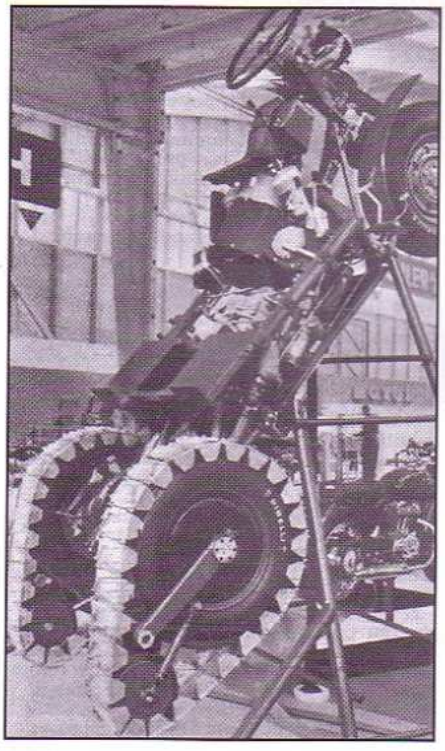
*Alpine troops in their traditional garb parading with regulation-loaded Mules in the early 1960s. (Fabio Basilisco)*

# Moto Guzzi Mulo Meccanico

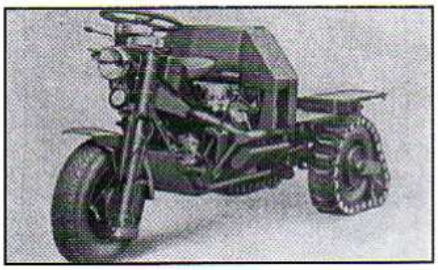
## The Italian 3×3 Mechanical Mule

During the Cold War there seemed to be no limit to defence spending and it was a period of many ingenious designs in the field of military automotive and other motorized equipment, from tiny to huge. Many examples have appeared in *Wheels & Tracks* over the years and this time we will have a closer look at the remarkable Italian Tre-per-Tre Autoveicolo de Montagna (three-by-three motor vehicle for mountainous use) but more commonly known as Mulo Meccanico (mechanical mule).

In the late 1950s came an initiative from General Garbari of the Italian Army to replace the traditional mule which for donkey's years had been the workhorse (pun intended) for the Alpini — the Alpine soldiers — by a mechanical substitute. Whether this substitution had anything to do with animal rights was not recorded, but the old four-leggers would prove to be hard to replace.



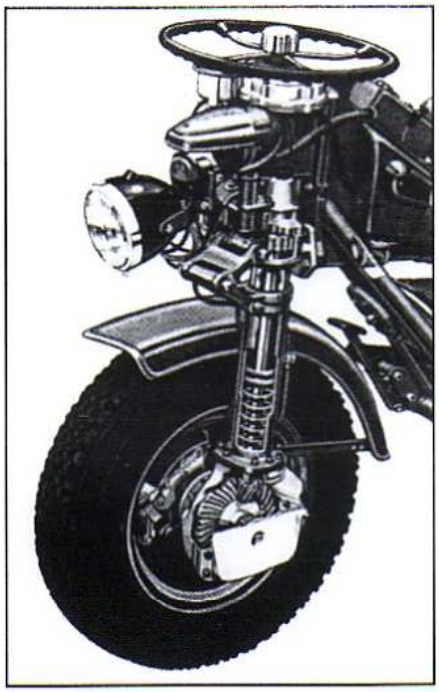

*This is how we first saw the 3×3 trike — still in prototype form — at the Geneva Motor Show in March 1960.*



*Pilot models — recognisable by different steering column and other details — under test. Upper left picture shows reduced rear track; this narrowing down (and vice versa) could be accomplished on the move, within 25 metres travelling distance.*

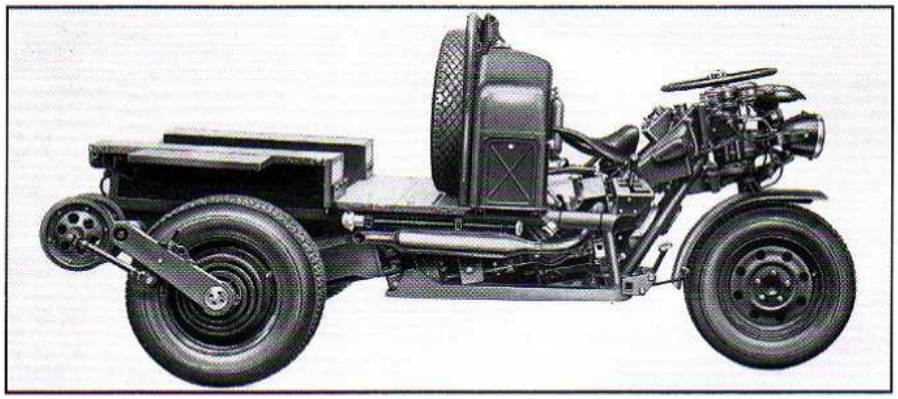
The manufacturer of the legendary Moto Guzzi motorcycles was approached for a solution and the firm's gifted designer Giulio Carcano was charged with the project. He envisaged a compact highly manoevrable three-wheeler with all-wheel drive. Our notes of around 1960 indicate that the original intention had been to use a 500-cc single-cylinder engine based on the one that had proved itself in such machines as the Guzzi 500U 3×2 Motocarro Militare, a robust high-torque slogger. This, however, proved not powerful enough and Carcano then set out to create an entirely new V-twin engine which he placed transversally in the frame so that the crankshaft was in line with the chassis and under such an angle that the drive in both directions was parallel, reducing the need for additional gearing to a minimum.

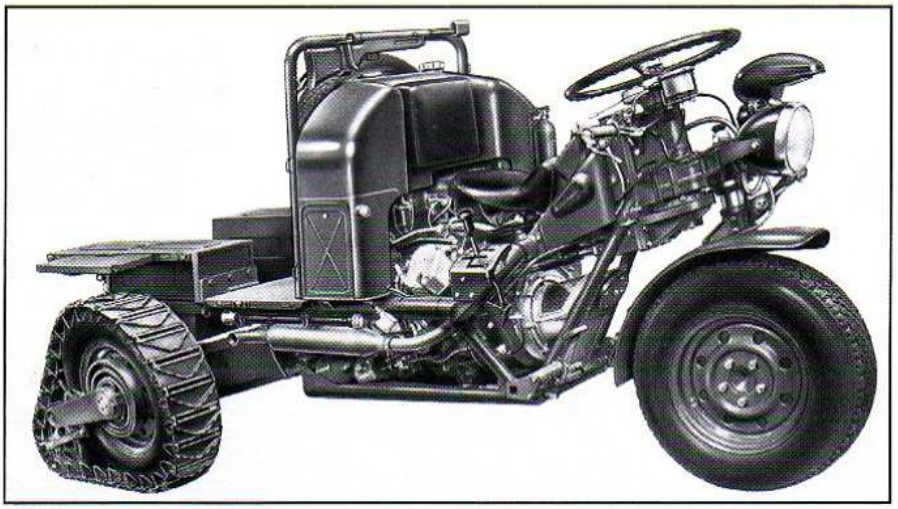
The preliminary end result was exhibited at the Geneva Motor Show in March 1960. The highly unorthodox machine was described as 'a motorized mountain-goat, with hydraulically reducible rear track to let it pass through narrow spaces, with a complicated layout of permanent drive to all wheels'. Tracks could be added to the rear wheels aided by auxiliary rollers which could be lowered and the machine was claimed 'to let you drive quite a long way up the side of a house'.

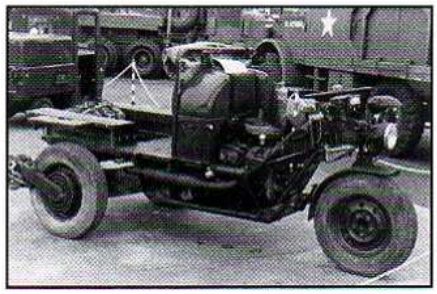


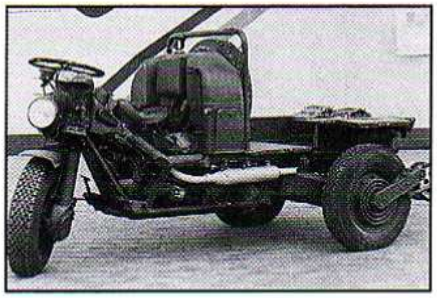
*Cut-away view of the production front end.*

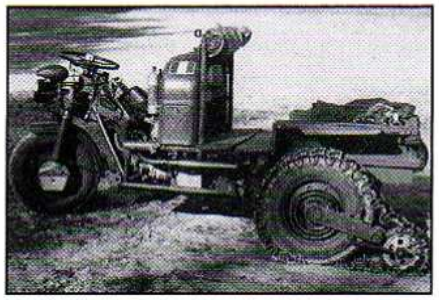
Following tests and detail modifications an order was placed for 500 units and quantity production of the final model commenced in 1961. In practice the machine was disappointing, though, 'due to the extreme cost and to problems associated with the excessive skills required by soldiers to operate it in the very tough conditions in which the mule had to perform', according to owner Antonio Allegranzi who preserved one. Another problem was that of driver safety, several drivers reportedly being killed when the vehicle inadvertently left the mountain track, rolling over and taking the operator with it. As a result production was discontinued in 1963. The vehicles remained in service until well into the 1970s, when a more practical 4WD replacement in the form of a 'pedestrian-controlled' platform carrier











*By lowering the rollers and installing the overall tracks the Mulo becomes a half-track. Driver's back rest is in fuel tank recess. The machine was an overkill, expensive and unsafe.*

*Of the surviving 3WDs, the majority have remained on their home turf.*

was introduced. This was configured like the US Mechanical Mule and built by Fresia as the F18 Mountain Utility Vehicle.

Not that everything had been a waste of effort, at least not for Moto Guzzi. The transverse V-twin engine, in several derivatives up to 1000 cc, was used in a succession of motorcycles beginning with the famed V7 model, which was sold for police work — including military — in a number of countries. The Mulo gradually disappeared from active service, to emerge again as a very desirable collector's item. ❑

## Technical Characteristics

**Type:** Mountain Vehicle, 3x3
**Make and model:** Moto Guzzi Mulo Meccanico (1961-63)
**Manufacturer:** Società Esercizio Industri Moto Meccaniche (SEIMM) SpA, Mandello del Lario (Co), Italy

ENGINE
Type: transverse 2-cyl. in Vee (90°), ohv, petrol, air-cooled, dry-sump
Make, model: Own Moto Guzzi 750
Piston displacement: 754 cc
Bore and stroke: 80 x 75 mm
Power output: 20 bhp at 4,000 rpm
Compression ratio: 6.5:1
Fuel pump: Weber PM15 or PM15/M
Carburettor: Weber 26IMB1 or IMB4
Ignition distributor: Marelli S89A

CLUTCH
Type: single dry plate, pedal actuated

GEARBOX
Type: 6-speed and reverse, in unit with lockable central differential with torque proportioning (80% to rear, 20% to front)
Ratios: 1st 12.92, 2nd 5.97, 3rd 3.10, 4th 1.93, 5th 1.31, 6th 1.00, reverse 13.7:1

FRONT WHEEL DRIVE
Type: shaft drive with reductions of 2.153 and 1.27:1 plus final drive ratio 3.416:1

REAR WHEEL DRIVE
Type: shaft drive to each rear wheel through suspension arms, final drive ratio 3.715:1; lockable differential
Overall ratio: 10.2:1

SUSPENSION
Type: telescopic with helical springing at front; rear trailing arms with rubber springing; variable track width

CHASSIS
Type: composite, tubular/welded plate

STEERING
Type: steering wheel; reduction gearing

BRAKES
Type, main: hydraulic on rear wheels, mechanical on front wheel; parking: mechanical on rear wheels

WHEELS
Wheel type: steel disc, 4½x15K, 5-stud
Tyres: 6.00-15
Tyre pressures: front 1.75, rear 2.5 atm

ELECTRICAL SYSTEM
Make: Marelli; waterproof
Voltage: 12 ( 1 battery, 45-Ah, negative-grounded
Generator: DN60A/180/12/2100D, 180 W
Starter motor: MT48A-07/12D8, 0.7 hp

BODYWORK
Type: open, single seat, rear platform
Other body styles: none

DIMENSIONS
Wheelbase: 2050 mm
Track, front: -, rear: 1300-850 mm
Overall length: 3000, width: 1570-1100, height: 1420 mm

CAPACITIES
Engine oil reservoir: 6 lit
Gearbox/differential: 6 lit
Fuel tank: 53 lit

WEIGHTS
Kerb: 1000 kg
Gross: 1575 kg

PERFORMANCE
Max. speed: 50 km/h
Cruising range: 350 km
Gradability: 42 per cent (in 2nd gear)
Turning circle: 4.4 m