Martha

(Continued from page 9.)

been selected not only because of its own charm, but because it conveys excellently the delightfully melodious nature of the music of 'Martha." This scene finishes with the "Goodnight" quartet, a gem which rarely misses the distinction of a repeat when sung on the stage.

Tips and Jottings

SENSITIVE measuring instruments should not be placed close to powerful motors, dynamos, loudspeakers, or eliminators, as they may easily be seriously impaired in this manner.

POWERFUL permanent magnets, as used for moving-coil loudspeakers, or electro magnets, such as M.C. pot windings, create strong magnetic fields in the space around them, and therefore are to be shunned while wearing a delicate watch, which may easily become magnetised.

IF you are employing a neutralised R.F. stage, do not forget that this will need re-neutralising if a different valve is employed for it.

IN nearly all circuits it is the moving vanes of the variable condensers which are connected toward earth to avoid hand-capacity effects.

WITH indirectly-heated A.C. valves the undesirable A.C. hum is eliminated by using a separate electron-emitting cathode heated by radiation from a hot "filament" placed very close to it.

A Radio Pioneer

Inventor of the Galvanometer

CAREFULLY stored away in the United States National Museum at Washington is a piece of electrical apparatus which is famous the world over.

It is a very simple galvanometer—the first ever made. A type of instrument, of course, which would be scorned by any practical man at the present day, but, nevertheless, an exceedingly interesting instrument. Its maker, Joseph Henry, the "Father of Induction," lived long in obscurity. He began life as a silversmith's apprentice.

Later he became a school teacher, and subsequently, through the sheer brilliance of his work, he gained for

ALLAN McSKIMMING,
who will be heard in company with Mr. and Mrs J. W. Bailey in two sketches from 1YA on January 14.

himself the post of Professor of Mathematics and Physics at Princetown University. Finally he was put in charge of the Smithsonian Institution at Washington, an American institution somewhat analogous to our own Royal Institution in London.

Perhaps if Henry had never made this galvanometer, with its magnetised darning needle, and its turns of wire, laboriously wrapped round with bits of silk, gathered, we are told, from a waste box, radio science might still have been a thing of the future.

Who knows?

At any rate, it is certain that to Joseph Henry of Washington, U.S.A., the radio and electrical world owes a debt which is only justly repaid by the christening for all time of the unit of inductance—the "henry"—in his name.

Henry constructed several galvanometers, but the one in the U.S. Museum at Washington seems to have been his earliest model, and, in many respects, his favourite one. He applied this instrument to many novel uses. He knew that the spark obtained when a Leyden jar (as the old-time laboratory condensers are called) was discharged was derived from the electrical energy stored up by the jar.

Henry's accuracy of observation, coupled with the assistance of his newly-invented galvo, took him a stage further, however. He noticed that when the Leyden jar was discharged through the galvanometer, although the needle was always strongly deflected, it was not always deflected the same way. Sometimes, for instance, the needle would be deflected to the right, while at other times it would go to the left.

A trivial observation, one might think, which, for many of us, would imply nothing at all. To the super-keen intellect of Henry, however, this variation in the deflection of his galvanometer needle implied something tremendously important.

Henry made his observations on this subject in 1842, and in the same year he wrote:—

"The phenomenon requires us to admit the existence of a principal discharge in one direction and then several reflex actions backward and forward, each more feeble than the preceding, until equilibrium is obtained."

Discovery of Radio Frequency.

IN other words, Henry had noted and recorded for the first time the oscillatory nature of the discharge from an electrical condenser. He had discovered radio-frequency.

Henry understood the nature of his discovery perfectly clearly. He saw that when a condenser is discharged a steady stream of current is not obtained. The current derived from the condenser, he noted, is oscillatory in nature, and from this realisation he went on to the inception and development of another mighty principle of radio science—the principle of Induction.

For some time Henry had known that a rapid and interrupted flow of current in a circuit could set up a strange influence in a distant and altogether separate circuit. A current, he held, that "induced" a sort of replica of itself in another circuit. In his own words:—

"A single spark from the prime conductor of a machine of about an inch long thrown on to the upper end of a circuit of wire in an upper room produced an induction sufficiently powerful to magnetise needles in a parallel circuit of iron in the cellar beneath, at the perpendicular distance of thirty feet, with two floors and ceilings, each fourteen inches thick, intervening."

A Landmark of Science.

HENRY had found that the electrical inductive influence could pass through space and through solid matter. Just as a wireless wave travels outward into space from its aerial of origin, and produces, or, to be more correct, induces a replica of its originating current in the receiving aerial, so Henry's machine-generated sparks set up waves which travelled downward into his cellar and thus enabled him to erect a series of observations which have long been regarded as one of the most prominent landmarks of science.

Henry, fortunately for himself, and in striking similarity to his English contemporary, the renowned Michael Faraday, lived long enough for his name to become well recognised, for, as we have seen, he ended his days in charge of the great Smithsonian Institution at Washington.

The Outspan Five

Used with Beverage.

A CORRESPONDENT writes: "Using my 'Outspan Five,' with a Beverage aerial, I can receive all the Australian and New Zealand A class stations and most of the B's, as well as several small-powered stations, such as Hastings, Greymouth, and Wairoa. Several Japs can be tuned in after 9.30 p.m., at medium speaker strength, as also can KFI and two other Americans clashing with 1YA and 2YA. I have heard 2FC and 2BL weakly in the daytime, although my locality is not considered to be a good one, and several sets I have had have not given good results. On the standard aerial I could receive little more than the Australian and New Zealand A class stations.

"I tune the aerial with a coil and condenser, and have a .0001 fixed condenser that can be switched into the aerial when necessary. This enables me to separate stations which would otherwise be jammed together."