between heavy bodies in motion and the same bodies at rest. A large stone placed in a balance not only acquires additional weight by having another stone placed upon it, but even by the addition of a handful of hemp its weight is augmented six to ten ounces according to the quantity of hemp. But if you tie the hemp to the stone and allow them to fall freely from some height, do you believe that the hemp will press down upon the stone and thus accelerate its motion or do you think the motion will be retarded by a partial upward pressure? One always feels the pressure upon his shoulders when he prevents the motion of a load resting upon him; but if one descends just as rapidly as the load would fall how can it gravitate or press upon him? Do you not see that this would be the same as trying to strike a man with a lance when he is running away from you with a speed which is equal to, or even greater, than that with which you are following him? You must therefore conclude that, during free and natural fall, the small stone does not press upon the larger and consequently does not increase its weight as it does when at rest.

SIMP. But what if we should place the larger stone upon the smaller?

SALV. Its weight would be increased if the larger stone moved more rapidly; but we have already concluded that when the small stone moves more slowly it retards to some extent the speed of the larger, so that the combination of the two, which is a heavier body than the larger of the two stones, would move less rapidly, a conclusion which is contrary to your hypothesis. We infer therefore that large and small bodies move with the same speed provided they are of the same specific gravity.

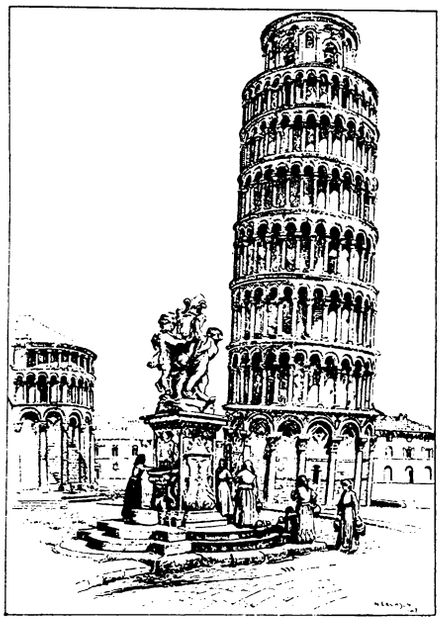
SIMP. Your discussion is really admirable; yet I do not find it easy to believe that a bird-shot falls as swiftly as a cannon ball.

SALV. Why not say a grain of sand as rapidly as a grindstone? But, Simplicio, I trust you will not follow the example of many others who divert the discussion from its main intent and fasten upon some statement of mine which lacks a hair's-breadth of the truth and, under this hair, hide the fault of another which is as big as a ship's cable. Aristotle says that "an iron ball of one hundred pounds falling from a height of one hundred cubits reaches the ground before a one-pound ball has fallen a single cubit." I say that they arrive at the same time. You find, on making the experiment, that the larger outstrips the smaller by two finger-breadths, that is, when the larger has reached the ground, the other is short of it by two finger-breadths; now you would not hide behind these two fingers the ninety-nine cubits of Aristotle, nor would you mention my small error and at the same time pass over in silence his very large one. Aristotle declares that bodies of different weights, in the same medium, travel (in so far as their motion depends upon gravity) with speeds which are proportional to their weights; this he illustrates by use of bodies in which it is possible to perceive the pure and unadulterated effect of gravity, eliminating other considerations, for example, figure as being of small importance, influences which are greatly dependent upon the medium which modifies the single effect of gravity alone. Thus we observe that gold, the densest of all substances, when beaten out into a very thin leaf, goes floating through the air; the same thing happens with stone when ground into a very fine powder. But if you wish to maintain the general proposition you will have to show that the same ratio of speeds is preserved in the case of all heavy bodies, and that a stone of twenty pounds moves ten times as rapidly as one of two; but I claim that this is false and that, if they fall from a height of fifty or a hundred cubits, they will reach the earth at the same moment.

SIMP. Perhaps the result would be different if the fall took place not from a few cubits but from some thousands of cubits.

SALV. If this were what Aristotle meant you would burden him with another error which would amount to a falsehood; because, since there is no such sheer height available on earth, it is clear that Aristotle could not have made the experiment; yet he wishes to give us the impression of his having performed it when he speaks of such an effect as one which we see.

*Science News Letter, July 8, 1933*



**GALILEO'S PHYSICS LABORATORY**

***The famous Leaning Tower of Pisa, from whose top Galileo dropped various weights to disprove Aristotle's axiom, while he was a professor in the nearby university.***

ASTRONOMY

# Mars Favorable to Life, American Astronomer States

RECENT observations confirm that conditions on Mars favor the existence of life on that planet, stated Dr. V. M. Slipher, distinguished astronomer, to Science Service's London correspondent.

Dr. Slipher, director of the Lowell Observatory, Ariz., where researches on planets have been carried out for the last four decades, was recently honored by the British Royal Astronomical Society, and lectured before the Royal Institution of London, upon the earth's nearest neighbors.

"If a rocket ship or other form of interplanetary locomotion existed today," said Dr. Slipher, "I should certainly not discourage any one from attempting to reach Mars." With its polar snow-caps, seasonal darkenings almost certainly due to vegetation, atmosphere containing water and oxygen and clouds, with an average temperature of 48 degrees Fahrenheit, conditions for life as we know it are most promising on Mars.

The regular markings on Mars, presumed by some to be canals constructed

by intelligent beings, have been confirmed by independent astronomers, including Schaeber, Campbell, Hussey and recently Trumpler at the Lick Observatory.

Photographs of the planets in different lights, by the use of colored screens, have given valuable additional information concerning the nature of their surface markings, and more will be gained by new methods and patient observation than by increased size in telescopes, Dr. Slipher contends.

As an instance he cites the proof of the presence of water and oxygen in the atmosphere of Mars, given by the "absorption spectrum" of Mars as compared with that of the moon, when in the same position in the sky, and the confirmation of the average temperature of 48 degrees Fahrenheit by radiometric measurements carried out at Flagstaff, Ariz.

The reason why astronomers have sometimes differed as to the existence of certain markings upon the surface of Mars, is easily understood if we admit the presence of clouds and other atmospheric disturbances which may considerably affect the appearance of the planet within a relatively short time. Dr. Slipher produced many photographs showing clearly the variation in the appearance of the Martian disc at different times.

*Science News Letter, July 8, 1933*

Electric welding has practically done away with riveting in German naval shipyards.

It is believed that ancient traditions of certain fine swords being sent from heaven can be explained by the fact that they were made from meteoric iron.



PSYCHOLOGY

# Punishment Isolates Children From Parent Who Disciplines

## Students Tell of Resentment After Youthful Whippings Others Report Respect for Lenient Elders

WHEN FATHER takes you to the woodshed or mother gets out her slipper, you may be sorry and resolve to do better or you may become sullen and defiant—but in any event you become mentally isolated from the authority that brings down punishment on your head.

Inquiry into the effects of punishment in 200 families showed that one result always follows, and that is a certain degree of isolation of the punished from the punisher, Dr. Ellsworth Faris, of the University of Chicago told scientists attending the Conference on Research in Child Development, held under the auspices of the National Research Council.

Punishment of children, and adults as well, is an accompaniment of the development of civilization—paradoxical though that may sound.

"Punishment did not always exist in human society," Dr. Faris said. "The origin of punishment was relatively late in racial experience being, perhaps, contemporaneous with civilization. The practice of punishing children arose long after the punishment of adults came into society. The effect of punishment on children has a disruptive tendency on the group to which children belong. The resulting isolation results in an increase of the 'social distance' which tends to lessen the control of the adults over the attitudes of the children in the group."

Dr. Faris quoted from the statements of college students who had been punished severely in their youth and those who had not.

One un-punished student wrote: "Discipline excellent . . . obeyed every rule . . . I worshipped my father," and another, "Never whipped . . . seldom scolded . . . I just seemed to know what mother and dad wanted me to do or not do."

In contrast are the following from those who were punished:

"Father whipped so hard I prayed I might die. There was bitter hatred for my father. I rebelled and practiced deceits and did not regret it. I would remain sullen and not talk for days. He never allowed us to explain."

"Step-father would take the buggy whip to me . . . when I was thirteen I ran away."

"Punishment . . . whipping by mother. Severe scolding by father which hurt worse and lasted longer . . . rebelled against the punishments and practiced deceits to keep from getting caught. Never lied except on a few occasions."

"Discipline by mother scolding and whipping . . . evaded punishment till father came home . . . he never spanked . . . . scolding made me resentful and sulky . . . father talked until we were shamed. Father expected obedience and got it . . . no fear of him . . . respected and adored him . . . never resented father, rebelled against mother . . . deceitful to mother to evade punishment . . . never with father."

*Science News Letter, July 8, 1933*

ARCHAEOLOGY

## 400,000-Year-Old Tools Found in Sand Beds

BONE TOOLS made by primitive dwellers in the Rhine valley 400,000 years ago, before even the low-browed Neanderthalers lived there, have been discovered and described by Dr. Otto Schmidtgen, director of the Mainz Museum of Natural History.

When they were first found, even their discoverer was skeptical of them, because it has always been held that the first bone implements were made by the much later men of the Crô-Magnon type, who lived in the Aurignacian period. However, so many of them have now been unearthed in the sand beds at Mosbach near Mainz that there seems to be no further doubt of their antiquity.

The materials used were bones of horses and elephants, and they were shaped into borers, scrapers and points.

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