

female sex hormone from the pituitary gland, on the other hand, increased the size of the male sex glands up to 65 per

cent. above that of the normal adult size of these glands.

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## ASTRONOMY

# Rotation of Milky Way Shown For Faint Stars as Well

## Study of 18,000 Intrinsically Faint Stars Shows These Dwarfs Take Part With Giants in Rotation

**N**EW PROOF of the rotation of the galaxy, the system of stars including the Milky Way and all those that we can see in the sky through most telescopes, was presented to the National Academy of Sciences by Drs. Piet van de Kamp and A. N. Vyssotsky, of the Leander McCormick Observatory of the University of Virginia.

Studying the motions across the sky of 18,000 intrinsically faint stars, they demonstrated for the first time that these "dwarf" stars are taking part in this rotation, as well as the bright "giants" with which previous studies of the kind have been mostly concerned.

The galaxy is a vast swarm of stars, arranged in the shape of a watch or a grindstone, with a diameter so great that light travelling 11,000,000 miles a minute takes something like a 100,000 years to cross it. The sun, with the earth and other planets, are part of this system, located some distance from the center.

From study of the brighter stars, most of which are giants, it has been found that the entire galaxy is turning around a center, which is in the direction of the constellation of the Scorpion, a prominent group in the summer evening sky to the south. However, the great majority of the stars nearest to us are dwarfs, and probably they predominate all through the Milky Way. For this reason, the new McCormick Observatory results are important because they show that the galactic rotation is not confined to a few groups of very bright stars but is a general feature of them all.

The researches of Drs. van de Kamp and Vyssotsky will necessitate a revision of the previously accepted ideas that stars of any apparent magnitude are, on the average, more distant if they are in the Milky Way than if outside it. It has been found that for stars of the tenth to twelfth magnitudes the average distances are greater for those 15 degrees either

side of the Milky Way than for those of similar brightness in it. This, it is suggested, is due to the presence of dark obscuring dust clouds in the Milky Way's plane, the presence of which have been indicated by numerous other pieces of work. Such clouds would hide the more distant stars in that direction.

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## PHYSICS

## New Musical Instrument Played by Light Flashes

**A** NEW electrical musical instrument called the "Photona" recently went on the air over Station WCAU in Philadelphia. Played with a two-bank piano keyboard, the apparatus produces notes of the musical scale through the loudspeakers by using standardized frequency

impulses of light striking a collection of photoelectric cells.

Inside the apparatus is a series of revolving disks with slots cut radially. They are driven in synchronization by a common belt and pulley drive. Each disk (and there are twelve of them) rotates before a metal screen behind which are an intricate group of electric lights which can shine through small holes in the screen. Finally, in line with the illuminated holes and rotating disks, are twelve photoelectric cells.

In operation, the disks rotate continuously and as the musician presses a given key the light corresponding to it shines through its particular hole. Because of the slots in the disks the light flickers with a given frequency on the photo cell. If the flicker is 256 times a second the photo-cell receives 256 light impulses a second and turns them into 256 electrical impulses each second in the amplifying circuit. And from the loud speakers issues a note with 256 vibrations a second, or middle C of the musical scale.

The "photona" which has a range of six octaves requires 900 six-volt lamps and a maze of wires for the operation of each one. Its tone is said to be different from any other musical instrument.

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The smallest of cattle is the anoa, and the largest is the Indian bison or gaur.

At least one of every five lightning strokes is not a single flash but a rapid succession of strokes.



### ELECTRICIAN'S NIGHTMARE

*This rear view of the Photona exposes its complicated maze of wiring, controlling the 900 lights and numerous rotating disks that combine with photoelectric cells to produce a modern kind of music.*