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Physics students build muon finder

Particle telescopes to detect high-energy muons that penetrate hundreds of feet into the earth's crust are being built by A&M physics seniors as a lab project.

Their telescopes are "little brothers" of 9½ and 17-ton spectrometer telescopes constructed and operated at the university's Research Annex under U. S. Air Force Office of Scientific Research support.

Heart of the Physics 425 "senior lab" device is a student-built Geiger counter containing a gas mixture that is ionized by the passage of a muon.

Three of the Geiger counters—student made at about 70 cents each (commercially purchasable starting at \$85)—are used in connection with standard physics lab equipment to detect the particles.

Muons are "born" high in the earth's atmosphere when incoming cosmic rays collide with air molecules. Pions and other classes of particles also originate through the process.

A&M students use burnt out fluorescent light tubes and other easily accessible materials in constructing the particle telescopes in the physics lab instructed by Dr. Philip J. Green

and Dr. Nelson M. Duller.

"Lots of things can be done with this equipment," Duller said. "Density flux of particles, absorption characteristics, statistics of random events and time resolution determinations can be made."

Dubbed "rocking chair" spectrometer telescopes, the large versions of the machines at the Research Annex show the passage of the muon as a tiny lightning trail in three 36 by 36 by eight-inch spark chambers containing a helium-isobutane gas mixture. Heavy magnets cause the muon path to be bent, the amount leading through calculation to muon energy in electron volts.

The annex spectrometer telescopes can be oriented at different angles with respect to the horizon, for flux variation determinations.

Duller pointed out that the student models set up in labs in the physics building, discern and count muons by automatically recording pulses from the Geiger tubes on scalars. Also used in the setup are amplifiers, power supply, oscilloscope and logic circuits.

Each of the three stacked one and a half by eight-inch tubes must be penetrated by a muon for it to be recorded. The physics professor said the particles pass at the average rate of about two per second through an area the size of a person's head.

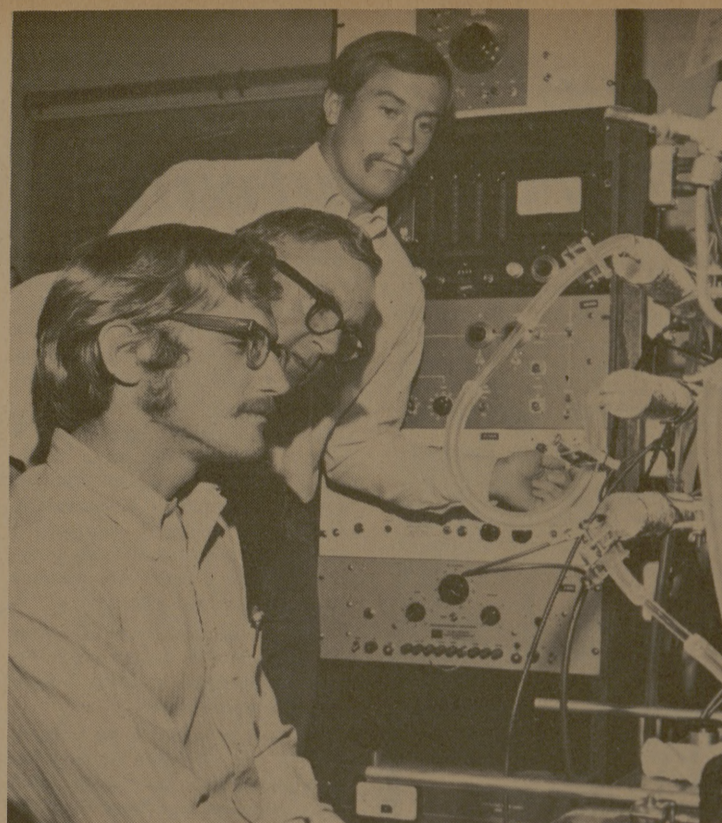
The particles pass unaffected through the atmosphere and building construction to reach the detecting machines.

All 19 students in the lab are making counters and the ones that "are working at all are working well," Duller said.

"It amounts to looking at a microscopic thing with a macroscopic gadget," he added. "We know the device is sensitive to the muon particle because the counter assembly as a unit does not respond when a gamma radiation source is introduced," he added.

Seniors Coy Morris of Waco and Milton Lumpkin of San Antonio consider the project highly appropriate and interesting.

"In other labs, textbook experiments are conducted for known results," Lumpkin said. "We have more freedom in this lab course."



High-energy muons from the edge of space are detected by this spectrometer telescope built by Coy Morris (left) and Milton Lumpkin (right) Dr. N. M. Duller (center), who has built larger ones for A&M, looks on.

Distinguished status awarded air cadets

Distinguished Air Force Cadet status has been accorded 22 Texas A&M seniors, Col. Keith C. Hanna announced today.

The professor of aerospace studies noted DAFC indicates the cadet has exhibited qualities desired by the Air Force in its career officers.

By making the distinguished cadet list, the senior may be designated a Distinguished Military Graduate and be commissioned in the Regular Air Force upon graduation. With the DAFC and a reserve commission, he may apply for a regular commission after entering active duty.

The 22 cadets were selected on the "whole man" basis from among 129 Air Force ROTC cadet seniors. Military subjects proficiency, leadership qualities, disciplinary records, scholastic standing and extracurricular participation are considered.

Twenty per cent of the graduating class was selected under the quota system. Three cadets to graduate in December were designated DAFC last spring.

Wearing the blue and silver ribbon of DFAC on their uniform are Thomas C. Bain Jr., deputy corps commander, and John C.

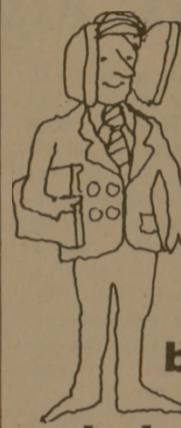
Souders, Squadron 13 commander of Dallas; John M. Braun, squadron 13 cadet, Austin.

Of San Antonio, Charles V. Brown, 1st Wing commander; David E. Frost, Squadron 12 commander; Lonnie D. Roberts, Squadron 3 commander; Roy E. Sewall, Squadron 10 commander, and Michael L. Wiebe, Squadron 8 member.

Also, Dennis K. Chapman, Squadron 9 commander and head yell leader, Haskell; Edward E. Duryea, Squadron 2 commander, Abilene; Jon E. Imler, Squadron 10, Arlington; Kenneth R. Johse, 1st Wing staff, Wharton; Robert L. Keeney, Squadron 8 commander, Killeen.

Plus, Robert M. Lowry, Squadron 3, and Michael A. Zwartjes, 2nd Wing commander, Alexandria, Va.; Robert H. Matthews, Squadron 14 commander, Amarillo; James W. Russell III, 4th Group commander, Annandale, Va.; Richard J. Rynearson, 2nd Group staff, Decatur; Charles H. Shipman, Squadron 11, Hurst; Roderick A. Taylor, Squadron 12, Wiesbaden, Germany; Paul C. Vollmar, 2nd Wing staff, Delanco, N.J., and Myles A. Yanta, corps scholastic officer, Runge.

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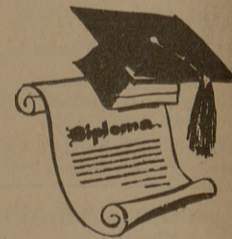
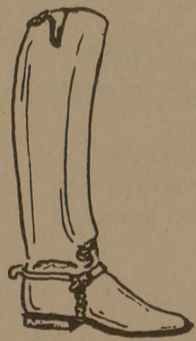
Attention... ALL SENIORS AND GRADUATE STUDENTS!

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YEARBOOK PICTURE SCHEDULE

M-N-O	OCT. 26-30
P-Q-R	NOV. 1-6
S-T-U	NOV. 9-13
V-W-X-Y-Z	NOV. 16-20
MAKE-UP WEEK — NOV. 23 — DEC. 11		



NOTE:

Students needing pictures for job-applications or any personal use may come ahead of schedule.

CORPS SENIORS: Uniform: Class A Winter — Blouse or Midnight Shirt
CIVILIANS: Coat and tie.

PICTURES WILL BE TAKEN from 8:00 A.M. to 5:00 P.M.

NOTE: BRING FEE SLIPS

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