The New Observatory at Ottawa.

(Ottawa correspondence.)

Standing on one of the highest points surrounding the City of Ottawa is situated the new Observatory of the Dominion of Canada, on the northern limits of the Central Experimental Farm. The magnificent new building is just about completed, and in a few days the Dominion astronomers will be translated from dingy offices in the city to the brand-new dome-capped building at the Experimental Farm. The intention is that the Experimental Farm is to be the Greenwich of Canada. A new fifteen-inch telescope has been erected with which to help on the good work.

Things happen to the sun; things happen on the earth. The scientist believes that there is a direct relationship between these things, but he has yet to find it. It is the missing link in meteorology. When the astromer finds out what comes between the monkey and the man in the solar system he will, so he declares, have done the greatest of all great things for the material welfare of mortal man. Canada's new telescope may yet be the means to this end.

This telescope cost a thousand dollars an inch, when you come to consider it as a "15-inch" telescope, which means that the lens—the important part of the instrument—is 15 inches in diameter. The whole cost was a little over $15,000. The telescope is only a baby compared with the big spy-glasses of the Lick and Yerkes observatories, but it is a powerful magnifier all the same. It is as perfect as the age has learned to make it, and is big enough for the work it has to do. A telescope may be too large. Some of the big ones of the scientific world—36 inches and over—cannot be used to their full capacity except for part of the year. The explanation is that they magnify the atmospheric waves, and so make trouble for themselves.

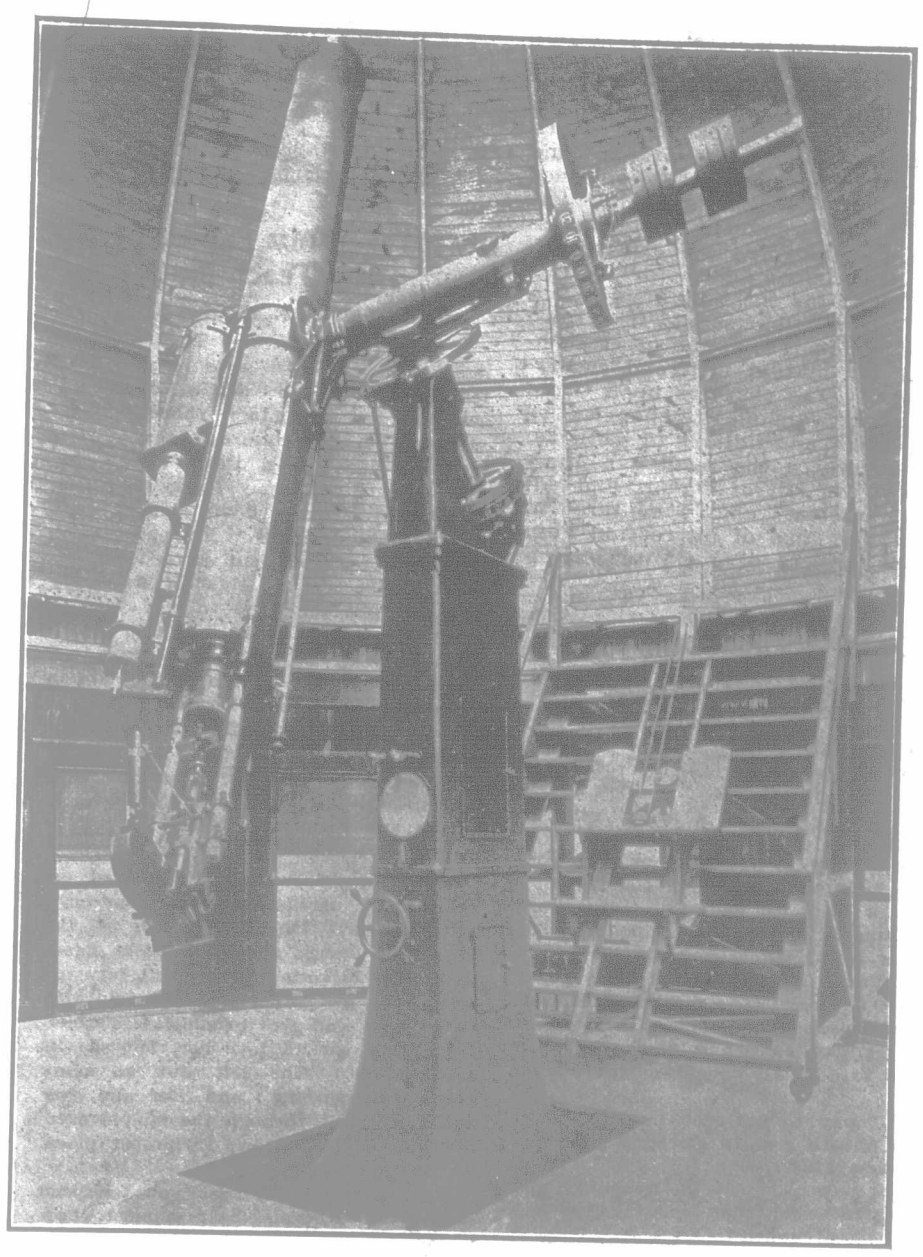
Prof. King's new telescope is 19 feet long. The mechanical part was built in Cleveland, the birthplace of the Lick and Yerkes machines. The glass was ground in Allegheny, Pa.

Down below the foundation of the observatory walls there begins the substructure of a huge pier, which goes right up into the dome and ends with an iron column. On top of the iron column is the telescope. The whole mechanism of this huge magnifier is of the finest and most delicate kind. You can swing the telescope up or down or any way at all with one hand and the turn of a little wheel, and it moves without the faintest squeak. A photographic apparatus is attached to it, and the whole thing turns on an axis, which turns on another pointing due north and south. The angle at which any telescope works must be determined according to the exact latitude of the particular locality.

You get to Canada's telescope by climbing a succession of stairways. When you find yourself in the dome the chances are that you will be surprised. You will see the roof suddenly come apart; or you may discover the whole dome to be moving round. Your suspicions will be set at rest when you see that somebody is pulling a rope, that there are wheels everywhere, and indications of ball bearings. The dome, you will be told, is made on a huge steel frame, which came from Cleveland.

Before very long you will find that there is something else that moves. You ascend a wooden structure like miniature baseball bleachers, preparatory to a look through the telescope. You find that the bleachers are moving. The thing is on wheels. Moreover, the contrivances are such that the astronomer can sit up aloft and move his telescope and his perch around without coming down.

All this is necessary because there are different stars in different places—there are three hundred thousand in the catalogue of the astronomy—and every star moves. Even the so-called fixed stars move, though in circles of their own. The astronomer aims his telescope at a star, and settles himself to watch. The telescope follows the star. It is all down to a fine point. There is a clock in the mechanism of the telescope. The clock knows all about the star, and keeps the telescope in the right path.

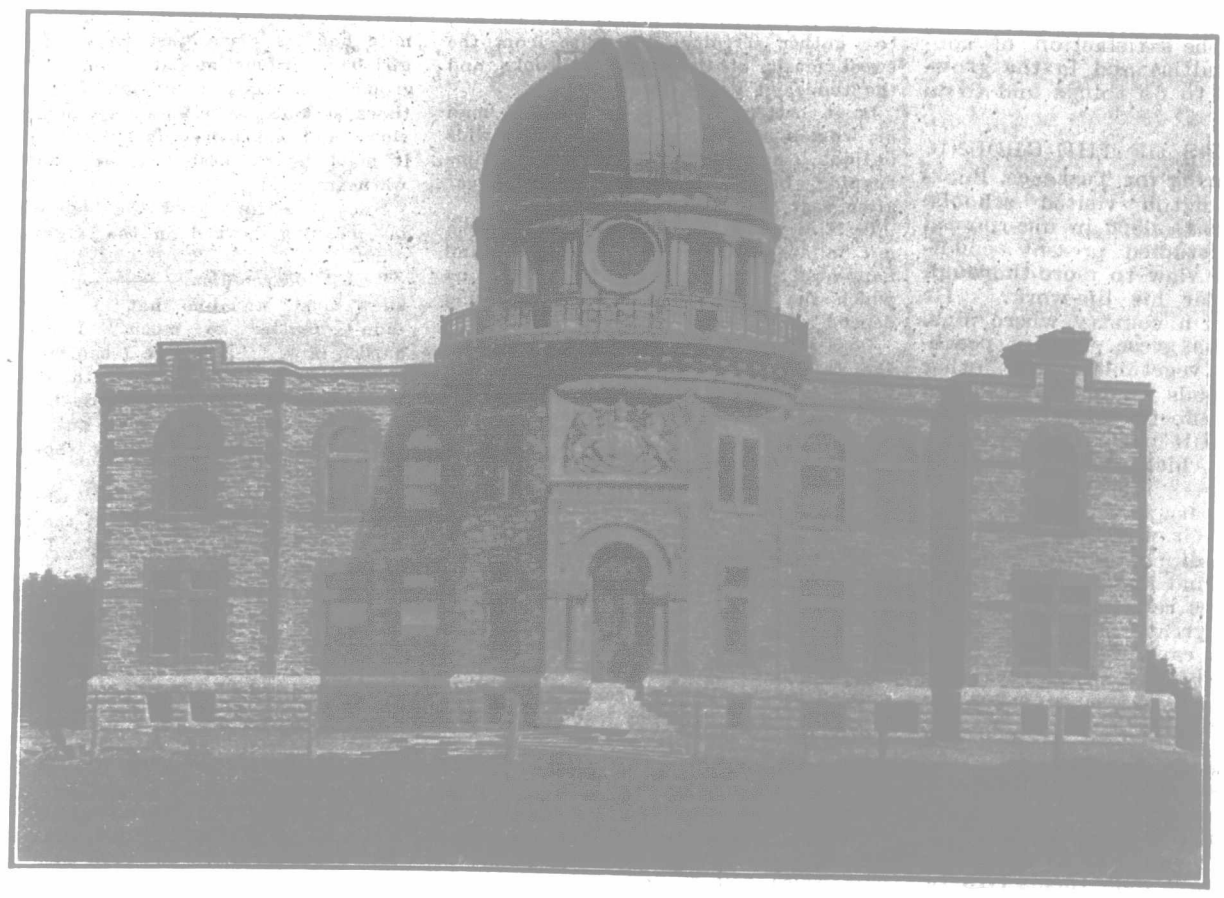


The $15,000 Telescope.

One of the queer things that this big telescope enables you to do is to look around corners. It is done by means of a little brass elbow fitted with reflectors on a principle which has before now been employed in unconventional ways. The elbow is convenient when the telescope is pointing almost straight up in the air, and the astronomer can't very well get under it.

The big fifteen-inch telescope has a number of attachments to assist the astronomers in their work. Among them are a stellar spectroscope for determining the constitution or elements of the sun and stars, and for measuring their velocity in the line of sight; a position micrometer for measuring the angular distance between stars and their position angle; a photometer for measuring the magnitude or relative brightness of the stars; a stellar camera for photographing stars and nebulæ, and a solar camera for photographing the sun. In addition to these there is an instrument called a meridian circle, for determining the position of stars, and several transit instruments for determining time and longtitude and latitude.

One of the most important functions of the observatory will be the operation of an electrical time service throughout all the departmental buildings in Ottawa. For this purpose two large siderial clocks have been installed. The Observatory is also equipped with a large number of surveying instruments, as the fixing of boundaries and the securing of data for map-making purposes, etc., which will be among the principal works of the new institution. The Observatory staff will consist of about fifty hands, but during the summer months about thirty of these will be engaged in survey work throughout the Dominion. The chief astronomer is Dr. W. F. King, while Dr. O. J. Klotz and Mr. J. S. Plaskett are among the other officials. The building itself, as the accompanying engraving will show, is a handsome, substantial structure, built of red granite. The architecture is of no particular date.



The New Observatory on Central Experimental Farm Grounds, Ottawa.

"Working with the Hands," or Mixing Muscle with Brains.

III.

Beyond offering a few quotations from Booker T. Washington's second book, "Working with the Hands," I dare not attempt the further tracing of his successful career, but I cannot too emphatically commend it to the attention of the readers of the "Farmer's Advocate" everywhere. The invitation to inaugurate at Tuskegee the system of industrial training pursued at Hampton was a great step upwards, yet it was but an initial step after all, and it required the exercise of the same indomitable courage and unquenchable perseverance which had led the little negro lad upwards and onwards hitherto to bring about what we may call the series of successes which have crowned those efforts to-day. Not only has Tuskegee itself solved its own wonderful problem, but it can point as its outcome to no less than nine similar institutions, which have been chartered under the laws of their several States.

First there had to be overcome the belief that after two hundred and fifty years of enforced labor, the emancipated race should be as idle as it pleased. The negro had to be taught the difference between "being worked" and being "free to work." The task undertaken was "the teaching of the students to lift labor out of drudgery, and to place it on a plane where it would be something to be sought after, not something to be dreaded, and, if possible, avoided."

SOME PRACTICAL RESULTS.

On page 79 we read "The visitor