

accelerator, with Dr. Ghiorso, are Robert Main and Bob H. Smith, both of whom have had long experience in accelerator design and operation.

Although the Omnitron is the most complicated accelerator ever proposed, Dr. Ghiorso said everything included in the design is based on proved techniques.

Crime Chromosome

A rare genetic abnormality appears to explain criminal behavior in men afflicted with the condition—an extra sexual chromosome.

Instead of XY, the usual sex chromosome pattern, the men in question have an additional male chromosome and a pattern of XYY. The link between XYY and criminality was first suggested two years ago in Scotland, when researchers discovered a remarkably high incidence—three percent—of the rare condition among patients of a maximum security hospital for the mentally ill and retarded.

Since then, further surveys in similar English hospitals have borne out the three percent figure, implying that genetics may be an important consideration when the criminal shows evidence of severe mental disturbance or retardation.

Drs. W. H. Price of Edinburgh's Western General Hospital and P. B. Whatmore of the Carstairs State Hospital in Scotland reported today the follow-up studies of personality and criminal pattern in these patients.

Altogether there were nine XYY men out of a total 342 patients at Carstairs. All suffered from severe personality disorders. They were extremely immature, unstable and irresponsible, had little capacity for affection and seemed unable to tolerate the slightest frustration. Seven of the nine were mentally subnormal.

When matched with 18 other patients with normal sexual chromosomes, no great differences in personality and mentality could be found, with some important exceptions. Rarely were the XYY patients violent, while the others were more openly hostile and aggressive. In effect, the XYY men were less dangerous criminals than the men with normal chromosomes. But their criminality began at a much younger age.

The XYY patients first ran up against the law at about the age of 13, while the others usually did not get into trouble before 18.

A second major difference between the two groups lay in family background. Criminality and mental illness was virtually nonexistent among the families of the XYY men, who came from a range of social classes.

"There is no reason to believe,"

wrote Drs. Price and Whatmore in the *British Medical Journal* of March 4, "that these patients would have indulged in crime had it not been for their abnormal personalities." And their abnormal personalities were probably due to the extra Y chromosome, they said.

In contrast, the families of the 18 controls did show some evidence of a criminal environment.

New Supernova Theory

Once every 30 to 60 years, astronomers estimate, a star in the Milky Way galaxy that is considerably more massive than the sun explodes in a brilliant blaze millions of times brighter than the sun.

These supernovas blow into space gaseous material amounting to at least one solar mass, but exactly why only certain stars undergo such tremendous explosions is not known.

The supernova explosion of a star is usually believed to result from a catastrophic implosion that reverses into an explosion. One mechanism for an instability that could lead to such an implosion is when the temperature of a heavy star's iron core rises to some five billion degrees C. and the iron begins to dissociate into alpha particles and neutrons.

A new theory concerning how supernovas are formed is reported in the March 6 *Physical Review Letters* by three scientists from The Hebrew University in Jerusalem. They propose an alternative mechanism for triggering the explosion.

The physicists suggests that the dynamical instability is caused by pair formation, which is the conversion of a photon into an electron and positron when the photon traverses a strong electric field.

This instability occurs in heavy stars prior to the formation of any elements heavier than oxygen, and the resulting implosion is easily reversed by oxygen burning.

The explosion following the implosion disrupts the star, spewing out oxygen and such elements as magnesium and silicon, as well as all lighter elements in the envelope surrounding the core.

The behavior of a star with a mass 40 times that of the sun was calculated by Prof. Gideon Rakavy and his two co-workers at The Hebrew University. The model becomes unstable when the star's core reaches a temperature of 1.8 billion degrees C. The implosion heats the center to 3.2 billion degrees and about four solar masses of oxygen are burned before the motion is reversed.

Totally, about six times the sun's mass is consumed, releasing more than enough energy to completely disrupt the star. The explosion lasts only about 10 seconds.

Vaccine Loses

The Federal Government has won its case against the Rand Development Corporation, manufacturer of the controversial Rand Cancer Vaccine that allegedly cures cancer.

Judge James C. Connell has granted a permanent injunction against both the manufacture and distribution of the vaccine that has been given to hundreds of "terminal" cancer victims in Cleveland, Ohio, hospitals, (SN: 2/18).

Corporation president H. James Rand says he may take his drug out of the U.S. for testing. He has been working with scientists in Germany, Israel and Russia who have been studying the theory he's been testing. Rand points out that Dr. Albert Sabin "had to go to Russia to get his (oral) polio vaccine tested before it was accepted in this country."

Government lawyers did not seek court injunction against Rand on grounds that the vaccine is ineffective; they stuck with more clear cut issues. The vaccine, they charged, was illegally transported across state lines, was found to be contaminated in some instances, and was used in clinical tests before it was cleared for such use by the Food and Drug Administration. FDA regulations require data on animal and laboratory experiments be obtained prior to use on humans.

The Securities and Exchange Commission announced it will investigate alleged stock manipulation by Rand following the rash of publicity the vaccine has gotten in the lay press in the last few months.

Survey Ships Launched

Two hydrographic survey ships will be launched for the Coast and Geodetic Survey in Jacksonville, Fla., this week.

The ships, each 231 feet long, will be used for charting United States coastal waters, according to the Environmental Science Services Administration, the Survey's parent organization.

They will be completed and go into service later this year, replacing older vessels being retired. Named the USC&GSS Fairweather and Rainier, they will join the Mt. Mitchell, which is also scheduled to begin operations this year for the Survey.