EMPLOYERS

Through our Capability Exchange we are in a position to furnish a complete history and recommend to you Consulting, Examining, Sales, or general engineers in the fields of Metal Mining, Coal Mining, Geology, Metallurgy, Oil Production, or Oil Refining.

The Capability Exchange is a non-profitable service of the C. S. M. Alumni Association, its purpose primarily to place School of Mines graduates in good positions and to assist employers to secure competent men.

If you are in need of an engineer fill out this blank and mail it to our office.

EMPLOYERS REGISTRATION BLANK

Date...

Name of Company or Firm...

Name of person in charge of employment...

Mail address...

Telegraphic or Cable address...

Nature of Business...

[mining, milling, smelting, oil producing and refining]

WE WANT A MAN TO FILL FOLLOWING POSITION:

Title of Position...

Duties...

Want man of following qualifications...

Salary $...

Opportunity for advancement...

Man will be stationed at...

Town State...

Will you pay traveling expenses to place of employment...

Accommodations and cost of living—Single man...

Accommodations and cost of living—Married man...

Colorado School of Mines Alumni Association

C. Lorimer Colburn, Secretary, 509-17th St., Denver, Colo.
COLORADO
The HIGHEST State of Enjoyment
Invites You to Learn
What the JOY OF LIVING Really Is

It doesn't take riches to "live high" in Colorado. All that's needed is a zest for life. In Colorado you live abundantly, at less expense, than anywhere else in the country. And you make friends here, too, friends like you.

In Colorado you get a vertical two miles of choice as to how high you want to live. Altitudes vary from 3,400 feet in the lower Arkansas Valley to 14,500 feet at Mt. Elbert, Mt. Massive and other peaks of the upper Arkansas Valley—11,000 feet on a single watershed. Forty-eight of the nation's 62 named peaks above 14,000 feet are in Colorado.

That altitude is the key to the joy of life out here. It means cool summers; it means cool, dry, sparkling air. The protective wall of Rockies gives shelter that, in the air, the sunshine, the forests, the mountain formations and the mineral deposits that give Colorado its endlessly varied display of colors—its dazzling mineralized metals and minerals: 250 minerals and compounds have been found. It's in the air, the sunlight, the forests, the mountain formations and the mineral deposits that give Colorado its world-wide recognition in the specialized and mineralized products—50 minerals and compounds have been found. It is the high-altitude growing conditions in mineral soil that make Colorado fruits and vegetables so delicious that they are demanded everywhere. It is the high-altitude growing conditions in mineral soil that make Colorado its endlessly varied display of colors—its dazzling mineralized metals and minerals: 250 minerals and compounds have been found.

When you know and understand Colorado you'll want to see it—and begin to know it. And that's very easy, too. Overnight and professional opportunity.

Bring Colorado sunshine into your home by getting vitamins and better flavor in Colorado fruits and vegetables.
The Engineering Course

A young man, graduated from the Colorado School of Mines in 1908, recently ranked third in a general survey examination at the Tucker School of Business Administration, Dartmouth. This young man was granted the degree of master of business administration this spring.

If this has any special significance, it seems to be that the four years' engineering course at the Colorado School has a more general application than is commonly believed.

It is usually held that a specialized training, such as given in engineering schools, has no significance other than the imparting of practical knowledge, the application of which is definitely limited to a given field of activity. This belief has been contradicted many times. In pointing to this specific case—the case of one of our very recent graduates—we are not giving all the evidence. There is no bogy generalization here. A long list of prominent names could be compiled—men whose engineering training has proved valuable in other fields. An engineering course is intended primarily to train men for the engineering profession, but there are some general cultural values, after all, in such a course.

A Strong Department

Students from Georgia Tech, West Virginia, the U. S. Mint at Philadelphia, LSU, Colorado, Mines, and many other colleges are registered in the Colorado School of Mines summer courses for graduate work in geology. The Mines department of geology is recognized throughout the country as giving one of the most thorough and practical courses in mining and petroleum geology.

On the faculty in this department, the School of Mines has men whose actual experience in the field is notable. Strengthened by the department of geophysics, which supplements the geology department, the geological training offered at Mines is not equalled anywhere else in the country. A geophysicist, you know, has been known as a “real good geologist.”

Chronical Knocking

If your motor car commences to knock, you know that something is radically wrong with the engine. If you are wise, you have it overhauled as soon as possible, either doing the job yourself, or hiring it done by a competent mechanic. But if you commence chronical knocking yourself, (by which I mean habitual, capricious criticism), who is there to overhaul you? You must do the job yourself, or take chances of becoming a general nuisance, and perhaps ruining your own career and success in life.

I do not know whether it was a Rotarian or a Kiwanian who first coined the expression: “Throw away your hammer and saw and wood. Be a Booster.” Although I agree with the sentiment he was trying to express, it seems to me that there are two sides to this question. For example, if you hire a carpenter to build a frame house, and he reports on the job with a saw but no hammer in his tool kit, he will not be able to do much of a job until he gets a hammer or uses something else in place of one. Although it is a well known fact that “you cannot saw wood with a hammer”, it is equally true that “you cannot drive nails with a saw”. Both a hammer and a saw are necessary tools in a builder’s kit, if used for their own proper purposes. A little of the right kind of knocking is sometimes helpful, but it must be constructive knocking.


Market Worth Cultivating

Recently the American Mining Congress, through its Bureau of Mining Economics, made an investigation concerning the purchasing power of the mines. The result was most informative and surprising. For instance, taking the industry in the United States as a whole, it is discovered that a large coal company, representative in production of at least 30 of the great producers, spent more than a million and a half for supplies and replacement equipment.

Multiply this sum by 50 and you have a sizeable market, isn’t it? It is common knowledge that approximately 50 percent of our more than 300,000,000 tons of coal is produced by 300 companies. So this is a somewhat conservative estimate.

One large copper company, representative of the group of great producers, spent almost three million for its necessary supplies and equipment. This expenditure may be multiplied by at least several times for a fair estimate of the purchasing power of that industry. A large lead and zinc property spent approximately one million, and an iron ore producer nearly three millions. In addition, as is shown by another statement in this issue, our export trade in 1930 amounted to better than seven billion dollars of coal for the manufacturer of mining machinery. Certainly the mining industry offers a great market for one worth cultivating.

—From the Mining Congress Journal.

A Small School Puts It Over

Why not Mines?

As an example of how other alumni associations are putting over the thing that the Mines Alumni are striving for, the case of Rollins College may be cited. Like the School of Mines, Rollins is comparatively small in so far as its student body is taken into account—the enrollment is about 400. Like Mines, in another respect, this southern school is an institution with less than a century of tradition, and its alumni do not number far into the thousands. The principal difference is that, while the School of Mines is an engineering institution, Rollins is a college of arts and sciences.

The Alumni of this relatively small school announced in the June issue of their Record that more than $1,000,000 had been raised, in cash, since last March. This is almost one half of the amount set as their goal for their endowment campaign.

This is how it is being done: The president of the college and the alumni secretary are working together, and both are devoting their time in carrying out a well organized drive. Several formal dinners and luncheons have been given. These affairs were attended by a number of influential and wealthy men who are interested in promoting education. The endowment plan, the college aims and the purposes for which the money is to be employed are all carefully explained on these occasions.

Following is an outline of the general policy which the Rollins alumni adopted before the campaign.

(a) To utilize all appropriate opportunities of describing the Rollins plan. The enthusiasm and its spirit of mutual fellowship between faculty and students to men and women who might become interested in helping the Rollins conference plan and its strongly developed advance plan which should be emphasized more.

(b) To report to the Alumni Chairman, Rex Bech, at the Endowment Office, 17 East 42nd Street, New York City, the names and addresses of potential donors, together with such details regarding them as may be helpful in making effective appeals. A hammer or use something else in place of one. Although it is a well known fact that “you cannot saw wood with a hammer”, it is equally true that “you cannot drive nails with a saw”. Both a hammer and a saw are necessary tools in a builder’s kit, if used for their own proper purposes. A little of the right kind of knocking is sometimes helpful, but it must be constructive knocking.

(c) To place themselves at the disposal of the Presi
dent and his committee or staff representatives whenever they may be engaged in work on behalf of the fund in cities where alumni are resident.

Why Not Mines?

If Rollins college, with an enrollment no larger than the School of Mines, and with an alumni list no longer than our own, can ask and receive from its friends such a noble and voluntary outlay of time and money, why not Mines? No college has an alumni group that has shown more enthusiasm than our own bunch of Miners! The Mines Alumni Association can put its Foundation Plan across as easily and with as much success as the Rollins alumni are doing when the time comes.

At present the work on the School of Mines Foundation is still in its first stage—that of popularization. The best procedure, it has been held, is to give the Foundation plan as much publicity as possible before undertaking an organized drive for funds. A great deal of time has been given by various Alumni in committee meetings, working out the details of the Plan, and the machinery for the handling of gifts, bequests and the like has all been provided. The publicity campaign is now being carried into its third year, but there is one feature of this effort to popularize—the Plan which should be emphasized more.

The Magazine has carried, in practically every issue since the Plan’s conception in 1928, a page editorial relating to the Foundation. Printed matter, broadcasting the School of Mines Foundation, has appeared in various publications, but what is needed most at this time is a by-word-of-mouth campaign on the part of Alumni. It must not be inferred that information has not been given out in this manner. It has, but there should be more talking than ever before. We may take a hint from resolution (a) adopted by the Rollins alumni referred to above: “To utilize all appropriate opportunities of describing the plan . . . to men and women who might be interested in helping the endowment fund.”
Anomalies of Vertical Intensity

By George R. Sorensen, ’29

INTRODUCTION

As originally planned this work was to cover thoroughly the whole of North America. In working up the mag- netic maps the writer found that although there were numerous stations for Alaska, Mexico and Central America, these stations were so widely scattered that no connection could be made between the anomalies for these countries and the geology. Furthermore, Northern Canada was found to be practically devoid of magnetic stations with the exception of a few along the Alaskan Boundary, and, consequently, the major portion of the work was concentrated on the United States and Southern Canada.

It was found from the first few states examined that little could be inferred about the geology from the large scale anomalies, and that individual maps were needed. As an example, in places the magnetic "highs" coincided with the geologic structural highs, while at other points the reverse was found to be the case. Under the circumstances it became necessary to try and correlate known geologic structures with magnetic anomalies as found, and to deduce the causes for position and negative magnetic effects from similar geologic structures. It was also decided to make simple isomagnetic maps which might enable the persons wishing to make more thorough magnetic and geologic investigations.

In order to obtain the most recent geophysical data, requests were made to various state geologists to send the isomagnetic maps to the United States Coast and Geodetic Survey. The replies were varied, and included a few that the geology was too complex to try and correlate the known geologic structures with magnetic effects from similar geologic structures. It was also decided to make isomagnetic maps and to ask the persons wishing. to make inferences as to the position and negative magnetic effects from similar geologic structures.

This thesis was presented to the Board of Trustees and faculty of the Colorado School of Mines in partial fulfillment of the requirements for the degree of Doctor of Science.

The entire thesis will be published in "The Mines Magazine" in five consecutive installments.

ACKNOWLEDGMENTS

The writer acknowledges with pleasure his indebtedness to the United States Coast and Geodetic Survey, the Topographic Survey of Canada, the Carnegie Institution of Washington, and the Observatorio Astronomico Nacional de Mexico.

DEFINITIONS

Isomagnetic line—A line which connects points of equal

vertical intensity for the magnetic field of North America.

In one case in which the intensity is less than normal.

Isomagnetic line—A line which connects points of equal intensity with no correction for planetary effects. On the

United States Coast and Geodetic Survey map of vertical intensity for 1925 for the United States, the isomagnetic lines have been interpolated from a series of points which offer more than the usual amount of interest.

Anomaly—A variation from the normal planetary,

and magnetic effects, including this thesis, and to any others not specifically mentioned, who rendered aid in the completion of this work.

The C. S. M. Magazine

for August, 1930

Alumnus Takes Up Old Duties

Lester J. Hartwell will re- turn to the Montana State School of Mines in September after his three year absence. According to Dr. Henry Hartzell, who was in charge of the foundation during the past year, the Alumni Fund has grown to $2,148.812. About 360 alumni have made individual contributions to the Alma Mater, and when the time arrives for conducting an organized campaign, many friends of the Colorado School of Mines can be approached easily because of this preliminary talking which the Alumni have done.

Some Alumni Associations Are Doing

Various alumni groups have established what is known as the "Alumni Fund." This is different from an "Endowment Fund" in that it is a permanent fund for alumni purposes. The alumni association and not by the college or some other non-alumni body. These alumni funds have been developed by donations from graduates, and in most cases by voluntary donations. The money accumulated in this manner is employed, as the association sees fit, in aiding alma mater. As an example of the functioning of such a fund the case of the University of York is cited.

In making the announcement, the chairman of the Alumni Fund Committee, reported that, after it had conducted a survey of the needs of the University and its several schools and colleges, decision was reached to assist through the Alumni Fund Committee, which seemed most worthy of help at this time. Accordingly, ten schools, colleges, and funds in the University received various amounts from the total sum, of which the largest contribution, $15,000, went to the fund for faculty pensions. Stated another way, the money donated by alumni from approximately $80,000. This money has been obtained exclusively on a voluntary basis, and alumni have felt free to give entirely as their personal circumstances dictated. For example, the 1920 Alumni Fund received contributions ranging all the way from $1 to $1,000.

Something Different to Consider

Many of us are unable to grasp the significance of a project when stated in the abstract. And to here is a concrete example of what the Foundation could do for the School. In 1919, two new gymnasiums were built in the Montana School of Mines. The new gym would be built on a lot just one and a half hundred feet from Brooks Field. It would be better located here than there was a building for instructional purposes. Perhaps the most evident way of having a new gymnasium is the stimulus it can bring to athletics which would result in the construction of better equipment.

If a new gymnasium were a definite project for consideration with all generalities removed.

The New York University Alumni are sponsoring a "Gymnasium Fund." The purpose of this fund is to raise $3,000,000, which is readily justified by the history that the campus is an oasis of the city. In the recent years, it has expanded ten fold since the day this building was erected. With a few partitions, this floor space could be used for recreation, and in most cases by voluntary donations.

The individual donations of the 300, who were not counted in the various groups, is significant. There are always a number of loyal members in any organization who give help, both financial and otherwise, without having to be stimulated to action by a group rally.

Here is a thought, left at the end of this essay, to be pondered over in the Alumni mind: "Who will re- store the interior of the present gym?"

The Colorado School of Mines Alumni Association is interested enough and financially to donate enough money to start a new gymnasium this year. What two individuals, or possibly three, are willing to get together on such a project and donate $100,000 for a building at Mines?

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Strange to say, the one new building proposed is a gymnasium. Yet, it is not so strange when explained, for the interior of the present gym would be remodeled into laboratories and class rooms. It is centrally located, near to Guggenheim Hall, and therefore an ideal building for instructional purposes. As a gym, this building is not only out of place, but is badly out of date. The basketball court is too small for indoor games, but it could be converted into a splendid museum to house all the valuable specimens now scattered among the various buildings about the campus. The lower floors of the present gym are unsuited to the needs of a physical education department which, through the combined efforts of the sports, has expanded ten fold since the day this building was erected. With a few partitions, this floor space could be made to accommodate a large number of students.

The gym would be built on a lot just one and a half hundred feet from Brooks Field. It would be better located here than there was a building for instructional purposes. Perhaps the most evident way of having a new gymnasium is the stimulus it can bring to athletics which would result in the construction of better equipment.

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for August, 1930

Gauss—1/100,000 of a gauss.
Magnetic field—A magnetic field.
High—A structural high.

In several places in this thesis the expression "the isonomalics coincide positively (or negatively) with the structure" is issued—By "positive coincidence" is meant those conditions where a magnetic "high" coincides with a structural high. Conversely "negative coincidence" has meant that a structural high coincides with a magnetic "low" or vice versa.

Chapter I—method of procedure

Selection of a Base Map

In order to show the relationship between the anomalies of vertical intensity and the regional geology to advantage, the best method seemed to be to superimpose the isonomalics onto a geologic map of North America. The best geologic map available for this purpose was the one accompanying Professional Paper No. 71 of the United States Geological Survey, but after due consideration it was decided that a tinted tracing of this map on tracing cloth would be more suitable for the following reasons: (1) The map was out of print and copies were hard to obtain. (2) Tracing cloth would be more durable, and corrections or alterations could be more readily made. (3) The colors on the map were too deep to show the isonomalics to the best advantage. (4) Unnecessary material could be eliminated in tracing.

After this tracing was made it was found that the isonomalics still did not show to best advantage on account of the colors. Furthermore, prints could not be made from it. Consequently plain outline maps showing only the countries, states and isonomalics were made on tracing paper. From these white prints were made so that each copy of the map could be provided with maps. The original colored tracing was then presented to the Geophysics Department of the Colorado School of Mines for reference work.

Preparation of Magnetic Data

General—In order to locate magnetic stations accurately without taping too many lines on the tracing, a supplementary sheet was made on which the meridians and parallels of latitude were drawn for each degree. By means of this supplementary sheet the stations could be easily and accurately transferred to the tracing from data sheets and maps.

On account of the fact that the magnetic intensity at any point changes from year to year, it was necessary to choose some year as a base and then obtain the vertical intensity of each station for that year in order to make the results comparable. It was decided to use the most recent year for which the greatest amount of data was readily available. The balance, given chiefly for 1915, 1920, 1925 and 1926 was recalculated for 1925.

The United States—The magnetic data for the United States for the year 1925 was obtained from a photograph copy of a vertical intensity map prepared by the United States Coast and Geodetic Survey for that year. This map gave both the vertical intensity at each station and the calculated or approximate location of the isonomalics for each one thousand gauss or hundredths of a gauss.

Each station was given a number for convenience in making calculations and plotting results. Several different systems were used as new ideas occurred and were tried out during the numbering process, but on the whole the numbers will be found to occur in groups. In a narrow strip which ran across Kentucky, southern Ohio, West Virginia, Pennsylvania and New Jersey, the stations were so close together that a four figured number could not be given conveniently to each one. In order to overcome this difficulty the area was divided into five sections which were labeled A, B, C, D, and E. At each section contained less than one hundred stations, each station could be given a two figured number.

In several instances stations were overlooked during the numbering process and these were later given the number of a nearby station together with a letter as 307A or 307B for example. They were thus easier to locate when the calculations were made and plotted than they would have been had they been given a consecutive number which differed by several hundred from those of surrounding stations.

Inasmuch as the vertical intensity increases from zero at the magnetic equator to a maximum at the north magnetic pole it was necessary to make a correction for this planetary variation in order to bring all stations to a common or normal basis before anomalies could be determined. In a previous article of a similar nature the writer used a base station and compared all other stations to this base. The average change in gauss per mile in north-south and east-west directions was computed. This result was multiplied by the distance north or south and east or west of the station to be corrected, from the base station. The algebraic sum of these corrections added algebraically to the value of the station gave the corrected value for that station. The method worked in a fairly satisfactory manner for one state, but it had several drawbacks for a larger area. First, it gave only the average change per mile while the actual changes may have varied considerably from the average. Second, the error introduced by using the average change would have been too great over an area as large as the United States, especially as the average changes at every point from east to west and north to south. Third, it was both cumbersome and liable to error. Fourth, the corrections at the extreme points of the country would have been so large that the anomalies by comparison would have been too small to be effective. Other methods of eliminating the planetary or regional effect have been used by Nippoldt and others but the one used here was decided upon as being more suitable for this work.

In order to overcome the difficulty, an entirely different scheme was used. First, the normal vertical intensity was determined for each station by interpolating between the isonomalics lines on the United States Coast and Geodetic Survey maps. These lines on the map have been smoothed out to such an extent as to make an appearance of continental anomalies but to eliminate regional and local ones. The value thus obtained was considered to be the true value of the station. The difference between this calculated value and the value given on the map (column 2 in data sheets) was taken as the anomaly at that station. This anomaly was considered as positive when the given value was greater than the true or calculated value, and negative when the given value was smaller.

After all the stations had been calculated and plotted, the isonomalics, or contour lines connecting points of equal anomalies, were drawn at 250 gauss intervals. This interval was chosen to remove any errors due to possible local anomalies at stations and thus to give more truly the regional effect. It was considered that an isonomalic interval of 100 gauss was entirely too small, but the
A New and Quick Method of Surveying

Kodak challenges Transit

by G. O. Mains, O1*}

The table would indicate that the measurements of height of image on the 1/2000 may be less than 1 inch, but that degree of accuracy will not ordinarily be obtained. If only 10% accuracy is desired (usually case of rough preliminary surveys), a 5 ft pole, not 3 ft pole, in height would suffice to measure distances of not to exceed 200 ft, and a reading of 1 ft would be needed to calibrate the kodak and the readings obtained for distances of 25 ft to 110 ft are given in the following table.

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<thead>
<tr>
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<td>420' 5.7&quot;</td>
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<tr>
<td>50 ft.</td>
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</tr>
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In obtaining horizontal angles by measuring the distance between objects on the film, a correction must be made for the difference between the tangent of the angle, and the angle itself for ordinary work. If, however, more accuracy is desired, the following corrections can be made for the difference between the tangent of the angle, and the angle itself:

- For difference between 3° and 10°, multiply the tangent by 1.06 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 3° (1.06%) from the tangent measurement to get angle.
- For difference between 10° and 20°, multiply the tangent by 1.086 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 10° (1.086%) from the tangent measurement to get angle.
- For difference between 20° and 30°, multiply the tangent by 1.095 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 20° (1.095%) from the tangent measurement to get angle.
- For difference between 30° and 40°, multiply the tangent by 1.103 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 30° (1.103%) from the tangent measurement to get angle.
- For difference between 40° and 50°, multiply the tangent by 1.108 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 40° (1.108%) from the tangent measurement to get angle.
- For difference between 50° and 60°, multiply the tangent by 1.111 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 50° (1.111%) from the tangent measurement to get angle.
- For difference between 60° and 70°, multiply the tangent by 1.113 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 60° (1.113%) from the tangent measurement to get angle.
- For difference between 70° and 80°, multiply the tangent by 1.115 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 70° (1.115%) from the tangent measurement to get angle.
- For difference between 80° and 90°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 80° (1.116%) from the tangent measurement to get angle.
- For difference between 90° and 100°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 90° (1.116%) from the tangent measurement to get angle.
- For difference between 100° and 110°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 100° (1.116%) from the tangent measurement to get angle.
- For difference between 110° and 120°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 110° (1.116%) from the tangent measurement to get angle.
- For difference between 120° and 130°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 120° (1.116%) from the tangent measurement to get angle.
- For difference between 130° and 140°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 130° (1.116%) from the tangent measurement to get angle.
- For difference between 140° and 150°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 140° (1.116%) from the tangent measurement to get angle.
- For difference between 150° and 160°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 150° (1.116%) from the tangent measurement to get angle.
- For difference between 160° and 170°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 160° (1.116%) from the tangent measurement to get angle.
- For difference between 170° and 180°, multiply the tangent by 1.116 to get true angle. For example, suppose that the distance between vertical lines on the negative for the same amount of pains. We will multiply the correction for 170° (1.116%) from the tangent measurement to get angle.

In measuring from the picture, it is better to use prints, rather than the negative, for reasons of the above.
Air Repressing Greatly Increases Oil Production

The title of how production of oil in the Williams pool, in Callahan County, Texas, has been greatly increased by the application of air repressing methods is outlined in an engineering report just made public by the United States Bureau of Mines, Department of Commerce.

The Williams pool is one of a number of shallow pools in the lenticular sands of the Cisco series in the Permian-Moran district. The outstanding features of the pool are the abrupt variation in sand conditions, the absence or presence of edgewater encroachment, the irregular oil-water contact, and the "low-head" and "small-volume" water that occurs apparently in the base of the sands in the "lowers" of areas of depression.

The following conclusions of the author of the report, H. B. Hill, are based upon a detailed study of repressing operations in the Williams pool. Other shallow pools in the Permian-Moran district have many similar features and characteristics. Correlative data on these pools were gathered during the study made by the Bureau of Mines and are recorded briefly in an appendix to this report.

Old development records are sometimes inadequate or unreliable, and it is often advisable to drill 5-spot wells and core the sand to ascertain subsurface conditions and to obtain other data regarding drainage, porosity, saturation, fluid content, and water conditions. Five-spot wells were drilled for this purpose in the Williams pool and caled to make them input pressure wells. This procedure gave satisfactory results.

The practice of caving with cable-tool equipment has been adopted by several of the companies. Corring has supplied data that can be used to interpret more accurately the character of the producing sands and has helped in the development of new methods and production practices, including restoration measures.

The gravity of the oil in the Williams pool was lower than the beginning of production than that of oil from wells in the surrounding area. There has been a continuous rise from 33.3 to 31.8° API during about 18 months.

The average gas-oil ratio of the air-gas mixture taken at the casing head of four wells in the Williams pool during November, 1927, was 1.1 gallons per 1,000 cubic feet of oil. A total of 4,340 barrels of oil were produced from this pool.

Restoration of pressure in the producing zone tends to encourage the production of lighter, more volatile lenticular sand areas of low-head-small-volume waters.

The presence of small volumes of gas in the shallow pools of this district suggests that low initial production is caused by lack of enough excelling force in the reservoir sand to magnify appreciable amounts of air into the oil column. Samples of air-free oil from the lower 10 feet of the pool, which is about 200 feet thick in this pool, have shown a gravity of 0.796 gallon per 1,000 cubic feet of oil. Before the application of air very little, if any, gas was produced at the casing heads.

Uniform distribution and spread of the represurizing medium are advisable but are generally difficult to obtain.

Methods of repressing that favor the maintenance of a low gas-oil ratio (approximately 1,000 cubic feet of air per barrel of oil) are desirable and aid in conserving the additional energy necessary for a higher recovery. The cost of compression is less. The recycling of casing-head vapors with air under repressing conditions is preferable. The most common method of attack on this problem is, first, to thicken, or concentrate the spent solids, together with gas absorbed in the liquids, and then to dilute these liquids with water. In general, we can distinguish two divisions or types of materials to be separated and washed: First, coarse, low-grade ores which have been batch-leached. In this case, there is no question as to thickening; the whole job is merely one of washing. Secondly, we have to deal with relatively fine-grained materials which have been leached by agitation and which are more or less in suspension in the solution. Evidently, these pulps must first be thickened, or thickened, to obtain a high ratio of solids to liquids so that the solids may be economically possible; then this thickened pulp must be washed to recover the entrained solution values. The treatment of the solid, the theory and practice of settling and filtering, together with what little we know about adsorption phenomena.

**General Principles**

Tapping up first the simpler case of ores which have been batch-leached by percolation, it is seen that, since the solids remain suspended, the question of extraction of solution values is largely one of displacing the rich solution by water. For purposes of analogy, this process may be considered as a repeated action of displacement: barren water pushing the rich solution away from the ore particles, and driving it out of the solid mass.

Actually, of course, this action cannot take place; the rich solution and the barren water diffuse into each other, and the best that can be hoped for is an eventual dilution of the solution values. From the kinematic and solvent points of view, the mechanism of this process may again be fairly accurately represented as a logarithmic function of time or of the number of batch washes applied. Thus, for a given value of the rate of reaction the "wash" efficiency of a number of batch washes is

\[ E = \frac{1}{1 + C \log n} \]

where \( E \) is the efficiency of a number of batch washes, \( n \) the number of washes, and \( C \) a constant.

Nearly all ores and concentrates are more or less porous; and, as the solids lose part of their mass in leaching, the conditions become increasingly evident and important as the leach proceeds. Again, even if there were no external agencies to affect the sorption of the solutions, it would still efficiently "dry" the solvents more or less.

Following the leach proper, it is necessary to separate the extracted solids and the barren waters. But this problem is always complicated by the fact that some of the rich solution will cling to, and be absorbed by, the particles of the solids. Hence, in addition to separation, as such, we must also provide means for recovering, in large part at least, the values absorbed in the solids.

The most common method of attack on this problem is, first, to thicken, or concentrate the spent solids, together with gas absorbed in the liquids, and then to dilute these liquids with water. In general, the most practical method of attack on this problem is, first, to wash, or concentrate the spent solids, together with gas absorbed in the liquids, and then to dilute these liquids with water. In general, we can distinguish two divisions or types of materials to be separated and washed: First, coarse, low-grade ores which have been batch-leached. In this case, there is no question as to thickening; the whole job is merely one of washing. Secondly, we have to deal with relatively fine-grained materials which have been leached by agitation and which are more or less in suspension in the solution. Evidently, these pulps must first be thickened, or thickened, to obtain a high ratio of solids to liquids so that the solids may be economically possible; then this thickened pulp must be washed to recover the entrained solution values. The treatment of the solid, the theory and practice of settling and filtering, together with what little we know about adsorption phenomena.

## Principles of the Hydro-metallurgy and Electrodепosition of the Metals

**Chapter on Separating and Washing**

By Thomas P. Campbell

**For August, 1930**

Example: 100 pounds of clean sand were saturated with 25 grams of gold, as Au(CN)_2, in week solution. Six batch washes were applied, each wash bringing allowed to drain completely before the next was added. Each batch washed 16.7 lbs., making a total of 101 lbs. of washed sand added. Results:

<table>
<thead>
<tr>
<th>Wash No.</th>
<th>As in Sump gr., Au</th>
<th>Displacement Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16.5</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>16.2</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>15.8</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>15.5</td>
<td>0.5</td>
</tr>
<tr>
<td>5</td>
<td>15.0</td>
<td>0.5</td>
</tr>
<tr>
<td>6</td>
<td>14.8</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Thus the total weight of gold recovered was 22.86 gr., in the formula given above, we may substitute

\[ (a) = 22.86 \times 10^{-5} \]

hence,

\[ C = \frac{100}{22.86 	imes 10^{-5}} \]

In other words, we are essentially limited to the practice of settling and filtering, together with what little we know about adsorption phenomena.

### GENERAL PRINCIPLES

Taking up first the simpler case of ores which have been batch-leached by percolation, it is seen that, since the solids remain suspended, the question of extraction of solution values is largely one of displacing the rich solution by water. For purposes of analogy, this process may be considered as a repeated action of displacement: barren water pushing the rich solution away from the ore particles, and driving it out of the solid mass.

Actually, of course, this action cannot take place; the rich solution and the barren water diffuse into each other, and the best that can be hoped for is an eventual dilution of the solution values. From the kinematic and solvent points of view, the mechanism of this process may again be fairly accurately represented as a logarithmic function of time or of the number of batch washes applied. Thus, for a given value of the rate of reaction the "wash" efficiency of a number of batch washes is

\[ E = \frac{1}{1 + C \log n} \]

where \( E \) is the efficiency of a number of batch washes, \( n \) the number of washes, and \( C \) a constant.

Similarly we may calculate successive values of \( x \) for the remaining values of \( t \). The following table shows the calculated values of \( x \) as compared with those found experimentally, as illustrated above:

<table>
<thead>
<tr>
<th>Wash No.</th>
<th>As in Sump gr., Au</th>
<th>Calculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16.5</td>
<td>16.6</td>
</tr>
<tr>
<td>2</td>
<td>16.2</td>
<td>16.3</td>
</tr>
<tr>
<td>3</td>
<td>15.8</td>
<td>16.1</td>
</tr>
<tr>
<td>4</td>
<td>15.5</td>
<td>16.0</td>
</tr>
<tr>
<td>5</td>
<td>15.0</td>
<td>15.9</td>
</tr>
</tbody>
</table>

Total 22.86

References:

1. "*Air Repressing Greatly Increases Oil Production in Williams pool, Texas*" by the author.
2. "*Principles of the Hydro-metallurgy and Electrodéposition of the Metals*" by Thomas P. Campbell.
can be applied in any given system: in general the total
were added in one batch, the sump solution contained 19.8
This brings out the advantage of stage washing with
the batch washing of ores after leaching. The first two
otherwise the solution volume would soon exceed the tank
amount of wash water allowable cannot exceed the
a weaker solution; and so on, until, in the final stage,
(No. 38).
then be pugged with fresh water and refiltered, this
be simply to run the pulp into a large tank, settle, decant,
and then filter the thickened pulp. The filter cake could
stant for constant temperature, equal to about 9, and V
is the velocity of the solid
This formula for particle path postulates the existence of
practice. However, most of these conditions may be
however, these solutions are usually filtered before passing to
flocculaio below that value,—and vice versa. In general,
for the present, sufficient unto the day is the ignorance
In flotation, and in cyaniding, the solution usually con­
Other states represented by students registered in the
receives in reply "None could have done better." So the fee is refigured, the price finally set.
With a dollar or two and a little more fame
With the work then completed he figures his fee
In that measure he will readily see
For he's called to do jobs that the others can't do.
And stays with the job till the end is in sight.
He is a great boasted one who works to beat hell to get what he can
Some Say Yes, Some Say No
An engineer is a poorly paid man
He makes up reports on fields and mines.
Or anything else—depending on times.
His guilt or innocence is over.
For he's called to do jobs that the others can't do.
So no, however hard he works.
And stays with the job till the end is in sight.
With the facts he has found in the difficult grids
He draws his reports in a clear concise way
In hope that its contents will bring him some pay.
Says yes, or no, he changes his mind.
So that other trained men can hand him no laughs.
And the four reasons for his success.
Expecting some pay and a great deal of fame.
With his work then completed he figures his fee
In that measure he will readily see
That time and expense and experience too
Have solved his problem come through.
After hours of thought he leaves a great sight
For what he has figured seems terribly high.
He thinks of the fees of professional men.
Including the doctors and most legal men.
How a doctor will look and say you are ill
Yet he can't beat his bill—you haven't a chance.
The legal man, too, says one hundred a day
And meekly concedes that isn't much pay
Including the doctors and most legal men.
He thinks of the fees of professional men
For what he has figured seems terribly high.
In hope that his client will readily see
Expecting some pay and a great deal of fame.
So the fee is refigured, the price finally set.
With a dollar or two and a little more fame
Receives in reply "None could have done better." So the fee is refigured, the price finally set.
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With the work then completed he figures his fee
In that measure he will readily see
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So that other trained men can hand him no laughs.
And the four reasons for his success.
Expecting some pay and a great deal of fame.
With his work then completed he figures his fee
In that measure he will readily see
That time and expense and experience too
Have solved his problem come through.
Through Spain to
North Africa and Spanish Morocco

By J. A. Riley, '23

SPANISH Morocco is usually entered from Spain, 
by crossing the Mediterranean Sea from Algeciras (Gib-
bar) to Ceuta or Tetuan, or from Algeciras to Melilla. 

The Arrival at Melilla. Right: The Majestic Head of 
Gibraltar Beyond the Harbour.

Lack of intercommunication within Morocco by means of 
good roads makes it necessary to plan one's trip so as 
to arrive as near to the ultimate destination as possible. 

Gibraltar disappointed me. Since I last studied geography 
they have moved this noble rock. Not far, its true, but 

Gibraltar, to my mind's eye, had been the southernmost point of Spain and at the narrow-

est point between Africa and Europe. A glance at a map will show that this is not quite true. There is another 

point of land at the narrowest point, a little to the west 

which, with Gibraltar forms the harbor, and on which are 

located Tarifa and Algeciras. Tarifa is in the town from 

which we very appropriately get our word 'tariff'. But 

my disappointment ended there for Gibraltar is all the 

better for it. We were promptly assisted by a number of 

boaters from whom we derived a considerable amount of 

satisfaction in our purchases—because we bought them half price and ask-

ing price. Later in retrospection we felt perhaps half her asking price was enough to pay. 

We crossed the barren half mile of neutral territory and had our first introduction to the Spanish Customs Officials. 

Added to this was the typical smell of Spain; composed of many ill smelling flavors, chief among which is burning

owever, every other calculation of the Captain and crew 

seemed to be correct—we eventually arrived at the port 

for which we set sail—and I suppose we were in that 

neighborhood. I also suppose some of the best known 

and least liked of that breed called the American Tourist will 

report a visit to the Azores on their return.

My first view of Southern Spain with its semi-barren 
hilly coast line very nearly persuaded me that it was South

America's west coast again. But there is a little more green 
evidence—then the majestic head of Gibraltar, and soon 

its shoulder, appeared and the similarity ended. But 

the lighter, reveals to the traveler a superb mixture of 

modern and ancient. A blaze of color and commercialism. 

On the west antique horse drawn carriages and American 

automobiles of the latest vintage compete for your patron-

age. And above the gate, to the city, where your passport 
is inspected, narrow streets, on the lip of the rock which 

is Gibraltar, are terraced with shining horse drawn carriages, streets 

with constantly screeching horns, these picturesque horse-

drawn vehicles of Victorian age—all demanding right-of-

way from pedestrians of all nations who, for lack of ade-
quate or any sidewalks, must also use these narrow traffic 

lanes. A type of English Bobby, British, Indian, and Hebrew 

merchants in their native garbs give to this city a colorful-

ness, along with its military aspect, to be found in certainly 

few if any other cities. Even the roar of the voices, as 

they rise like a small roar, give the idea of the polyglot 

nature of the throats that give it life. Separated from 

Spain only by an imaginary line for two hours from Africa; 

existing under English rule; and at one of the most im-

portant trade crossroads of the world; it is no wonder that 

this city seems to present itself as a compo-

site picture of the world in general and Europe and Africa in 

particular.

We drove to Algeciras, but as we left 

Sanlúcar we stopped a moment to pick up a 

friend's bags. We were 

promptly assisted by a 

number of carriages at 

whom we derived a 

considerable amount of 

satisfaction in our pur-

chase—a reason why 

we bought them half price and ask-

ing price. Later in 

retronspection we felt 

perhaps half her asking price was enough to pay. 

We crossed the barren half mile of neutral territory and had 

our first introduction to the Spanish Customs Officials. 

But as is their reputation (at least as bad as the worst 
in Europe) they treated us very kindly, opening only 

one bag and this picked at random. Photographic records 

I was carrying in a separate package they had decided must 

duly. Inside the customs house they dis-

covered the name of a Marques of Spain, an officer of 

the company for which I was to work, inscribed on the 

box. So after a brief consultation, and relieving them-

selves of all culpability, at least to their notion, by saying 

they understood they were in transit to Africa, they very 
courteously waved us along our way. The question.

"What is in a name?" was answered, at least to my 

present satisfaction. And so we drove on from this little 

"village of entrance", over streets of rough cobble-stone and 

out on to the road around the head of the bay. Once 

out of the town the road became panoramic. Lushly made 

by hand and a whistling steam roller, it was thoroughly 

in adequate to cope with high speed auto travel as we know 
it in the States, but good enough for our Spanish driver to 

negotiate an hour. Thoroughly we arrived at Algeciras still 

intact and thankful for it.

What a mirage had been our first view of this town from 

the harbor! Instead of the glistening whiteness we found 
in fifth and extreme poverty—the dazzle was all lost in a close-

up. Distance and a semi-tropical sun can work wonders. 

Added to this was the typical smell of Spain; composed of 

many ill smelling flavors, chief among which is burning

flower, and very good looking ships of about a thousand tons and pure

houses, set in a charming setting of masts and sails, many of them 

with constantly screeching horns, these picturesque horse-

drawn vehicles, we arrived at Algeciras still intact and thankful 

for it.

But to get back to Algeciras. The town, about as large 

as Golden in area, and being perhaps twice as many 

people and dogs, to say nothing of goats (the milk supply 

of Spain), is composed of two or three buildings that really 

draw the name and supersede the rest of the town, with those 

at which were two or three small steamaers. These were 

very good looking ships of about a thousand tons and pure

Left: A Street Scene in Malaga. Above: A Scene along the Shores of the Mediterranean.
white that sail each day for Tangiers. The city is also a ticket for Seville, Madrid, and other northern points and were in evidence everywhere in all stages of undress—the poorer classes. They substitute "alpargatas," a sort of fibre said to have been done to assist the Hotel Riena Cristina situated in the midst of a road Construction fVork in Spain. Laboriously Made by Hand. in Spain by the Phoenicians was made.

The district called the Lámuran is perhaps the most beautiful in the present city of Malaga. Here live the many English people who find its climate ideal for the winter months, and in it have built many very beautiful homes of all architectures, but chiefly Spanish. Just above this district stands a town, named by various conquerors—"Malaca." This is supposed to have come from the word "malea," meaning "to sail away," at that time the city was a great fishing port and the vessels could make it a fish for future use.

Historical remnants of past advantages in the Alcântara, Malaga temple, on a hill above the city. Supposedly this is the point where the first settlement of the site by the Phoenicians was made.

The harbor is a large arm chair. Usually its present state resembles a large arm chair. In its present state resembles a long distance. Truly this setting and view is an instantaneous "The C. S. M. Magazine of so many of the other kind which so very easily creep in. The observer—one of the most picturesque in all Spain. The railroad passes the mountain of Africa including shark which the natives eat. A little have never been completed but still the edifice is an imposing...
dently they feel a good story should never be spoiled by sticking in facts or other things that are not so far beyond their understanding.

So we boarded the "Atlantic," a 1,000 ton ship in the mail service to Melilla, Spanish Morocco. Dirty of itself, 300 army recruits bound for Africa as deck cargo helped put a kick into the boat. The first thing one noticed was that there had been orange skins, grapes, pieces of bread and other one-edible tid bits. And rising above all this the smell of 300 recalcitrant men who had all which must have been garlic! How thankful I was later in the week when the cabin was cool! When a description must have been these men of brave hearts, and probably located, been tested by the Mediterranean in the angry mood it can assume! My berth was four inches shorter and three narrower than I never been glad of! The officers and emulated many and the boats at full speed of eight miles. Early in the morning I was glad to get up to rest, and in the air once more, I watched Africa draw near over the starboard bow. And shortly the old Moorish part of Melilla became visible, poised above the new breakwater that was to be for Melilla. We were slow-moving mail service to Melilla, Spanish Morocco. Dirty of itself, 300 recently eaten meals, the greater part of each of which the passengers had been able to enjoy during the current year a total of twenty-three tuition scholarships. Fourteen of these were county or city scholarships; five were awarded to students prominent in the open scholarship contest; and four were recognition of the achievement in the statewide student affiliation contests. Awards for next year have not yet been made.

PROCEEDURE AT BATED

According to the new constitution of the Association the Alumni Council is the working body for the Association and more scattered General Executive Committee. The Executive Committee of the Council in turn is the group which functions between annual meetings of the Council and of the Association.

Beginning in September, 1929, regular quarterly meetings have been held, the last two in Boston. By vote of the Executive Committee a minimum of the procedure was followed.

There has been a hundred per cent attendance at all the meetings except the last, when one member was unavoidably kept away by business.

PRIZE SCHOLARSHIPS AT ROCHESTER

The Rochester prize scholarships of the Alumni Council, participation in the educational work, and the more scattered General Executive Association. The Executive Committee of the Council in turn is the group which functions between annual meetings of the Council and of the Association.

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New Professors on Faculty

Constantineple will lose one of its leading American educators, Prof. W. A. Manuel, who has been associated with the University of Colorado since 1915. He has held various positions and has been instrumental in the development of the College of Mines and Metallurgy. His contributions to the field of mining education have been significant, and his departure will be deeply felt by the students and faculty alike.

Miner’s Mother Visits School

A Mines母, Mrs. L. S. Austin, whose son, Arthur Austin, ’05, died in 1914, paid a visit to her boy’s alma mater. She is the widow of Prof. Austin, who was a charter member of the University of Colorado and played a significant role in the development of the college.

While her son attended school, Mrs. Austin made her home in Golden when houses were still rather scattered, and before the streets were paved. Guggenheim Hall had not then been built and the assay lab was just a row of shacks. She stated that her son was one of the delegates sent by President Alderson to receive the $50,000 check from the Guggenheims that meant the building of Guggenheim Hall. Other stories of hoth peaceful and turbulent times were recounted during her visit. The class pictures in Guggenheim were of special interest, Mrs. Austin stated, and the town village she had known years ago.

Dr. William A. Manuel, professor of chemistry at Ohio Wesleyan university, and a Mines graduate, has been invited by university authorities as new head of the department of chemistry.

Doctor Manuel was graduated from DePauw university in 1912 with the degree of bachelor of arts. He received an M.S. from the University of Illinois in 1916 and in 1928 was awarded the doctor of science degree from the University of Minnesota.

For August, 1929

Another veteran mining engineer passed away early in July, Victor G. hill, father-in-law of James L. Bruce. He died at his home on the Island of Cyprus after a brief illness.

Mr. Hill’s long and successful career was begun in Colorado. He was city engineer at Pueblo and Cripple Creek, and consulting engineer for Portland and Ajax and other mines at Cripple Creek. Besides his activities at those Colorado mining organizations, Mr. Hill was manager of the Scherlite Mines, Nova Scotia, and the Colorado Tompkins Corporation.

For four years he was engineer for the Cyprus Mines Corporation, copper mines on the Island of Cyprus. He was also president of a company he had brought to southern California.

Mr. Hill was a member of the American Institute of Mining Engineers, Canadian Mining Institute, Institute of Mining and Metallurgy, and a director of the Colorado Scientific Society.


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Dear Colhurn:—

In my last letter of February 1, 1930, I wrote you that I was on the verge of making the work sheet at the end of a fiscal period and that there were no lectures as a result. I believe that the last direct order was the one of September 1928.

My dear Mr. Colhurn:—

You will be interested to know that one of the best known and most experienced mining engineers, Mr. Karl Parrish, dropped out to the plant quite frequently.

My chief occupation since last November I have been attending the classes at the Chicago business college. The only thing I knew about the art of accounting was that there are no lectures. They sell you a text book and a book called The Work of the Banker and a text book and a book called The Work of the Banker's Assistant.

The unique thing about the course is that there are no lectures. They sell you a text book and a book called The Work of the Banker.

To make the trial balance sheet, you do our best to fill them in properly. I believe that the last direct order was the one of September 1928.

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Another interesting letter has been re-ceived from R. H. Horton, who is working for Compania Española de Mina del Rey in the Cordillera de Guataco, Peru. This trip, the mining of tungsten is quite compli-cated, but the company is making good. The com-pany is quite compli-cated, but the company is making good. The com-pany is quite compli-cated, but the company is making good. The com-pany is quite compli-cated, but the company is making good.
Basketball Rule Changes

Proposals to eliminate the center-jump in basketball were rejected by the joint rules committee which adopted a number of less drastic rule changes.

Despite this decision the committee recommended that experiments with the elimination of the jump at center be continued.

Rule changes, voted by the committee included:

1: A player fouled in the act of shooting, will be awarded only one free throw, if he makes the basket. In the event the fouled player misses, two foul throws will be awarded as in the past.

2: Falling to tie in the jump circle until the ball is tapped will constitute a technical foul, except when both teams are shifted to the opposite court after the jump.

3: On a jump ball the ball may be tapped not more than once by either player.

4: In ease of missed free throws the ball will remain in play instead of being returned to center.

5: When time is taken out for free throws, the watch shall be started when the ball leaves the thrower's hands, instead of when he has possession on the free-throw line.

6: A player removed for a subsitution may not return to the game until after the subsitution has been made on the free-throw line.

7: More than three overtime periods shall be played in a game, and a rest period of five minutes shall be allowed after the first overtime period. Local committees are given the authority to make the overtime period a "sudden death" test, with the first team to score winning the game.

8: The circumference of the ball shall not be more than 31 inches and not less than 28 inches. The weight maximum shall be 21 ounces and the minimum 20 ounces.

The committee went on record as favoring the three official plans when feasible.

The Lowdown Dryer

It will dry filtration concentrates at low cost, without clogging and with no dust loss. It is the standard machine in all modern lead and silver refining units and is used widely on various other sticky products not previously successfully dried mechanically.

The Skinner Roaster

An air-cooled, multiple-hearth roaster of acknowledged superiority both mechanically and metallurgically. Great freedom from interruptions even when run at high speed and very high temperature. For metallic casting, roasting and special calcining operations.

Colorado and Other Western Iron Works

Colorado Iron Works products are the result of wide experience accumulated during many years' solving of metallurgical and mechanical problems. They have long been the standard of mill and smelter men throughout the world. Some specialties of outstanding merit are mentioned below. May we send you samples fully describing them?

The Akins Classifier

Made in sizes large enough to handle the heaviest reconditioning loads in modern mill and rapid grinding, making close separation in such work also in grinding. Passed by operators because free from out-turning parts.

The Impact Screen

Many will never come into use, but the Impact Screen continues to show superiority on every point of comparison. Though already the best, it has recently been further improved. Large capacity—sharp separation—low upkeep.

Colorado Section

The July Meeting of the Colorado Section was held at the Auditorium Hotel on July 18. C. M. P. Adams, secretary, presiding. R. V. Kendall, Al S. Wyner of Ajo, Arizona, and George W. A. Wadsworth, Utah, were visitors from outside of Colorado.

Geoffrey Wiggan described the mineral deposits at Cerro Colorado, the Consolidated Chief Mining Co., in Bolivia and presented an interesting and well-conducted diagram.

Dean Menges spoke on the summer school activities. William Harris described an offer for leaving the School of Mines and affiliating himself with the Colorado University at Boulder. He tried very hard to convince the chapter that the fact Boulder is a Con­federational institution had nothing to do with his choice.


Student Editors Named

 Heads of the School of Mines publications for the coming year were named at a recent meeting of the school publication board. Ordinarily editor, Ralph Keeler; manager, Carl Dromen; Pro­pressor editor, Emil Holmberg; Donald Sullivan, manager. Both Keeler and Sullivan are seniors of Beta Theta Phi, and have noticed how it has been helpful to them in organizing and running their student publications.

Penn State's Plan

Reminiscent of the referendum on the National Student Federation of Pennsylvania at the recent convention at St. Louis, the student council at Penn State has unanimously agreed to plan solution of the Lein problem, the junior class assuming the responsibility for a competitive basis. Final decision was reached by a majority of the student body and members of that group were appointed as reward for political work.

Under the new plan all smokers who may wish to try out for the club. During the first semester of their junior year twelve of this group will be elected to the executive board. In May the new editors of the "Nittany Lion" will be named by the outgoing staff.

Since the days of wood engraving Kistler's has been the choice of the Mining Industry for printing Stock Certificates Booklets Circulars Office Forms and Letter Heads
Denver Equipment Designs New Type Machine

To meet the requirements of continuous flotation testing, the Denver Equipment Company has recently designed a radically different type of machine.

This flotation unit duplicates to the most minute detail the large size Denver "Sub-A" (Fahsewell) Flotation Machine. The all steel welded construction insures rigid design and occupies less floor space.

The machine shown here is a No. 5, being the smallest type of continuous flotation machine manufactured. Such a flotation unit makes it possible to perform small scale tests which are duplicated in field practice.
More Professional Cards

Professional Cards

A. E. Anderson, E.M. '04
Mining Engineer
826 Midland Savings Bldg.
Denver, Colo.

FRANK C. BOWMAN, '01
Mining & Metallurgical Engineer
1412 Franklin St., Apt. No. 4
Denver, Colorado

John Wellington Finch
Consulting Geologist and Engineer
408 Gilpin St.
Denver, Colo.

W. E. Burlingame, '01
Assisting in umpire and control work
522 Mack Bldg.
Denver, Colo.

C. A. Johnson Bldg.
Denver, Colo.

First National Bank Building, Denver

WRITE NOW to C. Lorimer Colburn, Secretary, Colo. School of Mines Alumni Ass'n.

E. I. DuPont de Nemours & Co., Inc.

Consulting Petroleum Engineer
A. E. ANDERSON, E.M. '04
BURLINGAME & PARKER

A. C. CARL

Refiner of Precious Metals
922 Midland Savings Bldg.
Denver, Colo.

EDWARD P. ARTHUR, '95
Mining Engineer
Cripple Creek, Colo.

MAX W. BALL
Consulting Petroleum Engineer
First National Bank Bldg.
Denver

Exchange National Bank Bldg., Tulsa

HENRY C. BERGER, '96
Mining Engineer
C. A. Johnson Bldg.
Denver, Colo.

Charles O. Pariter, '23
Denver, Colo.

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DENVER

MARSHALL D. DRAPER, E.M., '97
Mining and Metallurgical Engineer
431 So. Park Drive
Beverly Hills, Calif.

Donald Dreyfusoff, '12

The Dore Company
DENVER

Hey MINERS!

We've Started another page of Professional cards. How about yours?

WRITE NOW to C. Lorimer Colburn, Secretary, Colo. School of Mines Alumni Ass'n.

C. A. Johnson Bldg., 507 17th St., Denver, Colo.

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Golden, Colo.

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Mining Engineer
711 First National Bank Bldg.
Denver, Colo.

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