Many scientists look upon the electrons of radium as the very substance of electricity itself, if not of the very vital principle of life. Sir William Crookes, the eminent English scientist, says of radium that a single gram of electrons contains sufficient energy to lift the navies of England and France to the top of Ben Nevis. When it is considered that one small crystal of pure radium the size of a pin head hurls into the universe decillions of electrons a day, what an amazing exhibition of uncontrolled power is placed before our minds. In a few pounds of the substance there may well be stored the titan energy of the new solar systems, the reverberating thunder of worlds hurled from their orbits, the clash of unharnessed stars, the uproar of a ruined universe. Science long ago demonstrated the fact that no two molecules in any organic body actually touch each other. There is cohesion, but no contact. It is through these infinitesimal spaces that the radium electrons dash as freely as the stars shine and the sunshine filters through the inter-stellar spaces between the huge molecules of the universe.

The relative power of radium to the X-ray is as six to one. The rays of radium have 100,000 times the energy of those of uranium and over 100 times the energy of barium radiations. The radioactivity of polonium and actinium is also much smaller. Placed in contact with barium or thorium —or indeed almost any substance—radium will gradually impart to the neighboring substance its own radioactive properties.

Wonderful also is that fact that the radium will lose its own life in giving life to that with which it is brought in contact. This loss of life is only temporary. If the two substances be separated for a time, it will be found that the barium will gradually lose its radioactivity imparted to it by the radium, while the radium renews from some mysterious source its former marvellous powers. This series of operations may be repeated any number of times with the same result. Herein is a mystery which physical research is as yet unable to fathom.

THE DOMINION EXHIBITION.

For the first time in the long history of the Toronto Industrial Exhibition, the Dominion Government has voted a subvention this year, and the fair of 1903 will, on this occasion, be called by way of distinction, the Dominion of Canada Industrial Exhibition. During the past year large sums have been spent in erecting handsome new buildings, and the industrial and manufacturing departments of the coming fair will be features of greater prominence than ever. One of these new buildings is here illustrated. This is the Manufacturers' and Liberal Arts Building, constructed of brick and steel, and containing over 100,000 square feet, or over two acres of floor space. It cost about $120.000. Among the other new structures is a Transportation Building, (the old main building reconstructed), an Agricultural Implement Building, a Stove Building, and a building for illustrating processes of manufacture.

Nearly thirty different processes of manufacture will be shown in active operation. Among these will be chain making, electric welding, electric light bulb blowing, metal spinning, needle and pin making, broom making, glass blowing, diamond cutting, spectacle making, and a variety of textile and other work. The new management has profited by the criticisms of the past two or three years, and it will be seen that it will now be in reality an industrial fair where much can be learned, and where the progress of the country will be instructively reflected, while new departments will be added and the amusement features will not be omitted. The exhibition this year will open on the 27th August, and last till September 12th.

Manufacturers' and Liberal Arts Building.

NEW MODEL TURRET LATHE.

The accompanying cut is an illustration of the 2 x 26 New Model Turret Lathe, made by the Pratt & Whitney Co., of Hartford, Conn., and sold through their Canadian Agents, The Fairbanks Company of Montreal.

In the manufacture of these Lathes it has been the aim to reach a higher degree of mechanical excellence than has heretofore been obtained in Turret machines and results have been highly satisfactory. The features of early construction, the merits of which have been established by years of use, have been retained, while new features, the need of which has been pointed out in practice, have been added to the improvements incorporated, making possible greater accuracy, capacity, convenience, and durability. The machines are not only adapted to repetition work, in the production of duplicate pieces in large lots, but their work is advantageous for the manufacture of duplicate work, in lots of not more than six pieces. It has been demonstrated that the New Model Turret Lathe can be set up for any kind of work in less time and with less expense for tools than any other machine of its class. The head, stock, bed and pan of these lathes are cast together in one piece. It is of direct mechanical advantage to cast the head, stock and bed together to ensure against derangement of alignment and by casting the pan integral with the bed, the latter is materially reinforced, without increasing the weight of the machine as a whole. In fact the machines are materially less in weight than would be permissible were the bed and pan to be cast separate, and the present strength and stiffness maintained. Further by reversing the cone pulley on the small sizes, the front bearing of the spindle is greatly reinforced, better providing against springing, when heavy cuts are being taken. The end thrust and spindle are entirely taken up by the main bearing. The value of a collet which in closing does not withdraw or further advance the stock, particularly on "senond operations" will be appreciated by all familiar with turret lathe work. For turning short work such as rings and collars, in diameter above the regular collet capacity of these machines on rod work, blank split step chucks and closers are furnished, which materially increase the range of work these machines will handle. In these chucks, the feature of non-withdrawal of the chuck in closing is retained. For handling castings or forgings, these lathes may be fitted with two-jaw chucks in which either solid or inserted jaws may be used. The turret slide runs directly on the bed of the lathe, thus avoiding intermediate slide construction, making the alignment of cut-