

JAMES McINTOSH, Manager of Messrs. Dalgety and Co.'s Wellington Branch, examined. (No. 11.)

1. *Mr. Sidey.*] I understand that your firm have large dealings with Australia?—Yes.

2. Your firm, I suppose, have probably as many cable communications with Australia as most firms?—I should say so.

3. What we want to find out is whether you think the introduction of this system of putting the clock on during the summer would to any extent inconvenience your firm in its dealings with Australia and your branches there?—The difference in time now is an hour and a half, and if you put the clock on another hour it would mean two hours and a half difference. That would make a slight inconvenience perhaps, but nothing of any moment.

4. Do you think that, in the matter of obtaining money through the banks, there would be any serious inconvenience?—I should not think so.

5. *Mr. Fraser.*] Would this alteration of the clock cause any inconvenience in the matter of cabling to Australia and in getting a reply?—There is just this: that you would be an hour further apart than you are at present, and that of course would make some slight difference under certain circumstances. But, speaking generally, I can see no inconvenience of any moment.

6. Suppose, for instance, there is something you wish to know definitely and you cable to Sydney and desire a reply the same day; you have less time to get your reply in?—Yes; but, on the other hand, if you were asking a question you would send it away an hour earlier, so one would make up for the other. I do not think, therefore, that it would make any material difference.

7. I suppose that very often you send a cable, not at any particular hour of your own choosing, but during the day, when the occasion arises?—That is so.

8. If that occasion arose within one hour of your closing, you would have an hour less in which to get your reply?—Yes. At the same time the occasion would arise automatically an hour earlier, because people would come in an hour earlier.

9. You do not think, then, that the alteration of the law would in any way inconvenience the business of your firm?—Not to any extent.

10. Or, as far as you know, the business of other firms?—No.

MARTIN CHAPMAN, K.C., examined. (No. 12.)

*The Chairman:* We shall be glad to hear you, Mr. Chapman.

*Witness:* Perhaps you will allow me first to make a remark about that last question put to Mr. McIntosh. I would point out that the inconvenience will not be to the New Zealand merchant, but to the Sydney merchant, who, when he sends his reply or his inquiry, will find the New Zealand office closed an hour earlier than before. That, of course, if it is an inconvenience, will exist.

*Mr. Sidey:* I think that perhaps Mr. Chapman might make a statement with regard to this Bill. He knows what the proposal is, I understand?

*Witness:* Yes, I have read the Bill. I examined the first clause with the scientific facts, and I found that it was correct. I presumed that it was originally, because I suppose it was originally devised by a scientific man. I understand I am asked whether there is any scientific objection—that is to say, whether scientific men in any branch of science would find any inconvenience. My opinion is that they would not. As far as scientific men are concerned, I will consider first those who are concerned with astronomy. That includes navigation. A standard clock at an observatory is the clock on which they rely, and from which all other clocks are set. That is the standard clock, and that is set to what is known as "sidereal time." Sidereal time differs altogether from the time that is recorded on ordinary clocks, but it is a time that is easily ascertained. A sidereal day is the time from one transit of a star to the next transit of the same star, and it is always the same, whereas the interval between two transits of the sun is not always the same. The clock keeps local sidereal time. Now you see the difference. I have brought a clock with the face like that of an astronomical clock. You will see that the hour hand makes one revolution in twenty-four hours, and that the clock face is marked from 1 to 24. [Clock exhibited.] Not only does it go from 1 to 24, but the time taken in making a revolution, instead of being 24 hours, is 24 hours less 3 minutes 56 seconds. Now, that is the time that the astronomer goes by. He makes his observations by that time. You see it is absolutely independent of anything you put in an Act of Parliament. That will not affect him at all. A navigator has his chronometers set to Greenwich mean time, and they are never set to any other time. Greenwich mean time is the time that a well-rated clock shows at Greenwich. That is the Greenwich mean time, not the sidereal time, nor the time naturally indicated by the sun, which varies, but an imaginary time which is called "mean time." That is the time that a ship's chronometer shows. When a captain of a ship wants to know the time here, it is for the purpose of rating his chronometer—that is to say, for the purpose of ascertaining what error there is in the rate at which his chronometer goes. For that purpose he watches the fall of the time-ball. That time-ball is dropped at a moment. It may be any moment of the day; it does not matter what moment it is dropped at; but, as a matter of fact, they generally take 12 or 1 o'clock, and there is an advertisement stating that it will be dropped then. That time—that 12 or 1 o'clock—will not be the time that is shown by the town clocks, and never is. It is the mean time of the locality—the local mean time—and the astronomer or observer who is in charge of the dropping of the time-ball has to ascertain that moment by his observations. You will see there is a difference even as our time is now. The 1 o'clock which he drops that time-ball at is not the 1 o'clock shown by the town clocks, but differs from the time shown by the town clocks by 9 minutes 48 seconds, because we do not take the time in Wellington of the meridian of Wellington, but of the mean meridian which is mentioned in the Bill. So that the town time—the local time—is perfectly useless to the navigator. He takes the local mean time as indicated by the time-ball, and compares it with his chronometer, which should be set to Greenwich mean time, and by calculating the true difference of time from the known longitude he ascertains whether his chronometer is actually keeping Greenwich mean time, and, if not, the rate of error. That is all I have to say about such