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MEDICAL SCIENCE DEPARTMENT.

Hippocrates has said that "medicine is of all arts the most noble; but owing to the ignorance of those who practice it, and of those who inconsiderately form a judgment of these it is at present far behind all other arts." That was over two thousand years ago and medical science is still in many respects an unsolved riddle. However, its outlook is hopeful for a large amount of time and thought is being spent in its study. A goodly proportion of those who are not in the profession are interested in its study and acquire no small proficiency in its knowledge. It is with a hope of forwarding this good work that this department of medical science is opened. It invites reports of original research and of experiments and discoveries in all departments of hygiene from all who are interested whether in the medical profession or not.

It also invites questions on all subjects relating to the preservation and restoration of good health.

MEDICAL FADS AND FALLACIES.

We are living in an Athenian age with its mad rush after some new thing. Every form of science is invaded with some fad or other, some new thing which often is doubtless some old thing raked up from the past and brought to the notice of a new century. Medical science is full of fads. Our tables are piled with papers and magazines devoted to health culture. There is an eager reaching out toward something new and better, something that will enable us to live to the age of the patriarchs, or, what is a nobler aim, to free ourselves of the multitude of aches and pains that make life a piteous failure so that one may really live while we exist. In so far as the various fads tend to accomplish this object they are to be encouraged but many of them are but sorry fallacies.

There is no surer way of detecting a fallacy among the various health culture fads than by comparing the work it outlines with the leadings of health's own iother Nature. For example: A recent fad is drinking water, more water and more. Two tumblers of cold water on rising are recommended, several during the day and two or three more in the evening making about two quarts in the waking hours. This is to be kept up daily. The fad looks reasonable. A great amount of water certainsly does go to feed the activities of the human body and yet just as certainly Nature does not require us to drink two quarts of water daily. She even shivers at the two glasses of cold water in the morning. The recommendation is evidently not hers. Neither is it the recommendation of science when properly understood. It is true that water holds an important field in the human system. As an eminent physiologist has said, it is the medium through which the body is nourished. But it would be impossible to estimate with exactness by any known scientific methods just how much water must be taken as drink in order to fulfill the requirements of the human system. A large amount of water is taken in the various foods. They all contain water in proportions varying from three-fourths to nine-tenths. Nature demands these foods and if they do not supply a sufficiency for the work she has in hand she invariably calls for more in some form or other. And it is safe to say that no one who wishes to be well and strong, useful and happy should refuse to respond promptly to all the calls of Nature.

In fevers, it is true, water must be generously allowed. And it is also true that Nature demands it. In some ailments, as constipation, headache, and that long train of disorders caused by a sluggish liver water may be a valuable remedy but for the very reason that it is a remedy it may be discarded as a daily companion except as Nature asks for it.

It would also seem, upon a second thought that the habitual use, the forced use of a large quantity of water if contrary to Nature's wishes might be not only foolish but injurious. Two quarts of water if taken at once would cause a distended stomach. If taken as recommended would give work to the stomach between meals and give it less of the needed rest. Surely Dame Na-

ture has reason as well as instinct when she refuses to call for two quarts of drinking water daily. Also many other fads which are now seeking to win attention show themselves sooner or later as but fallacies. Nature should be the detective of every false thing. Her ways are the ways of good health, and in disease her methods and those in alliance with her methods are the surest way to recovery.

An ancient writer in describing the course of sickness pictures it as a battle between nature and disease. The physician who steps in to settle the difficulty is described as a blind man armed with a club. And physicians often are as blind men. They may do their best yet often they cannot see what they do. The physician, writes the Irish philosopher tries first to make peace between nature and disease. Failing in this he lifts his club and strikes at random. If he hits the disease he destroys it and restores the patient but if he strikes nature he kills the patient. Much of this may be applied to medical fads. There are among them many random shots some of which fall upon disease or disease-producing habits, while others just as surely are a blow to nature itself and are to be studied only to be avoided.

OLIVE EDDY ORCUTT, M. D.

PHYSICIANS ON ALCOHOL.

The following statement has been agreed upon by the Council of the British Medical Temperance Association, the American Medical Temperance Association, the Siciety of Medical Abstainers in Germany, and leading physicians in England, on the Continent and in America:—

We think it ought to be known by all that:

Experiments have demonstrated that even a small quantity of alcoholic liquor, either immediately or after a short time, prevents perfect mental action, and interferes with the function of the cells and tissues of the body, impairing self-control by producing progressive paralysis of the judgment and of the will, and having other markedly injurious effects. Hence, alcohol must be regarded as a poison, and ought not to be classed among foods.

Total abstainers, other conditions being similar, can perform more work, possess greater powers of endurance, have on the average less sickness, and recover more quickly than non-abstainers, especially from infectious diseases, while they altogether escape diseases specially caused by alcohol.

FLOWERS AND THEIR MISSION.

Yes, almost every flower that grows,
In its sweet life some romance knows,
And some heart at once will wake,
A joy or sorrow for its sake.

Even the fragrance of pine trees,
Recalls a long gone mountain breeze,
In vain we hoped health would restore
To the dear peerless child once more.

Yes, and a little bright green spray,
The teacher wore that summer day,
In the folds of her soft brown hair,
Make such green leaves forever fair.

With silent language all its own,
Some flower will make its mission known
And thrill the heart in after years
With thoughts that fill the eye with tears.

—Mrs. E. E. Orcutt.

RANDSBURG MINING DISTRICT.

A topographic map of the country adjacent to the Randsburg and Johannesburg mining districts, California, is now in press and will soon be issued by the United States Geological Survey. The area covered by this map is known as the Randsburg quadrangle, and embraces almost equal portions of Kern and San Bernardino counties, and shows part of the location of the Randsburg Railroad, which connects Johannesburg with Barstow, San Bernardino county.

The scale of this map is approximately one mile to the inch. The contour vertical interval of 50 feet shows well the topographic features of the region. All roads, trails, mines, and houses are shown with great exactness, and—most important in such an arid country—the positions of all wells, springs, reservoirs, and dry lakes are accurately located. This section is practically a desert, and unless water can be found within reasonable distances and at depths easily reached from the surface, prospectors and miners can not prosecute their work. The water for Randsburg and Johannesburg is piped from wells about 5 miles northeast of these places. It is of fairly good quality but is insufficient in quantity, and while the water company charges are not there regarded as excessive, the lowest rates would astonish those who are not familiar with

this desert country. Persons occupying houses or tents without water pipes usually pay one dollar a barrel for water.

The whole area represented on this sheet is one of the most forbidding deserts in the United States. The valleys are practically sand beds, the mountains bare masses of rock. The only vegetaton in the valleys is scattered, low cactus, with here and there a greasewood or creosote bush about knee-high. The mountains are absolutely devoid of grass or trees.

The mineral wealth, principally gold, constitutes the whole value of the country; but this is sufficient to have built up during the last few years the flourishing mining camps of Randsburg and Johannesburg, with an aggregate population of about 1,200.

NOTES AND NEWS.

E. O. Wooton professor of biology of the N. M. College of Agriculture, paid us a pleasant call recently.

A. S. Hitchcock, in charge of the grass investigations of the U. S. Dept. of Agriculture, spent a few hours in San Diego on a hurried visit to the Coast.

MARYETTE FOSTER EDDY.

Born at Volney, N. Y., April 28, 1829. Died at Los Angeles, California, August 17, 1903.

Wife of Cortes C. Eddy and mother of Samuel Willman Eddy, Mrs. Ollve L. Orcutt and Mrs. Clara E. Hamilton, husband and daughters surviving, and known to a large circle of friends at Mexico, N. Y., Norwalk, Ohio, and in Los Angeles, where her years of usefulness have largely been spent.

Below are given the words of Rev. Charles M. Fisher to her friends:

My Christian Friends:—It is to me a sad privilege to be permitted to speak a few words as a tribute of love and respect on this occasion. It was my privilege to know the beloved friend who has gone from us as a pastor and to know her as a pastor comes to know those who gather week by week in the fellowship of the prayer meeting.

Among those who thus gather she was ever faithful and her influence as a prayer meeting member of the church was strong and beautiful and helpful.

At such a time as this there are two aspects under which what we call "death" is wont to present itself. To the natural thought and feeling death means loss and failure and defeat. We struggle and toil in our earthly service and when it seems as if the time of reward should come to us then in its stead comes this strange and ever perplexing event of death. The pathway seems to nature, to run into clouds and darkness and were we compelled to judge things purely from the natural standpoint there would be no other interpretation than this, that life, so precious to us all and so filled with precious treasures of love and friendship, reaches at last the terminus of utter futility. We might reasonably ask the question, "Is life worth living?" But today there is in my mind and heart a very different thought as I stand in the presence of all that was mortal of our beloved friend. Not the note of defeat, but of triumph rings in my soul today as I recall this beautiful life to memory. We who have known her realize well that she would be the last to wish that words simply of eulogy should be spoken today, and yet her life as we recall its graces is ours as a precious heritage of memory today and it is right that for our instruction and for our help along the path of Christian service we should speak to one another of what in her life so beautifully portrayed the character of her Lord and Master—the Lord and Master whom we all desire to follow. And I shall speak my personal impressions in the confidence that they also will tell in part the story of her influence upon you as you met her from time to time.

I was impressed with the sweetness of her abiding faith in Christ. One was always better for being in her presence for a little while. There was ever strength and encouragement for weak faith in talking with her of the things of God. Her consciousness of God was so marked and manifest in her every word and deed that one could not but feel the inflow of new faith and joy in

the same Saviour in whom she so trusted. And with this assurance of faith there was always a wonderful humility. To think of herself as having any claim upon God because of inherent or manifested goodness was evidently not possible to her. She always seemed to me to be a living illustration of the words of the great Apostle when he said—"Not as though I have already attained either were already perfect, but I follow after if that I may apprehend that for which also I am apprehended of Christ Jesus." Her strength was the strength of an humble faith in Christ her Saviour.

There was also ever present with her, as one could not but feel, a great heart-hunger for Christ. She longed to be more like her Lord and she longed to have His fellowship more and more. You remember Jesus Himself said, "Blessed are they who hunger and thirst after righteousness for they shall be filled" and who shall doubt today that she is now realizing in its fulness the precious fulfillment of this assurance?

And then how marked in her life was her thoughtfulness for others! Never a thought apparently for what might bring blessing to herself merely but always uppermost in her thought what might bring good to the lives of those about her. In my last visit at her bedside I was especially impressed with this. It might have been expected then that she would have some words to utter as to her own condition but instead she was anxious to know of the welfare of others and she named over many of her friends and asked after them. In this she strikingly exemplified the unselfish spirit of her Lord. "Not to be ministered unto but to minister" was the guiding thought of her life and up to the last she maintained a warm interest in all about her

To my mind, dear friends, there is in this a blessed witness borne of the truth of immortality. The service ceases to our sight on earth but the incident of death can have no power to hinder the ongoing of that service with God and we are to think of her today as among those who "serve Him day and night in His temple."

The fragrance of such a life endures and shall abide with us all. She will "live again in lives made better by her presence" and not only thus but the immortality of those who have been "redeemed by the precious blood of Christ" is hers. Our thought must go on and up to the heavenly joy and we must think of her as dwelling "with Christ which is far better."

Pale withered hands, that more than threescore years
Have wrought for others, soothed the hurt of tears,
Rocked children's cradles, eased the fever's smart,
Dropped balm of love in many an aching heart;
Now stirless, folded like wan rose leaves pressed
Above the snow and silence of her breast,
In mute appeal they tell of labors done,
And well-earned rest that came at set of sun.
From the worn brow the lines of care have swept,
As if an angel's kiss, the while she slept,
Had smoothed the cob-web wrinkles quite away,
And given back the peace of childhood's day.
And on the lips the faint smile almost says:
"None know life's secrets but the happy dead."
So gazing where she lies, we know that pain
And parting cannot cleave the soul again;
And we are sure that those who saw her last
In that dim vista which we call the past,
Who never knew her old and laid aside,
Remembering best the maiden and the bride,
Have sprung to greet her with the olden speech,
The dear, sweet names no later lore can teach,
And "Welcome home!" they cried, and grasped her hands,
So dwells the mother in the best of lands.

Yes, beloved friends, into the joy of heaven her spirit has passed. We cannot ease our souls from the sorrow of parting but we may joy with her that her victory is won and this hour may be to our faith an hour of triumph. Her pathway was Christ and in the midsummer she has been called to the Summertime of joyful and unbroken service with the Saviour whom she loved. If we follow her as she followed Christ, we too, shall one day be called to the Summerland of love and fruition of all hope.

Some morning when the wind has set
his bugles all a-blowing
I shall have gone away perhaps,
wthout the flowers knowing
That I who knew their every want,
thrice happy in the tending—
Have gone to the fair gardens, where
the Summer has no ending.

And love shall have no power to hold
me with caresses tender,
For I shall pass the sunrise gold, the
moon's white silent splendor,
Beyond the sunset and the dawn where
never word was spoken,
Where since creation's natal morn
the stilness slept unbroken.

I know not of the gates of pearl, on
golden hinges turning
The glory bright, more than the light
of countless suns a-burning;
These thing await me, I would be no
reluctant comer,
And God shall call me early on some
morning in the Summer."

With the faith of these words, that we belong to God, may we press on beloved, hoping, expecting and at last realizing the fulness of God's promises in Christ Jesus!

And to you, dear friends, who most deeply feel the sorrow of this hour— I do not know what better or what other message of comfort I can bring to you than the assurance which it is yours to cherish, that all is well with the loved of your hearts who has been taken from you for a little while, and that you may, following her footsteps come to the joy of your Lord and the everlasting reunion of all who are Christ's.

Press on in the confidence that she

awaits, yonder, your coming, and in the fellowship of that Master whom she loved and served.

And when our service is done here, may we all be granted the reward of those who are faithful unto death, even the crown of life that endureth forevermore.

Isoetes of Southern California.

ISOETES MELANOPODA J. Gay.

"Polygamous; trunk subglobose, deeply bilobed; lvs slender, stiff, erect, bright green, usually black at base (15-60 in number, 5-10 or rarely even 18 inches long), sporangia mostly oblong (2-4 or even 5 lines long), spotted, with narrow velum, ligula triangular-subulate; macrospores among the smallest in the genus, 0.25-0.40 mm in diam, with depressed tubercles often confluent into worm-like wrinkles, or almost smooth; microspores also smaller than usual, 0.023-0.028 or rarely 0.03 mm long, spinulose."—E, St. Louis ac tr 4: 386-7 (1882). Ill.; Iowa; Chico, Cal.

Variety PALLIDA Engelmann.

"A larger plant, lf-bases pale, velum usually much broader, covering one-fourth or one-third of the sporangium; macrospores only 0.3-0.35 mm thick."—E, St. Louis ac tr 4: 387 (1882). Houston, Texas (E. Hall). Mesas, SD (Or, My 1903).

Variety CALIFORNICA A. A. Eaton.

"Amphibious, monoecious. Trunk bilobed: 2 cm broad: bulb 4 cm in diameter. Leaves 20-100 10-30 cm long, 3 mm broad, flat above, rounded on back, taper-pointed, white or fuscous at base, with many stomata and 4-6 cardinal and several accessory bract-bundles. Velum ⅓-½ indusiate sporangium with few or many spots. Gynospores 278-500 u, average 460 u, smooth with a few fragmentary crests or vermiform with wrinkles: androspores 26-35 u light brown, densely echinate. Differs from type and Var. pallida, principally in the larger, usually smooth gynospores and larger androspores. Olema, Cal. Mrs. Brandegee, Miss Eastwood. Also Powder Mill Canyon, Santa Cruz, Cala., C. H. Thompson. Type in Herb. A. A. Eaton. Cotypes in Herb. Mo. Bot.

Garden and University of Minnesota." —Eaton in Gilbert List N A Pteridophytes, 27 (1901).

"Note, July, 1903.—I have seen no polygamous tendency in this, so marked in the species. Later material from several localities in Central Cal., show that it grades almost imperceptibly into Howelli, on one hand, and the type and Var. pallida on the other, so with the mostly unripe material furnished it is hard to draw the line."—A. A. Eaton.

ISOETES ORCUTTII **A.** A. Eaton.

"Plant terrestrial, submerged only during the growing season. Trunk slightly trilobed, 4-6 cm long by 3-5 cm high, globose; leaves 6-15, 4-7 cm long, 6-7 mm broad, triangular, grooved above, slightly winged at base, with two (ventral and dorsal) weak bast-bundles, rarely with lateral ones also; stomata none (?); * sheaths fuscous, narrowly winged; velum entire; ligula lunate or semi-circular. Macrospores very small, 240-320 u in diameter dark fulvous when wet, cinereous or glaucous when dry, brightly polished, without crests, but the surface finely pitted as if with pin-punctures, and often sparsely covered with a fine scaly-white dust. Microspores dark brown, 22-35 u long, averaging 26 u long by 17 u wide, spinulose. Growing on mesas at San Diego, Cal. Sent by C. R. Orcutt.** Found only in "wet" seasons, when there is sufficient rain to fill the low depressions on top of the mesas, in which it grows. As there are often several dry seasons in succession it must have the power of lying dormant indefinitely, if, as may well be the case, it does not make a small growth in winter even when not submersed. It is not unique in this respect, however, as well ripened specimens of Eatoni and Bootti have been found to retain sufficient vitality to grow after being dried and kept in the herbarium six months or more, while Motelay (Mon. Isoetes) states that Engelmanni has been raised at the Botanic Gardens of Bordeaux from spores taken from herbarium specimens.

"A few of its anatomical characters may not be without interest to students of the genus. The rigidity of the leaves is not owing to the bast-bundles, which are small, but to the epidermal cells, which are large (13-17 u), with a very thick outer wall (4.4 u). As with all terrestrial species, the leaf cavities are very small and the dissepinents correspondingly thick, from 9-12 cells on the vertical to 6 on the transverse, Occasionally a bast-bundle is absent and its place occupied by another layer of epidermal cells. I have been unable to find stomata but from the character of the plant I think they are present, at times, at least. The leaves are very small and difficult to manipulate, owing to the thick dissepinents and walls, which must be removed after splitting the leaf by scraping, before the stomata could be seen. The terrestrial species heretofore found all have stomata, though fewer than the amphibious.

"This is the only North American species with ashy spores, though one black or dark brown spored species, Melanospora, is found. Colored spores are found on several widely separated species. Tasmania gives Gunnii, Stuarti, and Hookeri with glaucous or ashy spores; Australia gives Muelleri with ashy and tripus with fuscous spores. From South America we have Gardneriana with blackish spores, and from Central Africa Nigritana and Welwitschii with glaucous spores. Several other species have spores that are not chalk-white, the usual color.

"In all cases the color seems to be a pigment secreted in the spore itself, the enveloping silica having the usual white color, and all elevations have a chalky whiteness

"When the deposit of silica is thin the spores are dark brown, and ashy when it is thicker."—A. A. Eaton, Fern bulletin 8:13 (1900).

ISOETES MEXICANA A Underwood

"Amphibious: rootstock 2-lobed: lvs 20-30, bright green, 12-22 cm long; stomata numerous: sporangia oval, 5 mm

* Epidermis mounted in glycerine and allowed to stand till well cleared show many stomata.—A. A. Eaton (17 Jl 1903).

** Since seen from Clovis and Pine Ridge, Fresno Co., Cal., C. H. Thompson. Soquel Point, Thompson. Santa Maria, Lower Cal., C. R. Orcutt.

long, 3 mm wide, delicate, unspotted; velum very narrow, almost wanting: ligule triangular, two-thirds as long as the sporangium: macraspores chalky-white, 0.25-0.375 mm thick, nearly smooth, the 3 converging ridges in strong relief: microspores slate-colored, 0.028-0.033 mm thick, mostly smooth."—Underwood, bot gaz 13: 93 (Ap 1888). Slow streams, base of Sierra Madre, State of Chihuahua, Mexico, O 1887 (Pringle 1447).

Specimens referred to this by Underwood, from San Diego mesas, and from Baja California (and so listed in Or, W Am Sci 10: 156), are identified by Eaton as varieties of melanopoda and orcuttii.

EDITORIAL.

Our correspondents must still have patience with us as work is yet ahead of our facilities. Laborers seem not to be had, and the delays of moving have not helped us with arrears.

THE COLORADO DESERT.

A vast triangular-depressed plain, below the level of the sea for a large portion of its surface, with an approximate area of twelve million acres (about one-half of which lies in Mexican territory), and comparatively destitute of verdure or of animal life, is the great basin known as the Colorado Desert.

This remarkable region lies between the peninsular range of mountains and the Colorado river of the west, extending from the San Gorgonio pass, at the base of the San Bernardino mountains, on the north, to the shores of the Gulf of California, on the south, and forms one of the most extensive and important portions of the arid regions of the United States. On the north and northeast it is separated from the more elevated plains of the Mohave desert by a low range of denuded hills, extending from the San Bernardino mountains to near the junction of the Gila and Colorado rivers. Similar arid conditions exist on the eastern borders of the Colorado river, in

Arizona, and south in Sonora, and along the Gulf shores.

From their rich chocolate-brown color, the inhospitable barrier between the Colorado and the Mohave deserts is frequently indicated on maps as the Chocolate mountains; but the range is better known to miners as the Chuckawalla (Lizard) mountains, a peculiarly appropriate name, from the great abundance and variety of lizards, but probably given from some fancied resemblance in the outline of these hills to this nimble animal.

The peninsula range of mountains, with a varying altitude of four thousand to eleven thousand feet, rise in precipitous abruptness from the western borders of the plains. The crest of this mountain range forms a sharp and well-defined line of demarkation between the arid region and the rich and fertile western slope. The summit is usually clothed with forests of oak and pine The western slope is thickly overgrown with a varied vegetation, the valleys supplied in a greater or less degree with timber and water. Not so on the eastern declivity—the precipitous walls of rock, hundreds, often thousands of feet in height, present small inducements for plant growth, and the less precipitous banks are but slightly less devoid of botanical forms.

In the mighty chasms (or canyons), eroded by the still active, tremendous forces of nature, the botanist finds his richest harvest amid scenery that for beauty and grandeur would rival even the Yosemite. Surrounded by walls three thousand feet or more high, the queenly Washington palm (Washington filifera) may be found in groves, growing with tropical luxuriance beside quiet brooklets, rivalling in beauty and novelty the giant Sequoia groves of California.

Despite the large areas totally barren of vegetable life for the larger portion of the year, the absolute lack of rain through long periods, which may extend over three or more years of time, the Colorado desert possesses in seasons of precipitation a flora that in variety and beauty of forms sur-

passes that of the Atlantic states. In richness of variety and coloring, the flora of California is probably unsurpassed, and the arid regions of the state are not one whit behind the more attractive western slopes. In springtime the stately lily of the desert (Hesperocallis undulata) wastes its sweetness on the desert air; every dry and thorny bush produces its quota of beauty, and a wealth of brilliant annuals spring into brief existance.

During June and July, 1888, the writer made his initial exploration in the Colorado desert, the main object being the examination of various prospects of gold, silver, lead and copper, which had been discovered in the Chuckawalla mountains, for a gen tleman who was largely interested in their development. A brief report on this region, named the Pacific mining district, appeared in the tenth annual report of the California state mineralogist, 1890 ("The Colorado Desert," by Charles Russell Orcutt, pages 899-919).

Lyell says:—"Geology is the science which investigates the successive changes that have taken place in the organic and inorganic kingdoms of nature; it inquires into the causes of these changes, and the influence which they have exerted in modifying the surface and external structure of our planet."

In the decade commencing with 1850 the more depressed part of the Colorado desert seems to have been known as the Cienega Grande, now hetter known perhaps as the Salton Sea,but more usually designated as the Dry Lake; in 1870 we are told by early emigrants of that period that the Colorado river was in the habit of annually overflowing its banks during the time of summer freshets, when the snows melted in the mountains whence the river has its source. This "annual overflow" (as often omitted as otherwise, it is said) formed a channel through the deep alluvial bottom lands of the great basin, to which the name New River was applied by the earlier pioneers who crossed the desert on the old overland route from

Ft. Yuma to San Diego.

Along the course of New River, the Cocopa and other tribes of Indians planted and raised magnificent crops on the overflowed lands. Corn, melons, squashes, and other vegetables, and grain, reached the rankest growth attainable, and some of these early pioneers spoke with wonder of the fertility of the soil and the success attending these Indians in their agricultural labors. These fertile lands were formed of the sediment deposited by the waters of the Colorado river, and as the soil increased in depth the overflow decreased; with the increasing infrequency of these overflows now of more rare occurrence, the Indians were compelled to depart—the Cocopas retreating to the region of the gulf, the Cahuillas to the mountains around the northern arm of the desert. In 1890 the desert Indian huts might yet be found among the mesquite groves of New river, and in 1892 I found the Indians producing from the untilled soil crops of promise, after an overflow of some of the lands below the United States boundary.

"Approaching Carrizo creek, we saw for the first time in many days, strata of unchanged sedimentary rock. These consist of shales and clays of a light brown or pinkish color, forming hills of considerable magnitude at the base of the mountains. From their soft and yielding texture they have been eroded into a great variety of fantastic and imitative forms. This series of beds have been greatly disturbed, in many places exhibiting lines of fracture and displacement. Where they are cut through in the bed of Carrizo creek, they contain concretions and bands of dark brown ferruginous limestone, which include large numbers of fossils, ostreas and anomias. These have been described by Mr. Conrad, and are considered of Miocene age. In the debris of these shale beds I found fragments of the great oyster (Ostrea titan), characteristic of the Miocene beds of the California coast. A few miles north of this point, similar strata, probably of the same age, were noticed by Dr. Le Conte, but there they contain gnathodon, an estuary shell,

showing that the portion of the desert where they are now found was once covered by brackish water."—J. S. Newberry.

Dr. J. G. Cooper reports (in bulletin 4, California state mining bureau, pages 58 and 59) the discovery by H. W. Fairbanks, near Carrizo creek of "fossile coral-islands, the coral forming extensive beds about the summits of short isolated ridges detached from the mountains of the western rim, and consisting at their bases of granitic or metamorphic rocks. The ridges appear to have been islands when the desert formed part of the Gulf of California, or of the Pacific ocean, and were at the right depth beneath the surface for coral growth on their summits for a long period. With the coral occurred several fossil shells of forms quite unlike those of the late tertiary of Carrizo creek beds, and apparently unlike those now inhabiting the Gulf of California."

Fragments of fossiliferous rock of the Carboniferous age have been found in the Carrizo creek region by various collectors, but none in place have yet been reported.

The Indians, according to Dr. Stephen Bowers, still preserve the memory of catching fish along the eastern base of the San Jacinto mountains, where the Cahuilla Indians pointed out to him the artificial pools, or "stone fish traps," where their ancestors easily secured the fish on the receding of the tides of the ancient sea. This would seem to indicate that the change from an arm of the gulf is comparatively recent, and a study of the fossils seems to confirm this view. An old Indian in the Cuyamaca mountains pointed out to miners a few years ago points in the hills to the eastward where his great grandfather used to catch fish from the sea.

The cause of the separation of this region from the gulf can be readily understood in the present encroachment of the land that is forming from the sediment and debris of the Colorado river, where it empties into the gulf. With the formation of a barrier separating thebasin from the gulf, the imprisoned waters were at once subjected to rapid evaporation.

The presence of fresh water shells in a semi-fossil condition, of a brackish water mollusk, and of marine shells of species now found living at San Diego, on the Pacific side, would seem to indicate that the great changes which have unquestionably taken place in this remarkable region were the result of natural phenomena of gradual, yet rapid, occurrence. After its isolation from the sea, with rapid evaporation, few years were requisite to transform this basin from an arm of the sea to a barren waste, the salt of the sea water forming the salt mines at Salton.

The Colorado river doubtless hurried past as it does today to the gulf, until breaking down the barrier it had itself erected. With alternate periods of evaporation and influx of fresh water, the great basin changed first to a brackish lagoon, and finally to a vast fresh water lake.

The water of the Colorado river at Yuma is known to carry at high water not less than ten per centum of solid matter. The deposit of this sediment in the great basin doubtless rapidly formed the deep and fertile lands which are now being harnessed into service at Indio and Imperial, and being converted at the latter place, by the utilizing under control of the water from the Colorado river, into fields of agricultural promise.

Dr. Robert Edward Carter Stearns, in a paper read before the California academy of sciences, entitled "Remarks on fossil shells from the Colorado Desert" (published in the American Naturalist, 13:141-154, March, 1879), discussed the occurrence of fresh water shells found in a well at Walter's station at a depth of fifty feet. The surface of the desert where this well was sunk is 195.54 feet below sea level. Dr. Stearns remarks:

"Shall we indulge in a guess as to the depth of the water when these shells were alive? Shall we add the depth of the well to the elevation of bench marks, the ancient levels which form terrace lines in some places along the distant hills, once a part of the shores of an ancient lake, the walls of

the basin which once inclosed and held a fresh-water sea? It may have been, however, that the lake was never so deep as the figures thus added would indicate, and that instead of a lake or a series of lakes, there existed only a lagoon or chain of lagoons, connected or disconnected, according to the volume of water, which probably varied one season as compared with another; a system of shallow reservoirs, receiving the catchment or surplus water in periods or seasons of unusual rainfall, sometimes, after a prolonged and widespread storm of great severity, uniting and forming an extensive expanse a few feet only in depth, as was seen in the valleys of California during the notable winter of 1861-62. The rate of depression may have been such as to continue to keep the lagoons supplied, * * * and that only within a very recent period has this depressed portion of the Colorado basin become bare and dry. Are the phenomena which this vast and remarkable region exhibits * * * the result of catastrophic action, sudden, violent, and widespread, or the result of gradual changes moving slowly through countless centuries?"

At Salton fresh water shells are found in countless myriads, with recent species of marine shells, on the surface of the plain, 250 feet below sea level. Portions of the Dry lake are 300 feet below sea level. These minute fresh water shells are drifted into windrows in places, where they may be scraped up by the quart.

Along the eastern base of the San Jacinto mountains, an old beach line is well defined, and can be easily traced for miles. The rocks are worn and rounded up to this line, sharp and jagged above. This line by actual measurement has been found to be even with the present leval of the sea.

Major W. H. Emory, in report of the United States and Mexican boundary survey, gave the following table of distances:

San Felipe to Vallecito, 17.85 miles.

Vallecito to Carrizo creek, 16.6 miles.

Carrizo creek to Big laguna, 26.41 miles.

Big laguna to New river, 5.83 miles.

New river to Little laguna, 4.5 miles.

Little laguna to Alamo Mocho, 16.44 miles.

Alamo Mocho to Cook's well, 21.84 miles.

Cook's well to Fort Yuma, 20 miles.

Dr. Charles Christopher Parry, botanist and geologist of the United States boundary commission, in reporting a reconnoissance made in 1849, wrote, concerning this region, as follows:

"On leaving the last rocky exposures to enter on the open desert plain, we pass, some distance down the bed of Carrizo creek; along the course of which are exposed the high bluffs of sand, marl and clay, exhibiting a fine sectional view of the tertiary formation on which the desert plateau is based. At the point where the road leaves the bed of the creek, to mount to the desert tableland, some 150 feet above, fossil marine shells of Ostrea are found, and gypsum makes its appearance in extensive beds. The upper layer of the tableland shows a variable thickness, composed of water-worn pebbles, derived from the adjoining mountains. Near the mountain base, this plateau has a height of about 500 feet above the level of the Colorado river. The surface extends in a gentle slope towards the Colorado, or eastward, about the distance of 25 miles, where it reaches its lowest depression at the lagoon or New river basin, which is in fact a part of the extended alluvial tracts belonging to the Colorado river."

The New river region receives the drainage of a large scope of country, which is sometimes visited by heavy showers. "It retains this rain-water, and river overflows, for several months; when both these sources fail, it becomes a perfectly dry bed, or contracts into quaggy saline marshes" (Parry). After a heavy rain or overflow there is a rank growth of grass, and other vegetation, while considerable portions sustain a heavy growth of the mesquite. This affords fine grazing for stock, which cattle men have not been slow to appropriate.

Between the peninsula range and the Colorado river and the gulf lies a high mountain range, to the most northern and western point of which has been

given the name of Signal mountain; this consists of a form of syenite, associated with recent lava. "Its surface is bare, and presents a forbidding outline of dark weathered rock, variously marked by furrows, and shows an irregular crest, gradually sloping towards the east." (Parry).

The Maricopas (of Arizona), the Cuchanos or Yumas, and the Cocopas are said to have originally formed one tribe. The Cocopa Indians reside within the limits of Mexico and the Yumas in United States territory. Major Heintzelman, in speaking of their agriculture, says: "It is simple; with an old axe, if they are so fortunate as to possess one, knives, and fire, a spot likely to overflow is cleared; after the waters subside, from the annual rise, small holes are dug at proper intervals, a few inches deep, with a sharpened stick, having first removed the surface for an inch or two, as it is apt to cake; the ground is tasted; if salt, rejected and if not the seeds are planted. No further care is required but to remove the weeds, which grow most luxuriantly wherever the water has been. They cultivate watermelons, muskmelons, pumpkins, corn, and beans. The watermelons are small and indifferent, muskmelons large, and pumpkins good; these latter they cut and dry for winter use. Wheat is planted in the same manner, near the lagoons, in December or January, and ripens in May or June. It has a fine, plump grain and well-filled heads. They also grow grass-seed for food; it is prepared by pounding the seed in wooden mortars made of mesquite, or in the ground. With water the meal is kneaded into a mass and then dried in the sun. The mesquite bean is prepared in the same manner, and will keep to the next season. The pod-mesquite begins to ripen the latter part of June; the screw-bean a little later. Both contain a great deal of saccharine matter; the latter is so full, it furnishes, by boiling, a palatable molasses; and from the former, by boiling and fermentation, a tolerably good drink may be made. The preat dependence of the Indian for food, besides the product of his fields, is the mesquite bean. Mules form a favorite article

of food; but horses are so highly prized, they seldom kill them, unless pressed by hunger, or required by their customs."

Much the same methods are followed by the Cocopas today, as observed by the writer. They also visit the canyons opening on the desert from the west, and gather the sweet and edible palm fruits, there so abundant, and no doubt seek at times the pinyons or pine nuts in the forests at the summit of the peninsula range.

The townsite of Imperial is situated about 30 miles east of the old stage station on Carrizo creek, and here a new civilization, based on modern agricultural methods, is like to thrive where roamed the nomad in former time.

Dr. J. Le Conte, gave an interesting account of some volcanic mud springs or solfataras, near the Southern Pacific railroad, on the Colorado desert in Silliman's Journal (2d ser. XIX, Ja. 1855). Arthur Schott mentions a severe earthquake which occurred November 29, 1852, and quotes from manuscripts by Major Heintzelman, as follows: "There exists, about 45 miles below Fort Yuma, in the desert between the western Cordilleras and the Colorado, a pond, considered as an old orifice, which had been closed for several years. The first shock of an earthquake, in 1852, caused a mighty explosion. The steam rose a beautiful snowy jet more than 1,000 feet high into the air, where it spread high above the mountains, gradually disappearing as a white cloud. This phenomenon repeated itself several times in a diminishing scale. Three months later I visited the place; jets took place at irregular intervals, from 15 to 20 minutes. The effect was beautiful, as they rose mingled with the black mud of the pond. The temperature of the water in the principal pond was 118 degrees F., in the smaller one 135, and in one of the mud holes, from which gases escaped, 170. The air which escaped was full of sulphurated hydrogen, and in the crevices crystals of yellow sulphur were found. The ground near about was covered with a white efflorescence, tinged with red and yellow. On the edge of a small

pond crystals of sal ammonia, 1 to 5 inches long, were collected."

At the time of this earthquake low grounds near Yuma became full of cracks, many of which spouted out sulphurous water, mud, and sand. Dr. Parry records that the river formed new bends, leaving portions of its old bed so suddenly that thousands of fishes were left lying on the muddy bottom to infect in a few days the air along the river by their putrefaction, and that the frequency of earthquakes occurring here forms also a point in the mythology and traditional tales of the aborigines.

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