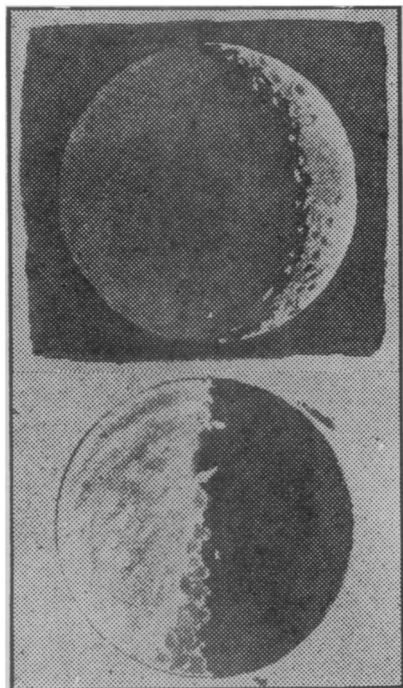


Classics of Science: The Mountains of The Moon



THE MOON, a reproduction of Galileo's own drawings showing the craters on the lighted side.

The telescopes devised by Galileo were of the type now used as opera and field glasses. His largest instrument has a magnification of about 33 diameters. So powerful a glass, however, is not necessary to see the moon's craters as he describes them, and an ordinary field glass will do very well.

SIDEREUS NUNCIUS (THE SIDEREAL MESSENGER), by Galileo Galilei, Venice, 1610; Tr. by Edward Stafford Carlos, London, 1880.

Ruggedness of Surface

Let me speak first of the surface of the Moon, which is turned towards us. For the sake of being understood more easily, I distinguish two parts in it, which I call respectively the brighter and the darker. The brighter part seems to surround and pervade the whole hemisphere; but the darker part, like a sort of cloud, discolours the Moon's surface and makes it appear covered with spots. Now these spots, as they are somewhat dark and of considerable size, are plain to every one, and every age has seen them, wherefore I shall call them *great* or *ancient* spots, to distinguish them from other spots, smaller in size, but so thickly scattered that they sprinkle the whole surface of the Moon, but especially the brighter portion of it. These spots have never been observed by any one before me; and from my observations of them, often repeated, I have been led to

that opinion which I have expressed, namely, that I feel sure that the surface of the Moon is not perfectly smooth, free from inequalities and exactly spherical, as a large school of philosophers considers with regard to the Moon and the other heavenly bodies, but that, on the contrary, it is full of inequalities, uneven, full of hollows and protuberances, just like the surface of the Earth itself, which is varied everywhere by lofty mountains and deep valleys.

Lunar Mountains and Valleys

The appearances from which we may gather these conclusions are of the following nature:—On the fourth or fifth day after new-moon, when the Moon presents itself to us with bright horns, the boundary which divides the part in shadow from the enlightened part does not extend continuously in an ellipse, as would happen in the case of a perfectly spherical body, but it is marked out by an irregular, uneven, and very wavy line, as represented in the figure given, for several bright excrescences, as they may be called, extend beyond the boundary of light and shadow into the dark part, and on the other hand pieces of shadow encroach upon the light:—nay, even a great quantity of small blackish spots, altogether separated from the dark part, sprinkle everywhere almost the whole space which is at the time flooded with the Sun's light, with the exception of that part alone which is occupied by the great and ancient spots. I have noticed that the small spots just mentioned have this common characteristic always and in every case, that they have the dark part towards the Sun's position, and on the side away from the Sun they have brighter boundaries, as if they were crowned with shining summits. Now we have an appearance quite similar on the Earth about sunrise, when we behold the valleys, not yet flooded with light, but the mountains surrounding them on the side opposite to the Sun already ablaze with the splendour of his beams; and just as the shadows in the hollows of the Earth diminish in size as the Sun rises higher, so also these spots on the Moon lose their blackness as the illuminated part grows larger and larger. Again, not only are the boundaries of light and shadow in the Moon seen to be uneven

(Just turn the page)

The House Un-beautiful

Quotation from ARTIFEX or The Future of Craftsmanship—John Gloag—Dutton.

In acquiring a multitude of superficial attainments we have allowed many of the faculties of our forefathers to lie dormant. True, we criticise and improve a number of things they ignored, sometimes disastrously, but we do not and quite often we cannot criticise our possessions as a seventeenth century householder would have criticised them. When town and country craftsmen made furniture by hand there was for its form an accepted character, a recognized idea of appropriate embellishment and a widespread knowledge of what the product of good workmanship should look like and feel like, and the attributes one should expect a piece to have after certain sums had rewarded the labor of the craftsman; in short, there was a real understanding of the meaning of quality in workmanship and material. How many of us possess that elementary critical faculty now? How many people can look at a piece of furniture made today and give a fair estimate of its worth from the point of view of workmanship? No, that sort of thing is left to the "experts" and what was everyday thinking in the life of England or the American colonies a couple of centuries ago is now regarded as a mystery, lit only by the lamp of expert knowledge. . . .

The atrophied critical faculty of the average man or woman is best demonstrated by their homes, by the host of ugly, useless, unfit and ill-made articles with which their rooms are crowded. These things are sold to them by advertisements that are not always framed in the spirit of commercial piety that produced the slogan of "Truth in Advertising." And it is the habit, three generations old, of relying on the views of others which makes the householder accept badly-constructed and ugly things.

Unless the great mass of people is taught to think, and consequently to criticise, technical education will be handicapped, for although it may improve craftsmanship, it cannot create the demand for well-made things that must sustain good craftsmanship.

Science News-Letter, October 22, 1927

A new hotel and office building in Cleveland is 555 feet high, the same height as the Washington Monument.

The formulae used by the Egyptians to color bronzes are still used by French, British and American mints, an electro-chemist declares.

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Mountains of Moon

(Continued from page 269)

and sinuous, but—and this produces still greater astonishment—there appear very many bright points within the darkened portion of the Moon, altogether divided and broken off from the illuminated tract, and separated from it by no inconsiderable interval, which, after a little while, gradually increase in size and brightness, and after an hour or two become joined on to the rest of the bright portion, now become somewhat larger; but in the meantime others, one here and another there, shooting up as if growing, are lighted up within the shaded portion, increase in size, and at last are linked on to the same luminous surface, now still more extended. An example of this is given in the same figure. Now, is it not the case on the Earth before sunrise, that while the level plain is still in shadow, the peaks of the most lofty mountains are illuminated by the Sun's rays? After a little while does not the light spread further, while the middle and larger parts of those mountains are becoming illuminated; and at length, when the Sun has risen, do not the illuminated parts of the plains and hills join together? The grandeur, however, of such prominences and depressions in the Moon seems to surpass both in magnitude and extent the ruggedness of the Earth's surface, as I shall hereafter show. And here I cannot refrain from mentioning what a remarkable spectacle I observed while the Moon was rapidly approaching her first quarter, a representation of which is given in the same illustration. A protuberance of the shadow, of great size, indented the illuminated part in the neighborhood of the lower cusp; and when I had observed this indentation longer, and had seen that it was dark throughout, at length, after about two hours, a bright peak began to arise a little below the middle of the depression; this by degrees increased, and presented a triangular shape, but was as yet quite detached and separated from the illuminated surface. Soon around it three other small points began to shine, until, when the Moon was just about to set, that triangular figure, having now extended and widened, began to be connected with the rest of the illuminated part, and, still girt with the three bright peaks already mentioned, suddenly burst into the indentation of shadow like a vast promontory of light.

At the ends of the upper and lower cusps also certain bright points, quite

away from the rest of the bright part, began to rise out of the shadow, as is seen depicted in the same illustration.

In both horns also, but especially in the lower one, there was a great quantity of dark spots, of which those which are nearer the boundary of light and shadow appear larger and darker, but those which are more remote less dark and more indistinct. In all cases, however, just as I have mentioned before, the dark portion of the spot faces the position of the Sun's illumination, and a brighter edge surrounds the darkened spot on the side away from the Sun, and towards the region of the Moon in shadow. This part of the surface of the Moon, where it is marked with spots like a peacock's tail with its azure eyes, is rendered like those glass vases which, through being plunged while still hot from the kiln into cold water, acquire a crackled and wavy surface, from which circumstance they are commonly called *frosted glasses*.

GALILEO GALILEI was born at Pisa February 15, 1564, and died January 8, 1642, at Arcetri, near Florence. His brilliant mind began to show its unusual powers even in childhood, and at seventeen when he entered the University of Pisa to study medicine he was already more than an amateur in both music and painting. The observation of the swinging lamp in the Pisa Cathedral, and a lesson in geometry which he accidentally heard, in that year turned his talents to the study of pure science.

The telescope with which Galileo discovered the mountains of the moon here described, and many other new objects in the heavens, was devised by him after one night's study when he learned that similar instruments were being made in the Low Countries. He was forty years old at the time. The discoveries made with his telescopes led to his famous *imbroglia* with the fundamentalists of his day.

Science News-Letter, October 22, 1927

Of about 50 kinds of grapes in the world, over half are natives of North America.

Perfumes came to be so excessively used in ancient Rome that their use was finally restricted by law.

Study of 50,000 school children shows that heart disease occurred more frequently in children who had kept their tonsils than in those who had their tonsils out.

Out of 19,000 children in orphan asylums in nine states, only five per cent. were full orphans, 30 per cent. were half orphans, and 65 per cent. had both parents living.