EXPLORE PARTY of the COLORADO GRAND CANON MINING AND IMPROVEMENT COMPANY.
DENVER, COLORADO. 1891.
Submitted by
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It can be safely presumed that if for any reason another expedition to and through the Grand Cañon of the Colorado should become advisable, every scrap of information regarding the boat and other equipment would be scanned with the object of arriving at as near a perfect line of equipment as is possible for an expedition that must of necessity be made by boat. The detailed reports of all former expeditions would or should logically be the source of such information. While reading the reports from time to time of the more recent expeditions, and particularly the account of the 1923 expedition by Lewis R. Freeman in the National Geographic of May 1924, I have become convinced that there is one unreported Mining and Exploration trip that should have a place in the permanent records, and I feel that it is up to me to correct this oversight.

This break in the permanent records can easily be explained, for this Company was formed and the expedition planned as a Mining, exploration and promotion project and was financed by private capital and all were asked to keep knowledge of Company affairs to themselves. Without Government, Railroad or Institutional backing of any kind, news value was minimized and only cursory reports of the organization of the Company, the field forces and their departure reached the press. As this was before the days of the Radio, when we entered this series of Cañons we were as good as lost to the world with but two places where we could get word out to our relatives and friends. Upon the completion of the field work the men returned in small groups, were absorbed in productive work and perhaps none of the Officers realized
the importance of an official report to the Government to keep the records of exploration clear and complete.

Believing myself to be the only one living who was in any way connected with the expedition or the Company back of it I am preparing this report for four specific reasons:-

First- To do what I can to complete the record of exploration of this most wonderful area:

Second- To get into the records as complete a description, as is possible, of our boats and equipment, with the hope that it will be of assistance to any future group that may be called into the field for further exploration.

Third- To include some personal observations and theories regarding the habitations of the Cliffdwellers and the circumstances surrounding their life which, I hope, may in some small measure help to solve the problems pertaining to this early civilization of the southwest.

Fourth- To paint a word picture of the Geological action that took place over a long period leading up to and including the present. This may be in a sense revolutionary but I hope it will make good reading and awaken much new thought. This last mentioned material will be added as supplementary so that if it should not be deemed suitable for such a report it can be eliminated.

The Colorado Grand Cañon Mining and Improvement Company was organized and financed during the winter of 1890-91.

The members of the Company were the following:-

J.A. Garfield, 
J.S. Best, 
H.B. Illius, 

Franklin Nowery
Albert J. Gregory
Harry McDonald
John Hislop,
The last two, McDonald and Hislop, were stockholders by virtue of an agreement whereby they took a given amount of stock as part pay as members of the field forces of the expedition.

The following constituted the personnel of the expedition:

James S. Best; Chief in charge.
Capt. Harry McDonald; Commander and steersman of boat No. 1.
John Hislop; Chief engineer and steersman of boat No. 2.
W.H. Edwards; Camp Cook and Oresman.
Silver Kane; Oresman.
John H. Jacobs; Oresman.
Luther H. Jewell; Oresman.
J.A. McCormick; Photographer and Substitute Oresman.

The Objectives of the Company were many:

1. To put suitable boats on the navigable stretches of the Green and Colorado rivers to be continued by safe horse trails along the several groups of rapids so that the horseback tourist could experience and enjoy the beauties and wonders of this unusual Canyon country. Four trips would be made available:

A short trip of 125 miles down the Green River to the first group of rapids in Cataract Canyon. This trip could be made by the most delicate traveler, to their benefit in health, without the necessity of special equipment.

The same trip with a continuation through Cataract Canyon to Dandy Crossing at the foot of the Henry Mountains.

This last trip with a continuation through Glen Canyon to Lees Ferry, Arizona, about 325 Miles.

This same trip to Lees Ferry, continuing through the Cañon, if it proves feasible, and along the rim if not, to some definite scenic point where the great sweep of the Cañon can be seen.

It is planned to locate supply stations at strategic points, townsights where same would be desirable, to prospect for minerals,
Oil, coal, timber, mineral springs &c. In fact to exploit everything that promised a fair return on the time and investment.

Herein lay the elements of a huge success if sufficient time were taken to properly survey these possibilities.

It was also a part of the plan to check over the railroad survey that was started by the Brown Party and completed by the Stanton party of 1889 and 1890.

All this would require slow movement, careful study, relocation at some points perhaps, would work to interest every member of the field forces and would relieve much of the monotony of what might otherwise be a tiresome trip. This definite object would assure a large measure of success for at that time the heads of the trans-continental lines were looking for routes that would shorten the distance to the Pacific coast and reduce grades. Both of these objects would be accomplished by an all Cañon Route according to the report of Mr. Bislop for he stated that the grades are generally easy, with few detours, bridges or tunnels and the distance would be shortened by hundreds of miles. He qualified his statement by saying that to date the field work was of a preliminary nature and much rechecking would be necessary before he would feel justified in approving the project.

The third object, which perhaps should have come first, as it was no doubt the primary incentive for the organization, will require some explanation to make it understandable:

Upon the return of the Stanton Expedition of 1890 the members reported that they had discovered a native silver vein in the head of Bright Angel Cañon. They had no samples of the ore and explained that by stating that they found this vein...
with their glasses from the opposite wall, that it was no doubt a very rich silver vein but that they could not get across the Cañon to secure samples. This was before the repeal of the silver purchasing act and any expense would be justified if such a vein could be secured, but they must beat others to it.

This I know was used as one of the principal talking points in the effort to interest capital and the logical procedure would be to rush a small group overland to this vein at once and if it proved authentic, to locate and record the claim and report back. If this procedure had been followed the main expedition could have taken sufficient time to survey all other possibilities and the assurance of success would have resulted. It can be presumed that those furnishing the capital hesitated to invest in such a one objective project and that after much thought the other group of objectives were formulated and were the real factors upon which the Company was financed.

As much as I regret it, I must report that when we were well along on the Expedition our Chief became obsessed with the idea that if we failed to reach and secure the silver vein the Expedition would be a failure so he sacrificed everything to speed. This resulted in the loss of one of our boats in Cataract Cañon which caused much delay and resulted in slowing the field work so that it took nearly five months to reach the head of Bright Angel the alleged silver vein which proved to be nothing more than Mica-schist. This left the Expedition at the end of the road with nothing of value but a few hundred photographic films of the scenery and this value made doubtful by the failure of the main adventure.

We also had a group of seven placer claims of real promise
with not one days work done on any of them and of no value unless they were re-located before the first of the coming January.

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With our field forces selected and organized and the stores and equipment packed well before July 1st 1891, word reaches us that the boats could not reach Green River, Utah, our starting point, until July 10th so we remained in Denver for the Celebration of the Fourth.

P.M.

We left Denver at 7:30 July 6th and reached our Rail destination at 8:30 A.M. July 8th and established camp on the bank of the river under a fine spread of Cottonwood trees. The heat was intense but we drove ourselves to hard work in beautifying camp as a toughening measure: In lifting on a rock I strained my shoulder so that I could not lift my arm from my side but could get it above my head by keeping it near my body: I told nobody at the time for fear of losing the trip; later I told Hislop of it and he was the only one that knew it. I have never fully recovered.

The boats arrived on the 10th and were launched on the 11th, re-caulked and sunk in the river to soak up after the long trip from Waukeegan, Ill.

We had two boats exactly alike in construction and size, each 22 feet long with 5½ foot beam and a 3½ foot cockpit width trimmed with a four inch high bulwark and a one foot sloping deck. They were built of air dried, steam bent white oak as flat and shallow as was permissible with this class of material in a clinker built type; they were double enders, sharp prow and stern, with a one inch keel. They had air tight compartments bow and stern and air tight cans the full length under the 12 inch decking.
They were delivered with a guarantee that they would carry their load even if the bottom were ripped out on a buried rock. They were the last word in serviceable boat building and their subsequent service justified the promises of the builders. Steel bracket outriggers were provided to put the ore locks over the outer edge of the boat so that the ten foot oars could be used with a free stroke. The Steersman used a twelve foot ore which permitted him to swing free from obstructions while under speed. They were built by one of the leading boat builders of America at Waukeegan Ill. and cost approximately $500. laid down at Green River. The weight was about 500 lbs.

In loading the boats the space under the floor boards was utilized for the drills, axes, picks, shovels, repair materials and all such equipment, putting weight where it belonged to best stabilize the boats and this acted to protect that portion of the boat that would likely receive the greatest shock in case of it hitting a rock. The powder, caps, fuses, charts, records and all articles subject to water damage were placed in the bow and stern lockers. The provisions and extra clothing were packed in moisture proof sacks and packed between water tight bulkheads in the center of the boat between the two oarsmen. These sacks were built of Divers cloth with an inner neck to be rolled over the contents and the outer neck laced tightly over it. They proved to be both light and watertight.

On the morning of July 15th we went over the packing carefully to see that the boats were properly trimmed and finding everything ready we started down the river at 1:30 P.M. In a half hour we entered the only dangerous rapid that we would have to contend with for
I20 miles which has the charming name of the Devils Auger. The river, at this summer stage, makes a sharp turn to the west, then south, then east compelling a quick continuous turn to escape a long jagged reef that extends east from the west shore. We barely cleared the reef because of our excessively heavy load and it was evident that we could not risk the trip through Cataract Cañon so loaded. At the Box-B ranch that night arrangements were made to have the wheeler boys take a wagon load of our supplies overland to Dandy Crossing, which is well below Cataract Cañon. This made our boats much more buoyant and easy to handle and assured us a reasonably safe passage through the 47 rapids ahead.

It is thirty miles from Green River Station to the Box-B Ranch through practically open country and 90 miles through an ever deepening Cañon to the head of the Colorado; this is called Labyrinth Cañon and it is well named for there is not a straight mile in the entire length; at one place there is a double 'bowknot' bend that is 15 miles around and but one mile through, while the lower bend is 9 miles around and but 1000 feet through. On the outside of each bend the river runs well up against the Cañon wall and in some cases under the overhanging cliff; on the other side of each bend there is a bottom which varies in size from a few acres to a few hundred acres.

In a mountain range the deer and other wild game will follow the receding snow in the spring to the high points and will retire in the fall to the lowlands as the snow line advances and covers the feed. In this Cañon country this rule is reversed for the game lives on the high desert in the winter when the water pockets are full and the feed is good and will drop down to these bottom lands in the
No. 2. Ten Mile Canon bottom.
summer where food and water is plentiful. Any Expedition can be assured of plenty of wild meat to supplement their supplies as they traverse these canons.

There are many outstanding scenic features in the Canon of the Green River that are deserving of detailed description but it is necessary to forego this inclination and confine description to those portions where the ruins of Cliff Dwellers are to be found.

About ten miles from the Box-B Ranch on the higher desert to the east a small box Canon heads with a tank of hundreds of gallons of water fed by a spring; about ten miles down the river from the Ranch and the same distance from this cistern, this stream, which is almost dry in the summer, enters the main Canon (Illustration No. 2) This is the first place where indications of Cliff Dwellers are to be found, almost entirely obliterated.

On an Expedition, such as this, where speed is proving to be the prime factor, one has little time to give to intensive exploration and less to the study of such an interesting subject as the ruins and habits of an ancient people, but I have been fortunate in this case for circumstances thru me back into this Green River Canion country on two successive occasions and I spent the winter of 1893-4 and again the winter of 1901-2 in this country. These supplementary explorations will be reported as of the original trip. The Photographs accompanying this portion of this report were made on the last mentioned trip but they cover points visited by the members of the 1891 Expedition and in some cases are duplicated.

At this point I wish to introduce (Illustration No. 5.) which is a splendid descriptive piece of photography and tells the story of the ages of formative activity by the elements of heat, cold,
moisture, wind, inundation, upheaval, controlled currents while while inundated which kept the immediate ocean floor in flux while that portion outside of this influence was solidifying, the washing out of these fluxed lines after upheaval initiating the series of Cañons in existance today. In fact this picture which is illustrative of a small portion of an immense area, opens up a field for study and speculation.

This picture was taken at an elevation of about 2,000 feet above the river level and the high points in the distance are about 3,500 feet above the river level. The flat tops of these were the then existing bed of the inland sea before the water receded and erosion began to wear the soft materials into what is now an immense area of desert.

It has been conceded that all of Utah and much of the surrounding country was for ages a salt sea and more recently a fresh water sea; fresh water fossil well above the salt water fossil in numerous places proves that. Note the fact that all of this 3,500 feet in sight is of a sedimentary formation and as it is a sand or clay formation throughout indicates the extensive age of inundation. The areas between the higher points that have been eroded away indicates the ages since the uplift which drained this area.

Just beneath the shale strata on which the man is standing there is a strata of brown soft sandstone containing a downed forest which is petrified or chrystalized; this strata can be seen to crop out at intervals for long distances along the Cañon walls and produces some interesting specimens. The strata at this point is about 30 feet thick.

Could it be that this first two thousand feet of deposit...
No. 4. At Horsethief Trail; horsethief bottom across the river.
No. 5. The Cliff-Dwellers Fort at Fort Bottom.
filled the then existing sea to a point which left a marshy surface on which a soft growth grew and fell of its own weight to be then inundated and the additional 1500 feet deposited, or, could this first 2000 feet have been upthrust and drained permitting a slower and harder growth to have formed which was destroyed by rapid inundation and the additional deposit. It would be well for somebody with a knowledge of these things to establish, not only these facts, but to determine the ages of inundation.

The next outstanding scenic feature is the bowknot bend which I mentioned earlier and then just about a mile below the lower bend of Bowknot there is an extensive bottom backed by AX a wide box cañon: This is called Cane Bottom because of a considerable growth of sweet cane. Surrounding an isolated cliff on this bottom there is a scattered lot of Cliff-Dweller ruins that are so poorly preserved that one cannot determine the probable size of the group: The factor that determines a considerable group is that at the top of this cliff where the sun first strikes at sunrise, there is a well defined image of the sun cut in the wall, which is additional proof of the oft repeated theory that these people were Sun worshipers.

Illustration No.4:-- was taken from the foot of Horse-thief trail showing the upper end of Horse-thief bottom across the river. There indications of very temporary building by what indicates a small group of dwellers or perhaps these might have been food storage buildings as the workmanship was rather crude. The same applies to a similar group on a bottom below and the opposite side of the river.

Five miles farther down the river, about 85 miles below the starting point, the river makes almost a complete turn bringing the higher portion of the cliff to almost a feather edge (Illustration No.5.)
No. 6. Front view of Crescent Castle.
No. 7. Crescent Castle—side view from a point six miles down river.
as indicated in the picture just beyond the man; This isolated a portion of the cañon wall in the center of this wide circle of river. Surrounding this isolated cliff is a bottom land varying in width from a few feet to a few hundred feet. At the top of the talus the afore-mentioned petrified forest is in evidence, capped by the same strata of shale on the top of which the cliff dwellers have built a substantial fort from the shale rock material. Along the top of the talus at the foot of the Petrified Forest wall just below this fort there are a number of ruins of former dwellings.

When one considers the conditions that must have surrounded the lives of these people, this fort would indicate a rather a high order of intelligence in the leader who picked this strategic point for a fort.

On the down river end of the bottom at the foot of this cliff there is a well defined ditch leading from the head of a rapid to the down river end of the bottom. Could it be that these people had knowledge of and used irrigation methods? Or, is it possible that some early settler strayed in to this river in the past, came down the river and occupied this bottom land and built this ditch? What year could they have arrived, how long did they stay and what could have happened to them?

As we rounded the next bend we came in sight of Crescent Castle, so named because of the great crescent of the body of the cliff. Illustration No. 6.

No. 7 is a side view of this same castle and was made from a point six miles down the river. These two views are included in this article because they are duplicates of two views made on the 1891 expedition, they so nicely illustrate the nature of this portion of
No. 8. Showing cliffs and box canon on Valentine Bottom. These show distinct water mark just under well defined dwellings. Also other water levels.
the Cañon and they indicate the several stages of water levels as they apparently held for long periods, and I was told on one of my subsequent visits to this Cañon that there are some ruins at the foot of these walls.

Aside from Fort Bottom, which was apparently the rallying point for these scattered dwellers, the most interesting portion of the Cañon, as relating to the Cliff-dwellers is to be found on Valentine Bottom, so named because a family of that name spent a summer there, put in an irrigation wheel and raised a most wonderful garden.

At the mouth of a box Cañon on this bottom there are some of the best preserved dwellings that we visited (Illustration No. 8.) This picture shows a number of distinct water markings indicating that each one held for a long period. The one just under the cap rock corresponds to the distinct marking on the wall beyond. Follow the distinct water mark to the right at the top of the fallen rock and you will see some small caves, each one containing what remains of a well built building that may have been a dwelling or a food storage house. This water marking continues at the same level up and down the river and on both sides and all of the ruins are just above this level.

The question arises:—did these people navigate this inland sea to find a suitable place to locate and build: Did they build just above the then existing water level because it had stood for a long time and was presumed to be permanent? Is it not possible that a general survey would prove that the great group habitations of the Mancos Cañon, Colorado and other noted groups, together with these outlying habitations were all on the same water level, that it could be presumed that some class of boat, dugout or catamaran was used as the common carrier? I have never visited the Mancos National Park nor
any of the other mass habitations but Photographs that I have seen and articles that I have read have indicated inaccessibility when discovered. This theory of water transportation would solve much of the mystery surrounding this early civilization. It may be found that earlier or later groups had built on the same existing water level of their time.

If this theory of water transport is true it can be presumed that they secured their building stone at the nearest source of supply, which in this case would be at the head of the box Cañon as this water level leaves a large area at the head above water where there are tons of the same class of scrap rock today.

Since many bones, cactus hull and corn cobs are found in these habitations we can assume that they were game meat eaters, supplementing their fare with cactus and corn, that they no doubt utilized the heads of the many small side canons for the cultivation of their maise and cactus and transported it by water.

well down the river, as I will detail later, we found indications of constant warfare between groups or tribes and this would indicate that it was very dangerous for a small group to leave the main village or community center and go out on their own, yet these scattered individual or small group habitations would indicate that the pioneer spirit prevailed even then. No doubt some scout found this outlying Cañon unoccupied, reported back and small groups left for the new home from time to time until a hundred miles of this Cañon was settled. They were just as much Pioneers as were those of recent years who invaded the Indian infester west. All Hail to the pioneer of any age. The Old Fort may have been built as a precaution or as a defensive one after pioneers of a hostile tribe had found this Cañon. who knows?
No. 9. Showing a closer view of the right hand wall in No. 8 with dwellings.
No. 10. A still closer view of one of the dwellings on the wall shown in No's 8 and 9.
No. II. The cliffs in the head of this box canon. The stick ladders were put up by recent visitors.
No. 12. A two story dwelling on the main wall down river from the others but on the same bottom. Stich ladders recent.
Illustration No. 9. is a close up of the same group shown in No. 8. All sticks and ladders were put up by visitors.

Illustration No. 10. is a close view of one of this same group and may be a poor man's house or it may be the type of building that they built for storage purposes as it is entered from the top.

Illustration No. 11. is made well up in the small box Cañon to check the water levels. The one in the foreground corresponds to the one under the dwelling group while the one under the cap rock is the same as under the caprock below. Note that this same one on the wall beyond shows little cutting as it is out of the influence of the main river or cañon wash.

On the continuation of the main Cañon wall just below this box Cañon we visited the best preserved of the many dwellings in this region (Illustration No. 12). It is of two story construction of the same woven rock as the old Fort but it has been plastered on the outside. The water markings all correspond.

If there had ever been pottery intact, it had been carried away. All that we found was scrap and not much of that. For many years this Cañon has been the outing place of the people of the hundred mile radius and they no doubt are responsible for the lack of material that might throw some additional light on the life and habits of these people.

It is about twenty miles from Valentine Bottom to the head of the Colorado, through Narrow Cañon. The water is smooth and the walls are perpendicular and close in so we took no time out to explore. From Green River Station south the country rises gradually as the river falls so that at the junction of the Green and the Grand which is the real head of the Colorado, the walls on all sides are
No. 15. The heart of a rapid showing the heavy effect because of so much suspended matter.
No. 13. The headwaters of the Colorado River, formed by the Green on the left and the Grand on the right.
about 3000 feet high, some of the higher pinacles 3500 feet and they show the same stratification of the up river country. (Illustration No.13.) Please note the tilt to this stratification as it will have some rather prominent bearing on later statements. As indicated in this picture the Green river shown on the left carries a heavier summer flow and a much greater suspension of matter. On top of the west wall at this point there are hundreds of acres of spires and needles of rock which has been carved by the winds into all conceivable forms; a monument park that would be attractive to the public if ever made available.

We reached the head of the Colorado during the afternoon of July 20" and camped in the mouth of a small Cañon on the east bank. As all were anxious to see what manner of rapid this stage of water promised, we left our boats tied up and walked down to the first rapid: It did not look very wild from the shore and was rather free from obstructions so we went back and pitched camp with a feeling that it might have been much worse. We retired early and as for myself I was sound asleep almost at once. As night cooled a breeze from down the river brought a Niagara roar that woke the entire camp and from then on our sleep was fitful and unsatisfying and only the fine breakfast that Edwards prepared brought us back to normal and ready for the big adventure.

The boats I went ahead and placed my camera so as to get running rapid No.1. and the boys were through it in a very few moments with no trouble at all. This gave us confidence and we were through eleven rapids by noon, after landing each time and giving the succeeding rapid careful study to determine the best method of approach.

Illustration No.14. is a general view of Rapid No.2. which I made in the winter of 1901 - 2 at the extreme low stage of the river and
No. I4. One of the rapids in Cataract Canon showing the many bad obstructions at the summer stage.
it does not, in any sense, convey the impression of volume, speed and force that we experienced. While I cannot remember with any degree of assurance the appearance of this rapid as we experienced it, I would say that the summer stage covered all of the rock that is visible above water and that these same rocks formed additional upturning waves and the main channel with its deeper water and much greater volume was several times more startling in appearance. Hislop estimated a speed of approximately 22 miles per hour by checking natural driftwood, as the natural speed of the water at our July stage. As our boats were very heavy and, with their trim lines, it was deemed advisable to travel under as much speed as the boys were able to develop, so that the steersman, with his twelve foot oar, could more easily swing the boat free from obstructions. This speed was not checked but it certainly was breath taking as we went through the wilder rapids.

Illustration No. 15. is a closeup of this same rapid, made to show the oily appearance of the water even at the winter stage; this is much more pronounced in the higher stages and it feels more like mud than water on the oars, due of course to the increased amount of suspended matter. On a lake or ocean the waves form under winds of various strengths and travel until they meet some obstruction, or, accumulate too much water and break. In a river rapid, the waves are formed by contact with a rock below the surface, will climb to a height influenced by the size of the obstruction, will roll up stream and break. They do not travel but break and reform at the same place until the obstruction moves. Each flood changes the entire form and appearance of the series of rapids so that each successive Expedition has a different condition to contend with. We who have gone
before cannot pass on reliable information to the next group, but we can only report what we experienced and where.

We landed on the east shore at the head of rapid No 12 for the usual inspection and found that rapids 12-13-14 were so nearly continuous that there was no possible landing place indicated in the entire length. It was advised by both Hislop and McDonald that we camp here and study the channels carefully, watch the drift wood, and formulate a plan of running the entire distance in one run without the extra men. There was an ideal camping place across the river on a bar with a fine group of cottonwoods. There was nothing to prevent the extra men, the Chief and myself, from walking along the shore to the safe water below and I would have had an opportunity to get some sensational pictures of the boats in a really bad water condition. With the argument that we had made such fine progress that it was advisable to go as far as was possible and that it was still early in the day, the Chief insisted on our making the run. With such superficial inspection here was the making of a major tragedy, and it was, as far as equipment was concerned.

Peculiar as it may seem the water has all the appearance of piling up at the head of a rapid and it has this feel on the oars as one tries to get up speed for steering. While it is not difficult from high on the shore to pick the exact place to enter a rapid with the assurance of escaping the obstructions, it is quite another thing to be able to find that spot from the basin above where one cannot see over the brink, particularly if the inspection has been curtailed.

Lunch, observation and the arguments pro and con consumed much time so it was 3:15 when we took to the boats for a fateful run.

No. 1 with the chief as passenger took the lead and it looked to us as though they were getting far to the right which proved true.
Their speed was so great that as they broke over the brink they were unable to swing over to the channel, and cut into the eddy which caught their bow and turned them toward shore and they were thrown well up on the rocks so that it was necessary to utilize the incoming waves and some effort to get back into the water, fortunately with no damage. We knew nothing of this as we had not yet turned the brink of the rapid.

Boat No 2. with me as passenger and Hislop steering, were well into the channel as we turned the crest but this brought us in sight of the other boat in apparent distress: Hislop swung his boat to the right to reach the other, which put him across the main current, and he immediately saw that he could not reach the eddy but would be carried onto a reef extending out from the west shore. He ordered the men to back water to escape this reef but the bow caught on the outer point and fortunately held until the current swung our boat through the opening between this reef point and a rock just below that looked as big as a cottage. This put us below and in the protection of the reef so we had no difficulty in making shore where we tied up intending to go back and help the other group. In one thousand attempts I doubt whether a boat could have reached this place safely, so it was mere good fortune.

Provision had been made for the two steersmen to have a consultation in case of trouble, which was subscribed to by the Chief, but, in this case, when he saw that we were safe he ordered McDonald to get back into the main channel. Just as they seemed to be safely in the clear, a cross current caught them and before one could hardly bat an eye their boat was plastered across the face of the big rock that we had missed, the water poured into their boat
picked the four men up, dropped Beat and McDonald on the top of the rock and carried Kane and Jewell down the river.

We boys on shore tried to follow the boys down the river but soon lost sight of them and as the Colorado never had been known to give up it's dead we were convinced that they were lost, without hope of even finding their bodies.

We returned to our boat, got out a grappling hook, bent it to a light line and overtaxed with excitement as we were, it took us an hour to get the line out to the boys on the rock. They fished up the bow line of the wrecked boat, we sent out our heavy emergency line which they spliced and with our two-one block and tackle we stretched the rope and the boys came ashore with an arm over the rope and their bodies dragging in the water.

After the boys were safe ashore we all lost our ambition and just sat there looking at the wreck and nobody had a word to say. The noise of the rapids between these 3000 foot walls makes it necessary for us to get close and shout to be heard so we could not hear any unusual movement. Before we realized it the two lost men were back with us. Adventure certainly affects men in different ways for Kane got us together and, without apparent excitement, told of his sensations while in the water and what happened. They were carried down river about a mile, bumping along the bottom with an occasional trip to the surface for air when the current released them for the moment. The current threw them into an eddy, fortunately on our side of the river, and as they were carried up stream they each succeeded in getting onto a rock fairly near shore. After coughing the water from their lungs Kane tried the water inshore, found it shallow and with no force so he waded ashore. Jewell did likewise and they came into camp. Jewell was so stunned that he had not a word to say.
This put new life in the entire party and we got busy at once and established camp while Edwards got us a hearty meal. We retired early with high hopes of saving our boat in the morning.

The rock on which the boat was wrecked lay diagonally facing up stream and the opposite shore, with the bow of the boat away from us and pointing down stream. During breakfast after discussing the matter it was decided to send two men to the rock, pass them timbers from the drift, they to rig a 'jinnie', pass the heavy line over this so that we on shore could put a strain on this line while they pried the boat upstream, thus lifting the bow of the boat little at a time until it was released from the force of the current. Theoretically, fine, but in practice we, with our combined effort could not overcome the power of the water but all that we accomplished was to pull the rivits loose and wreck the bow. It was evident that blasting the rock was our only hope, but how? Our powder was in the bow of the wreck. After trying other suggested methods without success, it was decided to send one man out to the nearest civilization for powder and as we had extra powder at Dandy Crossing that was the logical place. Hislop insisted that he was best suited for the trip so he started on the morning of the 25th and returned on the 31st. Hislop also arranged to have some provisions brought up to the first trail into the Cañon from below.

As Hislop came into camp he noticed that the rope attached to the wreck was nearly worn through and on more careful examination it was deemed unsafe to attempt to get out to the rock. Higher water was another factor which made it unsafe, so we broke the rope and packed, prepared to leave in the morning.

As a matter of convenience we had, from the start of the expedition, been living off of the rations in Boat No. 2 as Edwards was oarsman.
and carried the cook outfit with him, for the reason that he might reach camp ahead of the other boat. This was an added misfortune, for we lost, in the wreck, more than half of our provisions. While Hislop was out after powder we carefully rationed ourselves, but seven healthy men will consume much food and being almost entirely out, it was imperative that we make as fast time as possible to the provisions that the Dandy Crossing boys were bringing in.

It was decided that Hislop, Jacobs and Edwards should take the very much lighter boat through the rapids while the five of us walked along the shore.

Everything went fine until we reached Rapid No. 21, which was full of obstructions from shore to shore, with a huge rock in the main channel in the lower portion, making it impossible to pass the smaller obstructions and then swing free from this great barrier.

The obstructions near shore made it inadvisable to try to line the boat down along shore so we unpacked and carried forward. We then took the boat out over skids to the safe water below. As it was now late in the day we soon camped for the night.

Near this camp one of the boys found a case of Cranberry preserves in the drift wood, which had been exposed to the weather for so long that the glass was brittle and we had great difficulty in getting the bottles open. We were now down to just oatmeal with no sugar so we substituted these preserves for sugar and it made the entire party sick. A great spire of rock down stream inspired the name for this camp—Chimney Rock Bend.

Soon after leaving this camp the boys in the boat saw an inscription cut in a sheer wall (D. Julian 1836). We had found an inscription with a sailboat and a rising sun cut in a canon wall.
about a hundred miles north of this point which was signed by this same D. Julian. We learned that members of a former expedition had found another inscription by the same man in Marble Cañon, just below Lees Ferry, Arizona. We could not verify this as we left the river at that point. We concluded that he must have been a French-Canadian trapper who in some mysterious way had survived the Cañon dangers.

We reached our provisions soon after noon on this day and it was certainly a great treat after two days on plain oatmeal.

Having passed the worst of the rapids by now we made great progress. We five that were walking would stay on one shore until we would come to a straight wall, cross on the boat and continue until we were forced to return and in this way we reached Dark Cañon where we could all ride through.

We reached Dandy Crossing the afternoon of August 4th and sat down to a hearty meal that the boys had prepared after we came in sight. We enjoyed one day's stay here very much but were unable to get a boat that was suitable. We learned that there was a boat at Good Hope bar that we could get and with some caulking and paint would find it usable.

On the morning of the 6th we loaded our boat with all the extra provisions and supplies which had been brought overland and as there was no bad water immediately below, the eight of us got aboard and although this made the boat unwieldy we were able to keep the safe channel with no difficulty but lessened speed. It was during the trip to Good Hope that we made a pan test of the seven bars which we located and filed on. These were mid river bars and in each case we got free colors from the surface gravel after clearing it of the surface sand. While the gold was very fine we got a sufficient showing
to have justified real excitement. At least we should have done the necessary assessment work to hold these claims and get the locations recorded while we were at a point in the Cañon where we could get out to the nearest land office. With eight men working together we could have done the work required in ten or thirteve days. Our Chief said he would send men in to do the work after we got home.

I find, from my notes, that some of these locations were well below the mouth of the San Juan River and would have required recording from Lees Ferry. Supplies and machinery could be easily floated down from Dandy Crossing with little effort.

At Good Hope we were able to secure a large flat bottomed boat that required a full day's work to make it usable but it permitted the dividing of the load of both men and equipment and solved our boat problem for the moment.

From Dandy Crossing to a considerable distance down river the walls recede leaving wide benches of gravel carrying flour gold. At intervals, a bench is being worked in a more or less indifferent manner and usually a grub stake is assured.

Near the mouth of the San Juan river the Cañon walls close in and from there on Glen Cañon is one continuous picture.

The mouth of the San Juan river is a spot of unusual charm with high terraced Cañon walls trimmed with a nicely distributed tree and shrub growth dotted with large grey sage and backed by a straight box canon from which the river flows in a rushing stream. A good showing of flour gold at the grass roots made it hard to pass this point but our party had developed a silver complex and although we would have been within the intent of the plans and it
was the proper thing to do, our Chief ruled that we make haste. This same day, August 12th, we stopped at Crevice Cañon; a narrow gash in the wall which was little more than the span of a man's arms; the pools of water reached from wall to wall and we had to wade to reach the head of this short stream which opens up into the most remarkable amphitheater with its overhanging roof, leaving just a spot of sky visible. It is safe to say that 30,000 people could find shelter on the ledges under this roof; the acoustics were the most remarkable I have ever experienced. We carried on a conversation across and to the upper ledges without raising our voices and there was none of the usual reverberation found in such vast openings. Could it be that the break in the roof or the narrow inlet of Cañon accounted for this freedom from echo? If this is so it would be well for the Architects to introduce these features in their plans for Auditoriums. It would be worth a special expedition of specialists on acoustics to give this intensive study.

On August 12th we pan tested and located the two last of our seven river bars and in the light of our past performances and the perspective of time I can hardly understand how we delayed for such a trivial action.

During the day we came to a long stretch of beautifully formed Cañon with Navaho Mountain filling the end, this in full sun light while the Cañon was in deep shadow; it was a picture long to be remembered.

Another long stretch of serpentine Cañon that we negotiated on this day was rather unusual for the river ran under an overhanging wall, first on one side and then on the other, with in each case a small bottom land opposite. Other than the oddity of it which called forth
Hypoglyphics.

On top of the bluff.

These are so done that I can not get photos of them.
some comment at the time, it had no especial significance, but it will explain a freak echo which I will mention later.

We reached Lee's Ferry on August 14th and camped in the old John D. Lee fort and this proved to be the end of our river trip. With but one boat fit to navigate the waters of Marble and the Grand Canyon, it was declared more practicable to make the head of Bright Angel Canyon by pack horse.

McDonald and Best went out to Kanab to secure horses, then to Salina to get in touch with the Company to have riding and pack saddles and panniers, sinches and ropes sent in. They were called in to Denver for a conference which left the most of the party in camp for an uncertain stay.

We cleaned the old fort, got up a pile of wood, put new brush on the old open shelter and generally tidied up our camp for the long stay and then began to look over our surroundings.

To the east of us across the river there are two pinnacles of cliff, between which a well used trail leads down to the river just above our camp. This trail continues on the mouth and up Raina creek for a considerable distance and thence up to the top of the cliffs to the west. At the foot of this outgoing trail there is a wall of considerable length that was covered with Hyroglifics. Part of this wall is broken away and one can find parts containing these markings at the foot of the talus. We spent much time trying to piece these together so as to have a complete sketch to bring back. This proved too much for us so I sketched a number of the more distinct portions into my notebook. The four accompanying pages are photographic copies of these. The color-blind materials made it impossible to get photographs of these because of the slight distinction between the weathered markings and the rock face, yellow
upon yellow and just barely visible. Modern materials with available color screens would make photography a pleasure among these markings.

Much discussion failed to disclose the probable meaning of all this effort which must have taken months of intensive work with the crude implements of the day. Could this be directions as to negotiating this trail, which was what is known in Mountain parlance as a Blind Trail? or, could this be misinformation to mislead the enemy? could it be a history of achievement or some religious rite? These were some of the matters we speculated on but we could arrive nowhere. That they were interesting as well as mystifying was as far as we got. They did stir our imagination so that we were keen to see what we could find at the end of this trail.

The Canyon wall just back of our camp was about 1700 feet high and this had to be scaled before we could explore the country to the west and north. We had found a place that we could climb, with care, a few hundred yards up river.

One morning, at early daylight, Jacobs and I climbed to the top and just as we reached the crest the sun peeped over the eastern horizon. This reflected on what appeared to be numerous water pockets well out in this apparent arid stretch of desert. Johnson, who had lived on a ranch at the mouth of Piaia creek for sixteen years had cautioned us about going far from the Canyon rim, for he said that no game trails indicated no water.

We studied the landmarks for a time to be sure of being able to retrace our steps and started to investigate these reflections. Presently we came to a small dry wash and with no idea of being able to cross it a few hundred yards to the right, we went to the left for a mile and headed it, coming back to keep our landmarks in line.
As we got back to our starting point we found that we were just a little ways from where this stream, in flood, would pour into the main cañon, and it was easy of access. I went down stream and Jacobs went up the Cañon to see if water pockets were available, as we wanted to conserve our canteen supply. I found a large tank of fine clear water near the Cañon mouth and called to Jacobs: While waiting for his answer and after an astonishing length of time, my voice came back so clear and distinct that it was startling. Before I called again my call was repeated so often that I just stood too astonished to move. When Jacobs finally came down to me we spent a considerable time testing this echo.

The elapsed time was so great that I was able to sing two lines of Annie Rooney, which was the first song I thought of, before it would start to repeat, then repeating so many times distinctly before it began to overlap soon to become a mixture of sound. Explanation on Page 25.

If this echo is ever made available to the traveling public, it will become famous.

We continued along the line of our landmarks, soon coming to a group of dozens of water pockets, from deep cisterns to wide shallow pockets that would have been dry only for recent rains.

While skirting a high wall near these water pockets we found the first indications of Cliff Dwellings in the caves along the wall. These were almost totally obliterated, while in fact they should have been well preserved in the protected location where found.

This whetted our appetite for exploration so we climbed to the top of these cliffs and surveyed the surroundings for other prospects. This gave us a very extensive view of the same general formation described along the Green River. To the west at some distance we saw similar cliffs to the one we were on and after carefully studying all
landmarks and laying out a definite route, we struck straight for the nearest prospect.

This proved to be a large hard sandrock cliff which had resisted the action of the elements, except for some soft strata which had been eroded by the winds into caves, some quite deep. Each cave had well-defined indications of having been lived in without other building except for defensive walls of rock laid in a square, facing to the outside. Numerous mealng stones and hand pieces, much cactus hull, game bones and corn cob indicated long occupancy.

As we approached this cliff we had picked up many arrow heads of a material very much like the petrified trees along Pairea creek and near our camp. This indicated that these people were besieged, and it may have been a last stand, justifying the lack of buildings. We made a trip on top of this cliff which gave us a most extensive view, and found that walls were placed along the edges, without doubt as a defensive measure, behind which the able-bodied fought while the women and older men chipped arrowheads and made arrows. This was indicated by a large mound of chips in the protected center of the cliff top.

Returning to the caves below we found one much deeper than the others with the walls better placed: In one wing of this cave there was a wide spread of ashes: As I had read at some time that these people spread ashes from their fires over their dead, and as we were carrying a shovel for any eventuality, we began to dig to see if this were true: Presently we broke the corner off of a slab of rock, ran an arm in to explore and brought forth some bone tools, fiber fabric, a few human bones and some fiber rope with a square knot tied in it; the same knot that we tie today.
We found some scraps of pottery but none intact. The arrow heads were small, beautifully formed and we brought many back to give to our friends for tie pins.

As we dug into the grave, the ashes would cave in and almost suffocate us, and as our water was low we decided to start for camp, hoping to get back here for further investigation. We never had this opportunity for we proceeded with the expedition soon after this trip.

On our way in we came to a dry stream bed, followed it for a ways and came to a deep tank at the foot of what would be a considerable water fall in flood time, which contained some hundreds of gallons of water. Drinking our fill and refilling our canteens we were in no particular hurry to get to camp. We failed to find anything of interest but returned by way of the blind trail which required much careful study before we could get started right at the top so as to be sure to reach the bottom safe, as night was on us.

While I was speculating as to the method used in chipping those beautiful arrowheads I remarked to Jacob that as hot rock breaks the easiest, they no doubt would heat the rock, hold it in some protective material and chip it with a cold piece. A few days later he came to me with a dozen or so of Arrowheads and asked me to pick out the ones he had made. He had made some splendid imitations and they were hard to pick.

We reached camp late, had a hearty meal and after describing our days activities to the boys, retired with a feeling that we had really accomplished something definite.

The apparent long occupancy of these caves without protective buildings, the fact that we found in portions of the Green River Canon
ruins of habitations that had been built out in the open, without any effort to utilize overhanging cliff protection and built on the level bottoms; and the others as distinctive livers in the cliffs, brings up the question: Were there three distinct groups living here at the same time, or following each other, who represented three stages of development? Say the Cliff Dweller, the Cave Dweller and the Pueblo.

One thing I wish to mention is that wherever we found well preserved habitations, we found much cactus hull of the cow tongue variety and in two cases we found such large patches of it growing near that indicated either transplanting or cultivation. Did they by any chance roast this cactus, grind the pulp into meal and make a sort of mush or gruel? We baked some and found that when hulled it had the appearance of rice cake and while it had little flavor it was not unpleasant.

We left Lees Ferry on Oct. 15th and reached Kane Springs and the horse outfit late that evening. Edwards, Jacobs and Jewell were sent back to Denver from here and a Mr. Scott from Colorado, who was looking for sheep range, joined us.

We left Kane Springs on October 17th for Bright Angel Cañon and after an uneventful trip we reached our destination on the 22nd.

A party was made up at once to go down and visit the reported silver vein. They left with high hopes, were gone three days and returned with the full realization that our expedition was a total failure as far as the silver vein was concerned, and in much doubt as to how to turn failure into success.

The logical thing to do was to return to the seven Placer Claims, do the necessary work and get it recorded so as to assure the Company some measure of success.
In strict opposition to this logic, the few remaining boys decided to try to secure some claims of copper in a cañon lowered down to the south. Hislop and I left the party at Kanab and returned to Denver, having been nearly six months in the field.

On my return to Denver I made a deal with the Company whereby I was to develop the negatives along with my regular view work so as to assure their permanance. I was not pushing this work for I had to make my living and had only succeeded in developing thirty-nine of the several hundred when the Company went into the hands of a Receiver who took over the Photographic as the one definite asset.

On the advise of other Photographers as well as myself, he was told that if these plates were not soon developed there was grave danger of their permanent deterioration because of the camphor content in the celluloid support. He disregarded this advise, held them for ten years undeveloped and finally when an attempt was made to develop them it was found impossible to build a printing image.

If these plates had been developed while fresh, they would have been available for this report and it is conceivable that the Public might have absorbed enough of them to have returned to the Company much of the money invested in the expedition. The few that were developed were of exceptional quality and were pictorial even though they were chosen for trial development before the better subjects were trusted to the Chemicals.

Even though the expedition was a failure it is particularly unfortunate that the public were deprived of the pleasure of seeing these fine illustrations of an inaccessible country scenic beyond compare. It constitutes a capital crime that they were ruined through the ignorance of one man, the Receiver, of the exactitudes of a chemical process.
A WORD PICTURE.

To paint a word picture, is it not practical to use the same method of the painter; a background, a middle distance and a foreground? with, of course, enough detail to be satisfying.

Together with five other youngsters, all from different localities, all cutting and notching their logs differently, I helped to build a cabin. When I saw that cabin completed, I was fully convinced that nothing could be done right without a definite plan being first formulated. I am therefore giving the Creator credit for having a very definite plan.

Since the family Automobile is more practical than one to carry the population of the community, this may explain why the Planetary system. Perhaps the Elements and the Laws of Nature were planned to work better on the unit system rather than to the Universe.

To arrive at the theory which I wish to put forward, I will confine this to our planetary system, the development of our earth and to a spot on a school globe little larger than a Dollar.

The Background.

In the light of all scientific investigation, theorising and Laboratory experiment up to date, the most logical theory of the Creation is the Atomic:—The placing of the Atoms in the universe and the adding of the laws of Nature.

"In the beginning God created the Heavens and the Earth". It does not say the Heavens or the Earth but the heavens and the earth: "All was void and without form".

If all was void and without form, we can safely presume that all space was filled with minute particles called atoms, with no influence to disturb, control or influence them. No heat, light, gravity or electric energy—a cold motionless space with the atoms evenly distributed.
"And God said, 'Let there be Light—and there was Light'.

It does not say let there be light and darkness, but let there be light.
Logically, the first law of Nature added was Motion, presumably rapid
motion which caused friction, and friction created universal or
cosmic light.

This heated the atoms to the point of being a fire vapor which
called for the law of cooling, eventually reducing this superheated
atomic mass to a molten mass at the Gravity center of our Planetary
system. Untold ages were required to bring this about for it can
be presumed that this action was slow then, as it is today.

If the theory of evolution is correct, and it seems logical, this
great molten mass contained all the elements and materials of which
our Planetary system is composed, including all the water of all the
oceans to be, no doubt in the form of steam. This caused terrific
explosions, throwing up great waves which were thrown outward into
cold space, forming in each case, spheres, which cooled on the surface
into a crust. When the centrifugal force was wasted, these bodies
were attracted by the larger body and tried to return under the
influence of Gravity, but as they returned within the influence of
the rays of light thrown off from the larger body, the Sun, they were
repelled by the electric content of those rays and, according to their
size and density, they adjusted themselves into an orbit and have
circled the sun continuously since, first attracted and then repelled.
Thus our Planetary system was formed and the elliptic orbit explained.
It is conceivable that in the first leaving of the main body, and for
ages after this ellipse was, first extreme and later less so, as the
planets cooled and took on additional thickness of crust. It may be
that eventually this influence will be so well balanced that these
planets will travel in a fixed circle instead of an ellipse.
The Middle Distance.

Now that we have the Earth established in its orbit and working toward the ultimate home of Man, let us inquire into what is logically happening.

Let us consider a great ball of molten materials, containing many other disturbing elements as well as all the water of all the oceans to be; seething, boiling, exploding, hissing, in the effort of throwing off these disturbing elements: Consider all of this moisture being forced out through the newly formed crust in immense clouds of vapor, which rose above the superheated air, newly formed, contacting the cold, condensing and falling in torrents of rain only to re-evaporate, rise and condense again, and this continuing over ages of time. Imagine mineral gases exploding, tearing great holes in the crust, immense quantities of molten matter forced out by the gravity of the crust into the influence of these torrential rains and eventually cooled and hardened, thus building up as well as down a thicker crust. To fully understand this process one must consider thousands of these explosions over the earth's surface, with continuous outpouring of untold billions of tons of molten materials into the devastating effect of this terrible downpour. After untold ages of this action the earth's crust became sufficiently thick and cool so that great bodies of water could lay on the surface, forming our oceans and lakes.

To justify the theory of evolution, it is well to consider that the germs of every kind of life were a part of the original Atomic form, were carried into the molten form and were thrown off in that part of the mass that is now our earth. It is not too much to give the Creator credit for having included this in his definite plan.

These germs of Life developed in the sequence of the condition that was suited for each particular form and the food for each form was
timed to develop when that form of life needed it, and so on down through the Ages.

One thing which I wish to stress is that when the moisture was forced out through the crust and became a continuous evaporation and downpour, the crust, by local gravity, tried to conform to the reduced content and wrinkled forming the original mountain ranges. Liken this to the baking of an apple; the moisture is evaporated and the skin of the apple tries to conform to the reduced pulp and wrinkles.

Under these newly formed wrinkles or mountain ranges mineral gasses would form to the point of explosion, crack the surface, force to the surface quantities of Moulten material, the mineral content of which would freeze to the cold walls, primarily on the footwall, thus forming the true fissure in the mining industry. Much of my observation was from the top of one of the more recent ranges, so new, in fact, that the foothills were still in place.

Eventually the crust cooled and thickened to a condition that permitted the oceans to adjust themselves, they in turn lost their heat content, fish life of all kinds developed, nearer normal evaporation and rainfall made life on the land portions possible, so that the Great Sloth and Reptillian age arrived; These soft, glutinous animals fell easy prey to the more hardy creatures that followed, and so on until the air and other conditions made Man life possible.

All during these ages the torrential rains falling on the Mountains tore loose great quantities of materials, ground them into dust in the movement to the valley and ocean beds; the hot house condition of the atmosphere made green growth very rapid, it would grow and fall off of its own weight, decay, and be shifted by wind, rain and the shifting of the waters, thus mixing with, and fertilizing the newly formed soil.
Many of the major valleys of the world were likely filled by erosion while submerged, to be lifted eventually above the ocean floor; the Nile, Amazon, Mississippi and others. Many sections of the earth were no doubt re-submerged and re-drained many times to justify the strata found beneath the surface.

When all became serene and orderly, with a suitable temperature, the age of Man and the animal life suitable to his uses began, together with all vegetable and fruit growth that would sustain life.

What manner of man was first is no concern of ours as this is to show what probably happened leading up to and including the forming of the Colorado and other feeder Canyons.

When the Scientist uses the term - A Light Year - he means the time it takes a ray of light to travel in one year at the Light speed of 186,000 miles per second. It is just a measuring stick to simplify his calculations and make his statements regarding space and distance better understood.

Permit me to build a measuring stick by which some of my statements can be better measured and understood.

The paper upon which I am writing is called Bond-15 Lb. to the ream: 500 sheets will measure approximately one and one half inches in thickness; Eight Thousand sheets will measure about twenty-four inches. Let us then use a 24 inch School Globe as our measuring stick and consider that each mile of the diameter of the Earth is represented in this Globe by one sheet of this paper, If this Globe was made of, or with, a five eights inch shell it would approximate the crust of the Earth by every known measurement. In all the wells of great depth in which the temperature was taken, the average increase has been one
degree in each one hundred feet. Using this test as a basis and allowing two hundred sheets of this paper as the thickness of the shell of the globe, or two hundred miles as the probable thickness of the earth's crust, this would give us a temperature of 10,560 Degrees, or more than enough to melt any known combination of minerals. This is therefore excessive but it will answer our purpose, to approximate a truth, and make it understandable.

By this measuring stick, six sheets of this paper would equal the height of the highest mountain range and six more the deepest spot in our oceans, so the globe would be practically smooth. If the entire Human race could be concentrated in one spot, they would cover little more than the space of a dollar and would be so minute that they would hardly change the color of the paper.

The Foreground.

We have arrived at a world in place and reasonably quiescent but with occasional indications of indigestion. Revolving upon a fixed axis with a moulten interior and a deep air cushion, disturbance of some sort can be expected any place at any time, either above or below the surface. They are both equally destructive to Life as we know it.

While the earth's crust is adjusting under the laws laid down by the Creator, we will interest ourselves in the Colorado River water shed, an area of some 300,000 Square miles, that on the school globe will occupy space about equal to the size of a butter chip.

Let us assume that the Oceans and Continants are in place as we know them and that the salt content of the oceans is a part of the original plan—to prevent fouling of the waters.

When this portion was lifted up from the Ocean floor it carried
This shows a portion of the depression at the top of the fault as it probably appeared during the time it was the overflow of the inland sea.

Sketch No. 2.

From the cliffs back of Lees Ferry the slope of the ranges and the benched walls of the Canon are very noticeable, indicating the cracking of the surface one strata at a time and the wearing back of the walls.

Sketch No. 3.

This is to indicate that the west walls were the softest and wore away the fastest during the drainage of the inland sea.
with it a large body of salt water which was held in place by a group of the higher folds forming an inland sea. This sea was some 300 miles long by 200 miles wide. Through the breaks in these folds to the north, east and west great rivers flowed into this lake, all constantly at flood because of the heavy condensation on the then extremely high mountain ranges. This period was presumably long before the age of man.

The many minor folds in the bed of the inland sea, some high enough to form islands, directed the flow of these flood waters into devious, winding channels to a probable break in the barrier to the south, permitting the outflow to the ocean. This constant current following its devious way kept the deposit beneath in flux while that portion of the erosion settling outside of these channels settled and hardened. Wide open areas along the series of canons today can be accounted for by prevailing winds keeping unobstructed areas disturbed during this period, so that in the final uplift this soft material easily washed away.

The above will suffice to explain the winding course of the series of canons leading to the main canon of the Colorado as they are today.

Before the uplift which formed this inland salt sea, the fold which was to be the south barrier was subjected to much the same influences described in connection with the series of channels and open spaces above and to be so influenced must have been very near the ocean surface, some portions even above the surface. In the uplift that formed the inland salt sea, a wide fault that transversed this fold or range held without a break and the depression at the top of the fault acted as an outlet for the flood waters over long ages of time that permitted the depositing of thirty-five hundred or more feet of erosion in the bed of the sea. This outlet was much like an island dotted lake with perhaps more of a current, and had much the appearance of the sketch (No. I) which shows,
Indicates the probable internal action which put a strain on the upper strata, cracking it open, one strata at a time, until the canon had reached its present depth.

At some period, perhaps a part of this same action, a five peak range of mountains were pushed up through the floor of the inland sea at the approximate center. This sketch gives, roughly, the appearance of this—The Henry Range—at a considerable distance across the dessert.
approximately, the great gorge as it appears today. The main river channel follows the east and south wall and the many spires and pinnacles of today were islands in the former outlet.

Since all the evidence indicates that the Colorado Cañon is of comparatively recent origin, it can be presumed that when it was formed the earth's crust had reached a considerable thickness and that the upper strata for a considerable depth had cooled and hardened very much as we know it.

Since hot rock, or material, breaks the easiest, we can vision the forming of mineral gasses to the point of a terrific explosion beneath this fault, which is now the Colorado Cañon, shattering the inner, hotter strata; the gravity pressure of the upper crust forcing molten material up to a cold hard strata that resisted the explosion, spreading beneath this strata thus putting a strain upon the upper crust; this in turn cracked the upper strata giving a vent to the ocean and starting the drainage of the inland sea: The strain kept up and from time to time an additional strata would give way until eventually the break reached the bed of the inland sea and drained it completely.

It can safely be presumed that in this same action the Henry Mountain Range was forced up through the floor of the inland sea, raising the floor with it, thus increasing the speed with which the sea was drained, very much like tipping a dish and draining the contents through a crack in the edge. (See sketches 4 and 5)

The top of the walls of the Cañon are today 8600 feet above sea level; the bed of the Cañon is 2400 feet above sea level, which would logically approximate the level of the inland sea floor; today the dessert which was the sea floor is 4000 feet and better above sea level which could be presumed to support this theory.
The ranges on both sides of the Cañon very noticeably slope up toward the top of the walls.

The Cañon is made up of a series of walls and benches, with a very limited amount of talus at the foot of all walls below the upper one.

There is a noticeable prevalence of cleancut, straight lines through the Cañon as to give it the appearance of recent origin.

These, and the absence of Glacial markings, I offer in support of this theory of the formation of this Cañon.

I might finish by calling attention to the fact that the depth of this Cañon, the height of the newly formed range of mountains and the entire uplift involved is represented on the 24 inch globe by less than the thickness of two sheets of this paper. Compared to man, many of the activities of Nature are so stupendous that they are terrifying; but by our measuring stick they are comparatively insignificant.

It is said that when a stream, in flood, doubles its depth it increases by thirty-four it's ability to move the rock strewn bed.

With the rapid outpouring of the inland salt sea through the newly formed Cañon, great quantities of immense boulders and other debris were washed in and blocked some narrow gorge, forming a new barrier or dam: openings between these great particles permitted the complete drainage of the salt water content of the sea. After this by settling and erosion these openings were closed and a solid barrier formed. This permitted the fresh water floods to refill this basin and for a long period this was a fresh water sea. The upper portion of the sea floor was deposited under fresh water. The age of this fresh water content can be determined by the depth to the salt water fossil. When this sea filled to the point
overflow it began the process of destroying this barrier, eventually draining this fresh water sea. It can be presumed that this barrier gave way a portion at a time, holding the lake level for long periods, thus explaining the distinct water markings at apparent long ages such as the one immediately beneath the Cliffdwellers as illustrated herein.

The Desert

This newly drained area is largely arid, partly semi-arid, with a few open valleys that are astonishingly productive, especially under irrigation. In the larger valleys small towns have developed; in the smaller valleys individual families or small groups have settled, built individual or community irrigation facilities and are, with a few cattle on the meager range, living in peace and comfort. A few Cattle Companies are ranging small herds over large areas with limited feed and water. These people and their descendents have acquired a special brand of observant education quite suited to desert life, making it not only tolerable but enjoyable. Their ability to read signs is most uncanny. Two cowboys will meet, one headed for home after his days work, the other looking for his horses, when the following conversation will take place:— Hello Bill! Did you see any horses back that way? No! but I crossed a trail of a bunch of seven, with a roan, a bay, a grey and a black; two were saddle horses, one freshly shod; there was one barefoot which was crippled in the left hind foot; they were headed west. Thanks Joe! that is my bunch headed for Clay Springs; Thanks i will see you at the New Years dance. These boys never cross a trail without reading it, for they never know when they may save some rider hours on the trail. From the top of the Henry Mountain Range
one can get a comprehensive view of this entire basin and one is impressed with the newness of everything including the range itself. Under early morning or late afternoon light conditions, every thing of Natures activities of the past and all probable activities of the future are plainly written in the shadowed markings, the pinacles, flat-tops, the basins, canons, large and small, the eroded or sand areas; all telling a plain and understandable story. One is impressed with the few and limited areas of sandy desert as one sees this as a whole, which means newness as we interpret Natures Activities.

When one is caught out in one of the sanded areas the impression is reversed and the question that enters the mind is—how and from what source has so much sand accumulated.

On one occasion, after a hard day's travel over long sweeping sand hills in blistering heat, I was caught in a heavy downpour that was almost suffocating; I headed for a rock cropping where I found all the depressions full of water, and camped for the night. It was early in the afternoon but it was not advisable to leave this water.

In a short time the clouds had dissipated and the heat intensified by the added humidity. I was comfortably wet to the skin and enjoying the situation; there was not a breath of air moving. As I sat there I could hear the sand particles pop loose as the wet rock dried; all the lizards and rattlesnakes were out; what bird life there was were flying and lightning to rise and light again; a number of Coyote's came in sight; a bunch of wild horses came out of a draw, saw me and fled. This set me to thinking— that all these with the Antelope, the few deer, the many cougar, desert mice and rats, each in their movements throughout the days, weeks and years were constantly displacing sand and rock particles: All these with the frequent wind storms accounted for the
great sweeping sandhills that were very much like great ocean swells. All of these influences are no doubt displacing millions of tons of material each year and answers the question of - How and from what source?

Summary.

The Horse trail and boat plan of our Company proved to be impossible because of the boxing of much of the Cañon area, which would force the trail out on top for long distances along the rim, of an arid and rough hewn country, making the cost prohibitive.

Supply stations are being established where and as needed.

The Grand Cañon is being served out of Williams and Kanab.

The Government flood control programme of the Colorado River may prove the feasibility of a dam in Dark Cañon eventually, which would make available plenty of water to work the thousands of acres of gold bearing gravel from Dandy Crossing south. This would return several times the cost in gold supply.

The one thing that is perhaps open to profitable investment would be a health resort well down in the Green River Cañon. Some most remarkable health cures came under my personal observation on my two recent trips there. These were strictly Climatic for the patients had no special care. With a modern plant, supplemented with knock down Factory built units, for the isolation of cases, a cure for Tuberculosis could be, in most cases, assured.

Thirty miles of road out of Green River Station, Utah. connecting with a suitable steamer—preferably a high speed, flat bottom, side wheeler—would make any part of this Cañon available.