### Fierce Wars Over Cinnamon

For over 200 years war raged and nation succeeded nation in possession of the island of Ceylon, in their greed to obtain the fragrant cinnamon. Finally the land fell to the lot of the Portuguese, who so cruelly treated the natives that they appealed to the Dutch, with whom they were on friendly terms, to come to their aid. This nation for several months laid siege to the island, carrying on a fierce warfare in which many persons perished.

Finally in possession, the Dutch were hardly less cruel to the natives than their former rulers. They tried to keep the monopoly of the trade of the world; not a single cinnamon plant was allowed to leave the island. If the crop was larger than that demanded by trade and the price in danger of being lowered, all that remained was burned or thrown into the sea.

Cinnamon is now grown in many tropical countries, and much improved by cultivation.

### Fig-Trees Emblem of Home

The fig tree, from earliest times has been a garden tree cultivated for its shade and general usefulness. "Beneath the vine and fig tree" is used more than once in the Old Testament to designate "home." For centuries the fruit, fresh or dried, has made up a large part of the food of the natives of Western Asia and Southern Europe. Its juice is used to make a drink, and also a dye. Its leaves polish ivory, and the bark makes cord. The sap of one species is poisonous. The fig tree, in climates congenial to its growth, produces two and sometimes three crops of fruit the same year, on distinct shoots. The trees grow rapidly from cuttings, and are propagated by budding, grafting and seeds. The large, beautiful leaves are deciduous, palmately veined, three-to-five lobed, wavy-margined, and somewhat rough and leathery.

### The Claim of Columbus

"Oh, no," said Columbus calmly, as he sat down to dinner with the other shades on board the houseboat in the Styx. "I don't feel jealous of Washington. He is the Father of His Country, and I am not. I only discovered the orphan. I knew the country before it had a father or a mother. There wasn't anybody who was willing to be even a sister to it when I knew it. But Washington took it in hand, groomed it down, spanked it when it needed it, and started it off on the career which has made it worth while for me to set my name be known in connection with it. Why should I be jealous of him?"—Philadelphia Inquirer.