

Sceptics called Edison 'Looney'

Speak of electricity and you think of Thomas Edison—and the world's first light bulb. But what was that bulb made of?

A little piece of carbonized cotton thread that came from Mrs. Edison's sewing basket. The "looney" link that her inventor-husband had been searching for for years.

The thread, bent in horseshoe shape, was sealed inside a glass bulb and set upright on a table. It was the evening of October 19, 1879, in Edison's makeshift laboratory in Menlo Park, New Jersey. As the electric wires were connected, Edison's assistants huddled around, holding their breath.

Current was switched on. The lamp responded instantly, glowing with a soft light. Its resistance was measured—275 ohms—sufficient for Edison's purpose and far greater than the four or five ohms of previous incandescent lamps.

Hour after hour the scientists watched the lamp glow, expecting it to die at any minute. They

sat there more than 40 hours before the lamp faded—and they knew they had the world's first successful electric light bulb.

Edison was convinced but the world was slow to accept this new "gadget". As with most great inventions, the public said "Show me".

Just nine weeks later, on New Year's Eve, nearly 3,000 persons crowded the streets of the little village of Menlo Park. Some had come by carriage and wagon, but a lot more had arrived by special trains run by the Pennsylvania Railroad for the occasion.

ILLUMINATED STREET

Twilight deepened into darkness. Then a deit finger inside the Edison laboratory flicked a switch and—to the applause of the throng—90 light bulbs placed on poles along the snow-covered streets began to glow with a soft light.

One farmer, watching the lights brighten, remarked: "Well sir, it's a pretty fair sight, but danged if I kin see how ye

the red-hot hairpin in the bottle."

Edison had already solved that. But he still had the general public to convince—as well as battling strong opposition from gas and arc-light companies.

The inventor, whose father escaped Canada on a 182-mile walk after the rebellion of 1837 had failed, agreed to a plan proposed by New York City to install a trial lighting system in lower Manhattan.

Edison had to make every component himself, because no company could supply them. He needed a generator that would produce electric current in undreamed of quantities, and proceeded to invent and then build one. He worked in the ditches laying cable, with laborers, slept in his topcoat on piles of cable in a warehouse.

On the historic afternoon in 1882 when the lights were first turned on, only about 20 persons were present. Edison was apprehensive of the outcome and wanted no publicity.

GREAT SPECTACLE

But the current flowed and 400 light bulbs were giving electric light to 59 customers. By nightfall, thousands jammed the streets to see the spectacle.

For the first three months of operation, Edison supplied his customers without charge. He knew there could be breakdowns and didn't want customers complaining about their lights. But the installation was a complete success. The man they called "looney" and "addled" won out. He had invented a practical incandescent light bulb, designed and built an efficient dynamo and had planned, built and operated a complete electric lighting system.

Edison consolidated his various companies into the Edison General Electric Company and moved his headquarters to Schenectady, New York, from which grew the General Electric Company of today.

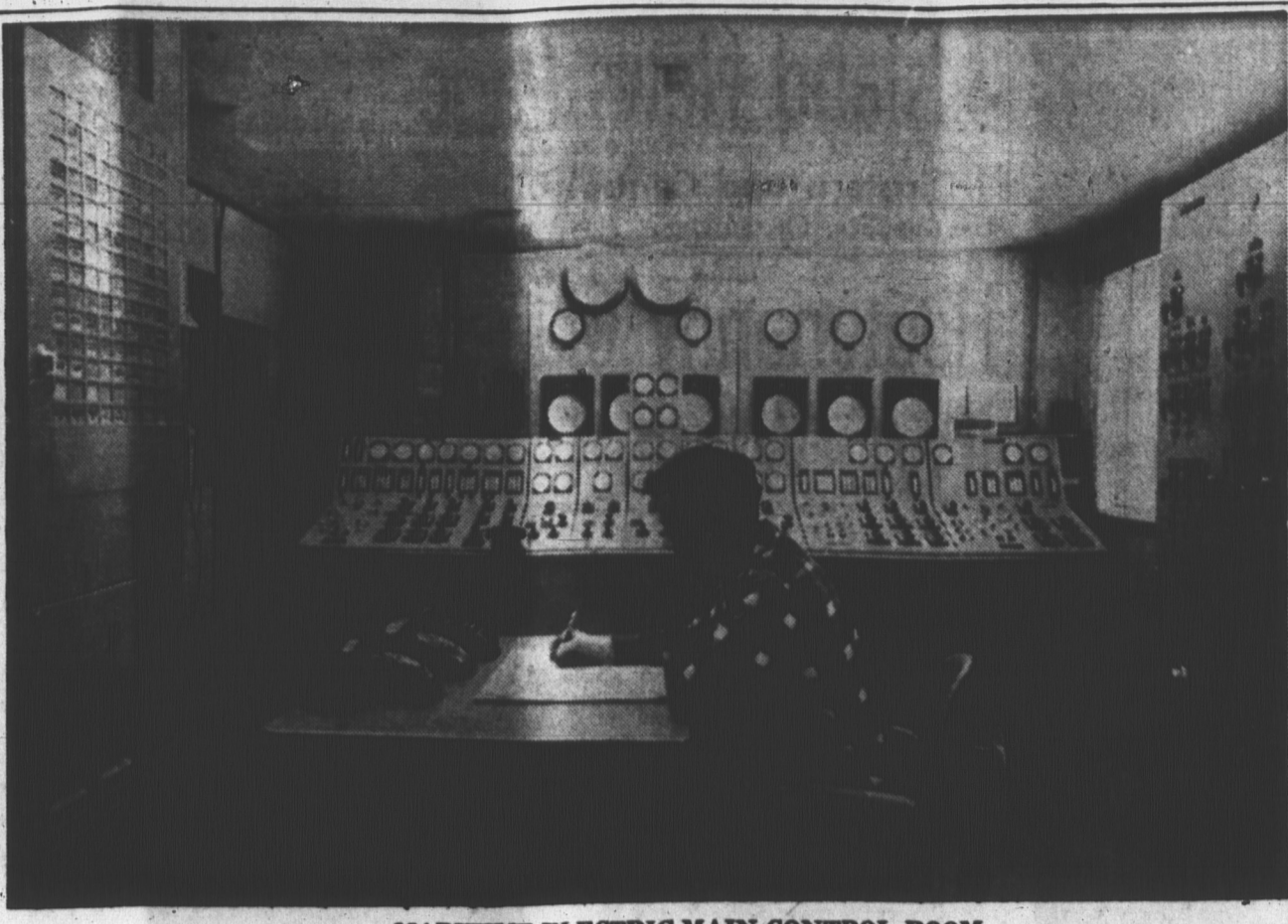
The electric light bulb he invented spread round the world and now plays a vital role in every aspect of modern living.

HAVE FINE RECORD

TORONTO (CP) — Indian-trained doctors recorded the highest pass percentage of any group of foreign students in the Medical Council of Canada examinations, Stephen West (N.D.P.—Scarborough West) said in the legislature Thursday. He asked Health Minister Dymond why Indian doctors had been barred from practising in the province by the Ontario College of Physicians. Dr. Dymond replied that he would take the question on notice.

NO TOKENS WANTED

NORWALK, Conn. (AP) — Item in this week's newsletter of Christ Episcopal Church: "will the person dropping New York subway tokens in the offering plate please cease and desist."



MARITIME ELECTRIC MAIN CONTROL ROOM

Light bulb economical essential commodity

There is probably nothing more irritating than walking into a dark room to switch on a light—and finding that the bulb has burned out.

The average householder immediately begins grumbling about the bulb manufacturer, and his "planned obsolescence." He beefs about the cost of bulbs how long they last, and the bother of replacing them in hard-to-reach locations.

But what is the actual cost? How long should a light bulb last?

Electric light bulbs are probably one of the most economical market today. They are purposely designed to give the most economical light for the combined cost of bulbs and electricity. You might say the manufacturer tries to strike a happy medium between bulbs that burn out too soon and bulbs that give too little light for the cost of electricity consumed.

The cost of electricity consumed by a 100-watt General Electric bulb during its life time, for example, averages about seven times the cost of the bulb itself. That bulb is designed to provide steady light for at least 750 hours.

The manufacturer can easily make a 100-watt bulb that will last much longer than the kind you buy in the store. But it would provide much less light, thus forcing you to use more light bulbs, with consequently higher costs for both bulbs and electricity to provide the same amount of light.

The design of the bulb and its hot-burning filament are carefully controlled in the manufacturing process to give the customer the most light for his money.

In a 60-watt bulb, the filament is only 18-10,000ths of an inch in diameter. But if it was only one per cent thinner in one spot the life of the bulb could be reduced by 25 per cent.

Or if the tiny coils of the filament were not exactly spaced, lamp life could suffer by 20 per cent.

A light bulb is not like a tire or a pair of shoes that you want to get all the possible "mileage" out of. It is merely a device for changing electricity into light. A 100-watt bulb uses about \$1.85 worth of current in its

lifetime, so the measure of its worth is how much light it will provide for that \$1.85.

Bulbs these days are burning out more frequently in the average Canadian home because more people are using light bulbs in their homes and leave them lit longer than they used to.

With a regular household bulb it is impossible to have both high efficiency and long life. This is inherent in the way a tungsten filament operates. The brighter a bulb burns, the hotter the filament is and the sooner the bulb burns out. At lower temperatures, less light is produced and the bulb lasts longer.

To commemorate Thomas Edison's 100th birthday, General Electric engineers designed and made a 100-watt bulb that they predict will last for a century. But the amount of light coming from that bulb is far below normal household standards.

To get the same amount of light produced by a standard 100-watt bulb, you would need 10 "100 year" bulbs, and electricity would cost \$18.50 every 750 hours instead of the normal \$1.85.

The lamp manufacturer strives to make bulbs that have the best balance between good efficiency and reasonably long life. The best "balance" rests on two factors that concern every customer: the lowest cost of light yet the utmost efficiency.

Electric lighting progressed fast

In less than one hundred years electric lighting has progressed from Thomas Edison's make-shift horseshoe of light to bulbs that measure cloud ceilings, that help trap insects in cow barns and bulbs that act as underwater searchlights.

Edison's inventive genius gave the scientific world its first practical knowledge about electricity phenomena. To find a needle in a haystack he would have removed each wisp of hay — one by one.

That was the way he worked, learning through failure until failure turned to success.

Eighty-seven years after Edison's first bulb, things are vastly different. A huge producer such as General Electric turns out 10,000 different types of lamps.

In this one company alone, more than 8,000,000 lamps are in stock or in transit each day.

Edison has been credited with inventing the world's first practical light bulb — it burned 40 hours — but he was not alone in the field of lighting. Even before Edison, experimenters had tried using platinized charcoal as "burners" for their source of incandescence. But they couldn't make the light last.

And even while Edison succeeded, he forecast many problems in the manufacture of bulbs using his carbonized thread. He tried carbonized burlap and gave several hundred hours of life. Carbonized bamboo strips were even stronger and gave 600 hours of life.

Processes using red phosphorus to "clean up" vapors and gases in the bulbs and dipping cotton in zinc chloride and squirting the pulp through a die to make a thread.

Then the researchers began working with tungsten. Alexander Just and Franz Hanaman, two Vienna high school laboratory assistants, worked from 1902 to 1904 to make the first practical tungsten filament. Improvements were made after that but the basic principle — heating tungsten electrically to incandescence in an inert atmosphere — is still unchanged.

Today's light bulbs are made under stringent controls. They have to be, with the microscopic ingredients that go into them.

Take a 60-watt bulb. First the filament is manufactured in a long string, not unlike a fishing line. If this "string" is only one per cent smaller than specified, lamp life could be reduced by 25 per cent.

The second step calls for coiling the filament. It is such a delicate operation that the coils must be precisely spaced or bulb life could be cut by as much as 20 per cent.

Manufacturers also have to watch for moisture before they seal the bulbs. A single drop of moisture distributed among 500-000 lamps would cause early blackening in all of them.

When you switch a light on, you are sending electric current to heat the filament to about 5,000 degrees — a temperature higher than any source of heat ordinarily encountered by man.

At that temperature, asbestos and fire brick would melt like wax in a furnace. It's twice the heat of molten steel.

When a person buys a light bulb for about 30 cents he is buying only a device to transform electric current into light. A 30-cent, 100-watt lamp will use about \$1.85 worth of electricity during its normal 750-hour life.

And why don't bulbs last longer?

Because it's impossible to have both high efficiency and long life at the same time. Long-life bulbs can be made but they would give off a lot less light and would use far more electricity.

A bulb designed to last 5,000 hours, for example, would use about 30 per cent more electricity to produce the same amount of light as a standard 100-watt bulb that is designed for 750 hours.

And think of the hydro bill!

Gov't Financial Transgressions Are Given Increased Attention

By JAMES NELSON
OTTAWA (CP) — Auditor General Maxwell Henderson's annual report of the government's financial transgressions tabled in the Commons, indicated he is widening his study of the public accounts.

He called for more formal controls over the 1,200-or-so organizations that claim tax relief for contributors to charitable causes, tightening of government administrative procedures in the North and more care guarding against sheer waste of public funds.

Mr. Henderson, a chartered accountant and senior corporation executive before joining the public service, also repeated references to earlier gaps in government administration on which he reported to the Commons in past years, but which have not yet been effectively dealt with by the administration.

REPORTS TO COMMONS

As auditor-general, Mr. Henderson not only audits the books of the government and most of the Crown agencies but reports directly to Parliament over the heads of the ministry on what he finds amiss.

Among his findings this year: —Financial control of government offices at Fort Smith, N.-T., is inadequate, with loop-holes through which taxpayers' money might escape. —Because of undue delays, bad planning, or other results of bureaucracy, millions of dollars have been spent for no productive purpose. —Inadequate procedures in the winter works program has meant losses through fraudulent and improper practices. —In development of the project alone, the defence department wasted more than \$7,000,000 on equipment that proved obsolete before it was completed.

Mr. Henderson's report normally is referred to the Commons public accounts committee, which usually goes through it item-by-item, calling the responsible ministers and their deputies onto the mat. But because of the rush of business and politics last year, the whole of Mr. Henderson's previous report still is to be studied.

MILLIONS DONATED

He noted in his new report, for the fiscal year which ended last March 31, that taxpayers as individuals and corporations claimed exemption from charitable donations amounting to nearly \$350,000,000.

But he said the law doesn't define a charitable organization, there is no check on the handling of funds by most of them and no surveillance to see that once an organization wins charitable status it remains a charitable institution.

Some years ago, the public accounts committee asked the auditor-general to report every year on the loss sustained by the post office department in carrying second and third class mail, which includes newspapers, periodicals and advertising matter.

Mr. Henderson reported the loss was \$35,000,000 in 1963-64 but said the post office has

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adopted a new estimating procedure, effective with the start of 1965, which made a more recent estimate on a comparative basis, impossible.

His report cited a number of cases — three involving ferry boats alone — in which plans were ordered for construction projects and then altered or abandoned. But the architects had to be paid.

The basic salary for Lutheran ministers in the United States is \$4,470 plus lodging and car allowances.

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