THE OMAHA DAILY BEE: SUNDAY, APRIL 12, 1896.



THE MOON-AGED 12 DAYS 61/2 HOURS-FROM A PHOTOGRAPH TAKEN AT LICK OBSERVATORY.

across the floor of Plato, in such a case we know that the length of the shadow would objects is the great Oceanus Proceilarum, which covers an area not very different from that occupied by European Russia. If howbe about thirty miles. From our knowledge of the relative positions of the earth and the we desire to look at one of the objects of this class which seems most emphatically moon, we can determine the height of the to suggest its origin to have been an ancient sea basin, I would specially call attention to the Mare Crisium. It needs but little effect of the imagination to fill this remarkpeaks. The isthmus on which Plate is situ-

able gulf with water, and then to see how the margin forms the cliffs against which the waves have hurled themselves for centuries. Close examination reveals that the floors of these "seas" are marked over with various irregularities so that when such features are eral objects in and about the Mare Imbrium.

and I believe justly regarded, as the most noteworthy object on the moon. It stands isolated in the Oceanus Procellarum, and this peculiar situation gives to Copernicus a dis-

Luctness which makes it very easy to recog-nize. The central regions of the ring are nize. The central regions of the ring adorned by a mountain, some of whose peaks attain about half a mile in altitude. Among attain about half a mile in altitude. Among the features which make Copernicus specially interesting as a telescopic object are the remarkable terraces which are to be seen

congealed. If the molten lava beneath subsided, it would doubtiess leave a margin of solidified material, which would thus form the first or highest terrace. At a subsequent outbreak the basin might have been only partially filled, so that the lava did not accend to so great an attitude. This would in due course bicome congested on the surface, and again the lawa would subside, thus forming a second terrace.

I must here specially mention a remark ble characteristic of lunar scenery which is displayed on a grand scale by Copernicus I allude to the presence of bright radiating ptreaks which extend from the great crates for many hundreds of miles over the lunar surface. The explanation of these bright sircaks offers one of the most difficult prob-lems in lunar physics. They are sometimes thought to mark lava flows from the central spot at some carfier phase of eruption than the crater as it now stands would indicate it does not, however, seem apparent why these streaks should in this care possess the peculiar brightness which characterizes them.

Near the southern pole of the moon is the emarkable crater known as Tycho. This is itrated in a region where the scenery indiintes the wildest and most magnificent con-usion. Tycho is specially noticeable for the number of bright streaks which radiate from number of oright streaks which radiate from it. Indeed, at the time of full moon, when these streaks are peculiarly visible, they have frequently been likened to meridians diverging from a pole. Nasmyth supposed that these streaks were due to cracks in had welled out from heneath. He gives a striking illustration of the mechanical possi-bility of this doctrine by showing how a glass globe has been observed to crack in such a way as to produce a system of streaks

It is known that great volcanic outbreaks on the earth, such, for example, as the re-nowned discharge which took place at Krakatoa in 1883, have been attended with the evolution of enormous quantities of volcanic dust, or comminuted pumice, which was of a light grayish color. It may be, as Mr. Elger suggests, perhaps have happened that volumes of volcanic dust have issued from the fissures produced in the moon, under the influence of the cracking suggested by Nasmyth. This dust would accumulate along the lines of fissure, for it must be remembered that as there is no air on the moon, there would be no wind to blow the dust away, as there would be on the earth. There, consequently, the dust would remain, and its characteristic whiteness would present just the same appearance that the streaks now seem to have. This view seems to present the most reasonable explanation at present available as to the origin of these remarkable lunar characteristics.

One more striking feature in the scenery of our satellite should be referred to. I mean the deep but narrow clefts or chasms which extend for hundreds or often for thousards of miles across the lunar surface. These chasms seem in all probability to owe their origin to earthquake shocks by which the moon was shaken in the days when its

volcances were still active. Those days seem, however, to have long since passed. The volcances on the moon no longer give any manifestation of energy. They are all extinct and silent, though one or two cases have been recorded in which apparent changes server. These facts suffice to enable us to ascertain the altitude of the corresponding they are but insignificant.

The fact is that the moon appears to have lost its volcanic energy. This is doubtless evergy left to produce a volcanic outbreak. The eath is so much larger that it still re-tains large quantities of internal heat which manifests itself occasionally in the eruption of volcances. The difference between the earth and the moon in this respect may be expressed in this way: That while we have many extinct volcances on the earth, and comparatively few active ones, yet, on our neighboring gicbe all the volcanoes seem to



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homes.

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obstruction. If we also remember many of the features of our satellite are within reach of a telescope of comparatively moderate power, it will not be surprising that the linar scenery has attracted so much attention and that thousands of minute features on its surface have been carefully iden tified. In some cases accomplished observer have devoted themselves with praiseworthy assiduity to the detailed examination of special minute parts on the surface. It would be impossible to enumerate al

atmosphere would thus oppose great difficul-ties to the study of the geography of our

earth by an outside object. It may, indeed be well doubted whether even the outlines o

the continents could be completely discerned

notwithstanding that the area of earth at the

distance of the moon would be thirteen times

larger than the area of the moon as pre-

For the purpose of the terrestial astron-omer, it fortunately happens toat the moon is almost entirely destitute of atmosphere The features of its surface are consequently

never obscured by any of those causes which would tend to hide the features of the earth

from outside scrutiny. Whenever the clouds on our globe are out of the way, it is then

observe the mu

but little

sented to us.

the astronomers of recent times whose labors have been directed to the study of the lunar scenery, I may, however, here mention a few names, adding the remark that there are doubtless many others whose valuable labors could not be overlooked if it had been possible to give a more complete account of the subject than would be practicable within the limits of the present article.

First, I must mention Mr. Nasmyth, who was at once a famous mechanical engineer, a skillful artist, and a devoted student of a skillful artist, and a devoted student of the stars. He employed his well-earned leisure in the study of celestial objects, and he devoted especial attention to the moon. The work which he produced in conjunction with Mr. Carpenter is a standard authority on the lunar scenery, and is per-haps one of the most beautifully illustrated books that has ever been devoted to the sub-ject of the heavens. I must also refer to ject of the heavens. I must also refer to Prof. Holden and other distinguished astronomers at the Lick observatory, on the top of Mount Hamilton, in California. They



have applied their resources to the pho tography of the moon with remarkable suc-cess, and some of their pictures of our miellite have formed the basis upon which Dr. Weinek has produced excutsite drawings of the lumar features.

of the lunar features. As, perhaps, the latest book on the topography of the moon. I may mention the elaborate work by Thomas Gwyn Elger, who is himrelf one of the most assiduous of lunar observers. He has collected to-gether the most interesting facts relative to the topography of our estellite. I am much indebted to the various authorities I have

spoken of as smooth, it must be understood that this is merely by way of contrast to the extreme reggedness which prevails over the greater part of the lunar surface. EXTINCT VOLCANOES ON THE MOON. The most characteriotic features of the canery on our satellite are, however, the remarkable objects which are the results of volcanic phenomena. There are many classes into which these objects can be divided, but for cur present purpose it will, perhaps, be sufficient if we attempt to give some brief necount of what may be called the walled plains, and of the volcanic craters properly so termed. According to Mr. Elger, the authority to whom we have already referred, the most perfect example of a walled plain on the moon is the great object known as Ptol-emaeus. The remarkable district so designated covers an area on our satellite considerably larger than Wales. It is sitmated nearly centrally on the face of the moon directed toward us, so that it generally lies very caveniently placed for examina-tion. It will be recognized as the last of a chain of four magnificent objects of the same character, which lie along the coast of

that darkest of lunar seas, known as the Mare Nublum. Ptolemaeus may be described as almost circular in outline, though some-times it might be regarded as a rudely sixsided figure. Its appearance may be com pared to that of an eye glass, whereof the little handle is formed by a beautifully shaped crater bearing the name of Herschel The floor of Ptolemaeus is a plain, not much depressed below the general level of the lunar surface. It is so vast that an oberver placed in its midst would see a bound less horizon stretching away from him on al sides. He would not realize the fact that Ptolemacus was surrounded, more or less completely, by a noble circle of lofty moun-tains, for these mountains would be below below his horizon. Some of the peaks ascend one mile, and in certain cases even two miles above the interior of the plain. At certain coints the mounta's chains will be found interrupted by mighty passes; especially is this the case on the margin between Ptolo-

macus and the next adjoining walled plain, which is called Alphoneus. To my mind, however, the most interesting of these objects, as well as perhaus the most perfect representative of its class is the beautiful walled plain named Plato This is so well placed, and has such a striking appearance, that it is probably one of the first objects which a student of lunar topography succeeds in identifying. No other object of the same character happens to lis in its neighborhood, and, consequently, there is but little difficulty in distinguishing the walled plain referred to. For it may be remarked that the aspect of the moon changes so frequently that the identification of some features is at times a little trouble some. This partly arises from the never-

ending varieties of light and shade as the moon changes from day to day. There is also another circumstance which s sometimes and to puzzle the beginner, for, owing to what is called the moon's libration, the face which is directed toward us is not always exactly the same. Hence t follows that at different times the dis-ances of objects from the circular edge

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Beginning at the northern point, we first ome to the very remarkable bay known as the Sinus Iridum. Then comes Plato, and then the guif sweeps around by a noble range of mountains called the Caucasus, between which and the range of the Ap-penines there is a passage which leads into the Mare Serenitatis.

the Mare Serenitalis. At this point the observer will not fail to notice three splendid rings lying out in the Mare Imbrium. The smallest of these is Autolycus; directly below that is the larger ring, known as Aristillus, which is thirty-four miles in diameter. Its rampart rises upward of two miles above the surrounding plain, while the interior of it is depressed some 3 2000 feet below the level of the seneral u some 3.000 feet below the level of the general lunar surface. Aristillus may be regarded as a typical lunar crater, inasmuch as it is adorned by a lofty mountain peak ascending from the center. A view of multitudes of details in this mighty extinct volcano will reward the dilligent student, who has the use of a good telescope. If he should be an



ALPS, APPENINES, ARCHIMEDES, TAK EN AT THE PARIS OBSERVATORY.

SIR ROBERT BALL. FASTEST IN THE WORLD.

## The Astonishing Speed of the Latest British Naval Craft.

have passed into the extinct condition

Details of H. M. S. Desperate, as they cal very craft belonging to the British navy, down to a dingy, if she is independent, are now at hand, says the New York Sun. She is 210 feet over all, with a beam of reward the dilligent student, who has the use of a good telescope. If he should be an artist, he will find ample scope for practice with his pencil in delineating the many

inctive titles and phraseology directed esne cially to attracting the attention of these who have come to look upon religious work as a perfunctory affair; demonstrations of various kinds, usually arranged by combin-ing different corps, partly for the purpose of making an impression upon the public mind partly to increase the esprit de corps of the coldiers, partly to promote the advance of the local work by giving special prominence to some particular feature. Of these particular features the most noted are, slum work curried on chieffy by female officers, who take rooms in the most degraded neighbortake rooms in the most degraded heighbor-hoods, live among the people, nurse the sick and perform any available kind offices for those who need, visit the saloons and dives and deal with the people they find there; rescue work, applied especially to fallen women, and prison gate work, dealing

There are also certain general features which may be called distinctive; prominence given to women, who form about one-half of the total number of officers; pressure upon each individual member to be an active worker as soon as conversion is professed adaptation of system and methods to peculiar fested in the daily meetings; the principle of self-support applied to each corps, division and territory; self-denial throughout the army; distinctive uniform; implicit, unquestioning obedience; prominence given to the teaching of entire sanctification or complet deliverance from the power as from the guilt of sin; the democratic element allowing any individual to rise to any position; mutual personal love and affection of the members; the development of native soldiers and officers

ried on. No statement of the Salvation army is complete without a reference to Mrs. General Booth, who died in 1890, and to whose wisdom as well as energy and eloquence has been due to a great degree the success of the organization. She manifested many different characteristics from those of her husband. While he was aggressive and apt to be harsh and dogmatic in his action, the was mild and considerate, but not less persevering and determined. It is noticeable that the two characteristics run through the family. Bramwell and Herbert Booth are like the father, Ballington Booth and Emma Booth-Tucker are like the mother, and these dis-tinctions explain to a degree some of the facts made manifest during the past months.

facts made manifest during the past months. Another movement that should have more space than can be given is that which occa-sioned General Booth's book "In Darkest England and the Way Out," a scheme for the relief of the lower classes, called the "submerged tenth," by the establishment of a city colony, a farm colony and an over-the-sea colony; a labor bureau and factory end various other measures whose principal WEBSIERCE. SUFACE. ANDREW ROSEWATER. Civil Engineer. G. W. SUES & CO., Solicitors of Patents. OMAHA COAL EXCHANGE. MRS. J. SMITH, Lessons in Embroidery. MISS IDA V. MASON, Lessons in Dressand various other measures whose principal idea is not pauperism through charity, but the development of individual character. E. P. ROGGEN. The latest form developed is that proposed by the general in India. This is simply a colony on an enormous scale, but it has not as yet met with the endorsement of those most thoroughly acquainted with that em-

pire. The following statement shows the number

of corps and officers in December, 1895. The list of officers includes social, trade and international staff employes: Officers 4.500 1.85 1.53 66 79

Corps. ... 1,375 ... 585 486 Jamaica South Africa and St. Helena... South Africa and St France Switzerland Norway Denmark Holland Germany Belgium ..... Finland ..... Ita'y Spain Gibraltar Java British Guiana. Iceland Japan ..... Total ...... 3,673 Mrs. Burke-Roche is said to ride a silver

mounted wheel, while the queen of Italy's bloycie is a gorgeous affair with gold trim mings.

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