These new drills are made in three sizes. Descriptive bulletins will be sent on request.

Does Speed Mean Anything on Your Job?

The latest Ingersoll-Rand drifter drills are the fastest machines of their class and weight in the world today. In almost every test, they outdrill machines from 20 to 40 pounds heavier.

This combination of speed, lightweight, and durability—backed by Ingersoll-Rand service—produces results on any job.

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Does Speed Mean Anything on Your Job?

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AND KEEPING THE LEAD are the reasons for the success of the TRAYLOR ELECTRIC VIBRATING SCREEN.

This success is the result of many years experience, and today the Traylor Electric Vibrating Screen Stands as the Champion.

Our expert engineering service will be glad to sketch plans and make valuable suggestions on your particular screening problem. Write!

1400 Delgany Street The Traylor Vibrator Company Denver, Colo., U.S.A.

"$5,000 for the Plaintiff" THE JURY'S DECISION

A SMALL investment in STONEHOUSE SIGNS would have prevented the accident and saved the defendant $5,000 and an expensive damage suit. How about your Company? Are you giving them every possible protection against similar losses?

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You will find many suggestions you can use in our latest complete catalogue, profusely illustrated in colors. Write today for your copy.

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GARDNER-DENVER
Again they ordered Dorrco Filters!

PICTURED above are two of the three Dorrco Filters which were installed three years ago at a well-known mining property. The ore was hard to handle on filters and, at first, considerable trouble was encountered with filter operation.

Dorr engineers stuck on the job, and with the cooperation of the operating staff, the Filters were worked into smooth, satisfactory operation. In fact, when enlargements to the mill were started recently, two more Dorrco Filters were selected for the filtration work.

This convincing vote of confidence was based on two factors. First, the proven ability of the internal-drum Dorrco Filter; and second, the policy of the Dorr Company of standing behind every installation until all parties are satisfied.

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When Patronizing Advertisers Please Mention Colorado School of Mines Magazine
For 45 Years we have been designing, erecting and equipping Mills for the Middle West, Canada, and Mexico. Many carloads of Mining Machinery leave our shops each year, including Hoists, Timber Framers, Flotation Machines, Rod and Ball Mills, Jigs, Roasting Furnaces, etc.

Low-cost ore reduction!

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 choice of mill and smelter men throughout the world. Some specialties of outstanding merit are mentioned below. May we send you pamphlets fully describing them?

The Akins Classifier
Made in sizes large enough to handle the heaviest circulating loads in modern ball and rod mill grinding, making close separation in such work also in cyaniding. Favored by operators because free from reciprocating parts.

The Lowden Dryer
It will dry flotation concentrates at low cost, without clogging and without dust loss. It is the standard machine on this work and is widely used on various other sticky products not previously successfully dried mechanically.

The Impact Screen
Many mill screens come and go, 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.

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 metallurgical roasting, acid making and special calcining operations.

COLORADO IRON WORKS COMPANY
Established 1860
MAIN OFFICE AND WORKS, DENVER, COLORADO, U. S. A.
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This Little Tube Measures Stars
Centuries of Light Years Distant

By means of a new vacuum tube called a low-grid-current Pliotron tube, astronomers can gather the facts of stellar news with greater speed and accuracy. In conjunction with a photovoltaic tube, it will help render information on the amount of light radiation and position of stars centuries of light years away. It is further applicable to such laboratory uses as demand the most delicate measurement of electric current.

So sensitive is this tube, that it can measure 0.000,000,000,000,001 of an ampere, or, one-hundredth of a millionth of a billionth of an ampere. This amount of current, compared with that of a 50-watt incandescent lamp, is as two drops of water compared with the entire volume of water spilled over Niagara Falls in a year.

General Electric leadership in the development of vacuum tubes has largely been maintained by college-trained men, just as college-trained men are largely responsible for the impressive progress made by General Electric in other fields of research and engineering.

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

GENERAL ELECTRIC
When Purchasing Advertisers Please Mention Colorado School of Mines Magazine
A PPLICATION of Bettis Drill Stabilizers above the drill bit is fast becoming universal practice in rotary drilling fields. These Stabilizers, like their worthy companions, Bettis Protectors, are made entirely of specially compounded rubber—so tough in texture, so durable, that they are actually outsizing the drill pipe.

Bettis Drill Stabilizers cushion the drill pipe in open formation, eliminating in a large measure these factors of destruction that prematurely fatigue drill pipe. The Stabilizers, being lighter than the mud, will float to the surface and if by any chance they become lodged in the hole will cause no trouble because no metal is used. The tool joints will not wear out, because friction is not imposed greater than the area within the drill pipe. By keeping the pipe centred and in vertical position, straighter hole will be drilled, fatigue drill pipe, pipe in centre when fishing. No wall hook is needed. The overshot is eliminated. The collar will not corkscrew and fatigue.

In case of a cave-in the drill pipe and bit can be pulled through the Stabilizers. Being lighter than the mud, the Stabilizers will float to the surface and if by any chance they become lodged in the hole will cause no trouble because no metal is used.

The tool joints will not wear out, because friction is not imposed upon them.

The drill pipe will last much longer, due to reduction in vibration and fatigue. By keeping the pipe centred and in vertical position, straighter hole will be drilled.

Bettis Drill Stabilizers do not interfere with mud circulation because the open area on the outside for the return mud circulation is several times greater than the area within the drill pipe.

In case of a caving of the drill pipe and bit can be pulled through the Stabilizers. Being lighter than the mud, the Stabilizers will float to the surface and if by any chance they become lodged in the hole will cause no trouble because no metal is used. If mud in strawgum casing the Stabilizer will practically eliminate trouble from collapsing or a broken out.

Under ordinary conditions dropped drill pipe, equipped with Stabilizers, will float in the instance—avoiding serious trouble. There is no necessity in every rotary drilling well. Ask for Catalogue.
Silver

The price of silver has a direct influence on the production of gold, copper, lead and zinc. About 80 per cent of the silver produced in the United States is derived from gold or zinc ores or from complex ores, principally valuable for its gold, copper, lead and zinc. Low prices for silver, therefore, mean a fall in the price of all these metals, but also reflects upon the prosperity of other metal mines. The metal mining industry is concerned with what happens to silver.

On November 25, Senator Key Pittman of Nevada, speaking over the national broadcast, gave a splendid picture of the relations of silver on the present world-wide depression. Senator Pittman said: "The world is not suffering from overproduction but from underconsumption. The problem confronting the world today is not one looking to the reduction of production but to the restoration of the power for consumption. Business genius and government statesmanship should be earnestly and intensely directed to the encouragement of a return to normal consumption by the removal of all obstacles which have brought about depressed consumption in the United States and throughout the world."

"The Senator goes on further to show that there was never an overproduction of silver, but that the present oversupply was principally due to the action of the British Government in deciding to place India upon a basis of silver instead of gold. Taxation of silver both in India and the United States has been a most serious problem. The present condition is due to the fact that there is an agreement between the governments of the world as to the stabilization and use of silver for monetarial purposes."

When the dumping of silver is ceased, the Senator believes that the United States, Great Britain, France, Japan and other countries will now see the commercial benefits in China should tend to lead the national government of China financial and expert aid for the pacification of China and the revivification of that country.

Taxation

What do you know about taxation? Right now the economic side of the mineral industry in the forefront, in the border of silver, is at a period of depression. Not only in Colorado, but in other Western states, the mining industry must keep a keen and on the look out for the world market. Taxation of silver, however, is one of the big problems which each legislature will have to solve during the next few months.

The tax burden on real property has become virtually unbearable. Legislators are looking for new sources of revenue. The income tax, the sales tax, all suggestions are being considered for the general property tax. The mining industry, too, often immersed in technical problems, must see that its interests are safeguarded in the taxation rate. The Gold and Silver Bureau, in its one hundredth annual report, brings out the fact that the work of this Government Bureau is steadily enlarging and that the Survey has large tasks ahead.

Scientific investigation is a continuing work. Its field also expands, never contracts. The fiscal year 1930 is the first year of the appropriation in the work accomplished by the Survey. The personnel, of which more than ten per cent is professional, was larger than the appropriations for the year ended by 50 per cent of those in 1929. Including cooperation funds, the expenditures were double those of 1929.

In spite of all this enlargement and progress, the Geological Survey is woefully deficient in its ability to publish promptly the results of its work and investigations. The reason for this is partly due to the inadequacy of the printing appropriation. In 1930, the appropriation for printing and binding was $14,000, with an additional appropriation of $35,000 for engraving. For the fiscal year 1930, the printing appropriation was $50,000 of which not to exceed $15,000 could be spent for engraving. This shows a decrease in the appropriation for printing.

New demands are constantly being made on the Survey for more investigations with additional allowances for the publication of results. The dollar does not buy as much today as it did in 1910, and conditions are such that increased investigations the Survey has a good excuse for its inability to publish the results of its work promptly. There is no doubt about the great value to the country of the publications issued by the Geological Survey. The work of this scientific bureau should be made available to the public immediately after it is prepared. Scientific work loses much of its value if held up for several years in cold storage. Congress should increase the appropriations to the Geological Survey for editorial, mechanical, and printing purposes.

But the trouble does not lie wholly in the inadequate printing appropriation. There is much room for improvement in the Geological Survey itself. Too much time is spent in the time of the year that the masts and other equipment is brought to the ship and the ship is put into the water. Too many good geologists are being killed with administrative duties. Get busy, Geological Survey, clean up this mess, and we will go down the line for larger printing appropriations.

"..."

George Bernard Shaw, who isn't given to praising very many people, did a right-about-face recently and has praised the scientist, Einstein.

But first be "Shewed" Napoleon saying that it would have been much better for the world than the year he had built his empire, Einstein had created a universe, and he had made a real contribution to mankind.

Talks in School

"..." SOUND MOVIES, since their introduction into technical schools, have gone a long way in bringing theory and practice closer together. The golf between industry has been lamented by professional men for years. Research has proved that most of our knowledge is obtained through "seeing is believing." Second in importance in learning is hearing. A lesson combining the use of one-half of the brain, and in such a vivid and acceptable way as "talking pictures" are presented, should be invaluable in making even the most complicated lessons less difficult.

The printed page teaches well but indirect means, while "the talks" offer the direct services of the world's finest scientists and teachers.

Mines' Spirit

ACCOLOADS coins and pink teas have never been in style at Mines. Working clothes are the costume of the School. It may be that this disregard for the social side of life and concentration on the business at hand is one of the reasons for the famous "Mines' spirit." Anyway, here is what the Silver and Gold, Colorado University's newspaper, has to say about it:

"... Mines, with almost always a losing team, is certainly a school of loyalty, of indomitable spirit. Why? Because there is no tendency to substitute social life, no set of loaund louses. How great Colorado could be in a period of larger printing, she'd have to find a school of loyalty and support Colorado. Mines afford its losing team, if such spirit could be placed behind the winning State eleven.

On Giving

REPORTS from workers in a nearby community chest drive, reveal that those who are in a position of responsibility and earning power have gone a long way in giving to the fund. Many times in the past, when catastrophes have overtaken workings where they have been in charge, they have been relieved to know that an organization such as the Red Cross could be called upon to help. The Red Cross was founded in 1897, and is the result of the efforts of the Rev. John J. Kinzie, a Chicago, Ill., resident, who, in 1881, founded the American Red Cross Society.
The Fraternities have done their share to make the Campus beautiful.

This is the new A.T.O. house, looking across the stretch of lawn in front of Guggenheim Hall. The interior of this club house is no less beautiful.

Humanizing Trend in Mathematics

By J. G. Fitterer*

Recall that so many years ago—at least in the late Pleistocene—a movement to humanize or industrialize mathematics had a vague inception in scientific circles engaged in research and teaching. The accepted and time-honored development of the subject was logical and concise; a beautiful structure of thought and argument, worthy of the labors of the ancients who fashioned and shaped their concepts into objects of grace and intellectual appeal. All due praise to them for their efforts and contributions, without stint or cavil.

However, the modern world needs and demands something more. The machine-age incessantly calls for the annihilation of space, that is, for transportation in miniature time, the instantaneous transmission of information and news, and the prompt generation, conveyance and utilization of power anywhere and everywhere. Not only these, but in the building of vast centers of population and news, and the prompt generation, conveyance and utilization of power anywhere and everywhere. Not only these, but in the building of vast centers of population and news, and the prompt generation, conveyance and utilization of power anywhere and everywhere. Not only these, but in the building of vast centers of population and news, and the prompt generation, conveyance and utilization of power anywhere and everywhere. Not only these, but in the building of vast centers of population and news, and the prompt generation, conveyance and utilization of power anywhere and everywhere.

The question naturally arises; is mathematics amenable to a closer adaption and better application? may the gulf between theory and practice be spanned by a suitable bridge, or must this yawning chasm ever present its cavernous depths as an insurmountable barrier? This leads us to a short review of the main steps in a movement, or trend, to make formal analysis better understood and more useful.

The more practical courses, more useful and useful, America, still young and unjaded by centuries of conservatism, deserve at least some slight credit.

In 1824, the first distinctive college of engineering in the world was founded in Troy, N. Y., by Stephen Van Rensselaer—Rensselaer Polytechnic Institute—from which time engineering education, as such, under the influence of industrial growth has advanced by leaps and bounds, not only in the United States, but in Europe and the world over. In 1924 the centenary of this pioneer institution was duly celebrated and many of its early aims and vicissitudes consigned to the printed page for posterity.

Another landmark arises in the Morrill Land Grant Act, 1861, by which 10,000,000 acres of public land were set aside for the express purpose of scientific education in its broadest sense. With this step the modern movement was in full swing and the increasing growth of the annual student body presages a most magnificent future.

Soon thereafter: a different and better type of textbook made its appearance, and especially so in the field of mathematics, which constitutes our special theme. Not so much that there was less of Euclid, but more of DesCartes and Newton and Leibnitz, and the latter in working dress.

One of the first writers of books to respond to the modern call of the scientific workers was John Perry, who to contribute his part to the new era was inspired—inspired seems proper—to issue a "Calculus for Engineers", 1897.

*Professor of Mathematics, Colorado School of Mines.
Silvanus P. Thompson wrote a small book, and named it "Calculus Made Easy." One of his chief objects was evidently to remove the usual inferiority complex with which the student very often approaches this subject, and furthermore to point out simplicity and fundamental concepts of this most powerful method of analysis. Written in more or less of an inimitable spirit of joviality, it is vastly worth while the pleasant time spent in its perusal by anyone sufficiently interested. When we remember that he was one of the leading physicists of his generation—a giant among giants—his exquisite shafts of satire aimed at himself and others in his prologue to this little volume surely give us a better and more intimate insight into the true character of the man. We cannot forbear quoting it here:

Thompson's Prologue

"Considering how many fools can calculate, it is surprising that it should be thought either a difficult or a tedious task for any other fool to learn how to master the same tricks.

Some calculus-tricks are quite easy. Some are enormous-difficult. The fools who write the textbooks of advanced mathematics—and they are mostly clever fools—seldom take the trouble to show you how easy the easy calculations are. On the contrary, they seem to desire to impress you with their tremendous cleverness by going about it in the most difficult way.

Being myself a remarkably stupid fellow, I have had to unlearn myself the difficulties and now beg to present to my fellow fools the parts that are not hard. Master these thoroughly, and the rest will follow. What one fool can do, another can."

Alumnus Describes Interesting Features Encountered While On Foreign Duty in Russia

Editor's Note: Here are two interesting letters about the work going on in Russia, compiled by Dr. Ben F. Angus, '29, Angus is one of the many American engineers and mathematicians who have joined the U. S. S. R. for work on the so-called 'Epsilon' project. Letter is by W. E. H. Johnson.

I suppose by this time you are curiously engaged in getting the new "Washy" processed out. When the time of the year rolls around it makes me wish I was back in school once more.

So far, I have had a great trip and have seen many interesting things over here in the U. S. S. R. I stayed in Leningrad about four days and was and still am acquainted with the Caspian Sea for miles until we reached Bakau. From Bakau we came west again until we reached Tiflis, in the State of Georgia, about half way between the Caspian and the Black seas. Thence we came on south again to Armenia near the Persian border where I've been located.

In Leningrad, we visited many art galleries and museums including the famous Hermitage. I didn't have the occasion to invoke such somber effects in many minds? Perhaps more often than not because it is and remains a strange term for an unknown concept.

Richard C. F., Utah

A Relic of Other Days, This Arrastre on The Mines Campus

More factual tales and queer ideas have been associated with the arrastre on the Mines campus than with any other relic possessed by the School. Even the name is subject to contention, being spelled another way, (which is given preference in the dictionary) and arrastre.

Various editions have been associated with this crude drag-stone mill laid claim to a most interesting identity and an ancestry with a Spanish-Mexican flavor.

Dr. James Underhill, Director of the Experimental Mine, presented the arrastre to the School of Mines when it was retired from active duty at Dumont, Colorado, just west of Idaho Springs. A place was made for the old mining machine on the front lawn of Guggenheim, near the steps. There it has stayed, misunderstood and misrepresented, no longer a chalice for the shining metal—"but for rain and snow." But what bearing has all this in connection with mining engineering? To say the least, the mining engineer is a more or less of a cosmopolite among his professional colleagues, and by that we mean that every field of engineering contributes to his training and discipline and his clients and employers look to him for service in many and varied ways. And at the root of his training is found the basic subject of mathematics.

It is not a very difficult thing to get some idea of what there is in a Hanging Chain; etc. By Epsilon he may be a simple way of computing deflections of a Cable Span carrying Multiple Lines evenly spaced. Since Vol. 83, p. 1388, 1928.

The Arrastre, crude drag-stone mill, which stands on the Mines Campus as a monument to the early day miners.
During the past summer numerous changes have been made in the petrographic laboratories of the Colorado School of Mines. New sample cases and new equipment were necessary to meet the rapid growth of classes in petrology, optical mineralogy, and related subjects. The rooms have been rearranged to accommodate classes in freshman work and senior palaeontology. The west laboratory has been rearranged primarily for the courses named above in which the use of microscopes is essential. This laboratory is also used for advanced courses in map interpretation.

The accompanying sketch shows the arrangement of cases and tables in the new laboratories. The east laboratory has been the building of a low wall and balcony which completely encloses the space over the basement stairs. Cases, of the pigeon-hole type, have been built on the walls for filing oil well samples. It is possible to file about 20,000 to 45,000 samples, depending upon the type of sample contained in these cases.

About 4,000 well samples, given to the School of Mines by the Texas Production company last year, are now ready to be studied in the new cases. Additional samples will be received at various times from other companies, and it is hoped that eventually the School of Mines will become a depository for all well samples of rocks drilled in the Rocky Mountain States.

The new laboratories have been wired for any type of illumination necessary in microscopic work. Artificial illumination is usually necessary and the intensity of light can be obtained by use of daylight. With this new arrangement it is possible for twenty-four students to work without crowding and interfering with one another.

More Room for Petrology

By W. A. Walldschulte*
The Superintendent of Mining used to rave at the young "mill gang" and he'd often say (at least, once a day,) they're not worth rufe to hang.

One day I was called to his office, and this is what he said: "Your whole damn mill is upside down and re­

The conversion burner is used if one does not wish to install a new gas designed furnace in his home. The burner is a very easily installed but certain principles must be strictly adhered to if correct and efficient operation is to be ob­

Western Mining Journal, where you will have great need, to find the pH of the "overflow," when the ball-mill is charged with a

Experience is a teacher, and I believe it's true, for you lack the years of experience to know just what to do when the classifier bends a rake or the roll mill casts a shoe.

So I said to the Mining Super, "That's easy as 1-2-3, a Marcy mill or a broken flute are simple as A-B-C, but there are some things that are not so simple.

When the fine ore hangs in the feeder chutes and you sweat like a slobber steake while you poke and punch with a long bar, till you feel like a broken steave, the ball-mill run bowls low load for feed, and you mutter a heartfeet curse, while you hope and pray that the mill chokes up, or some thing even worse.

A kick-out in the power line is the worst of any ill, for it cannot be controlled by us and comes just when it will. The classifier rakes bed down when the cut off hits the line, so you rush and stomp on them up, but you never are in time. Then you tug and you pull on the driv ing chain but all without avail, so you drain the muck to the tailing race and then its exacerbated per inch that power is on again and you crawl out in the light to find that the thruth of the "cleaner cells" is clean down out of sight.

For the sake of the patient factor, I'd say it isn't bad, but you find six inches of settled muck on every inch of your canvas. The reason is obvious. Theoretical calculation of the damn things out, and just as you finish up the job, you hear a loud hoot; About The Forester tail gates stuck on account of the wood. After all, as the saying goes, "when the mahm darn floor is covered a foot with goo."

The resistance of several conductors connected in parallel is

The resistance of the circuit is defined as being directly proportional to the length, and inversely proportional to the area of cross section of the circuit.

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Arbenius noticed this difficulty by assuming that part, or all, of the up, or dissolved, in solution to form charged ions, or discrete particles displaying a net positive or negative charge. Thus, in aqueous solution,

NaCl=Na+ + Cl-; if the NaCl dissociated to the extent of x% then the concentration of Na+ would be x%, and of Cl- also x%, so that the total number of particles, both charged and neutral, would be 100-x%. The intensity of a given electrolyte was found to be a function of the extent of dissociation, of the temperature, and of the pressure. Since the first solution was known to be obviously due to the motion of the ions, under the potential gradient of the applied e.m.f. at the electrodes, it was thought that the equivalent conductivity should be a convenient and accurate measure of the degree of ionization. Instead of using specific conductances, the ratio of "equivalent conductivities" was employed. The equivalent conductivity was taken as the conductance of a volume of solution containing 1 gram-equivalent of NaCl (assuming Fa=96,500 coulombs). The negative electricity passing any cross section per second is the current, I. Hence, 

\[ U*=I/\text{cm. per sec} \]

where \( q \) is the charge, and \( E/1 \) in the potential gradient. The charge carried across every unit of cross section in a second by the cations is \( U^+ \), and for the anions is \( U^- \), where \( F \) stands for the Faraday=96,500 coulombs. But since, by definition, since 1 cm. of negative electricity passing any cross section per second is the current, I. Hence,

\[ I=F(U^++U^-)/A00; \]

and \( U^+=U^-=A00/F; \)

To arrive at the velocities of the single ions, finally, we make use of a quantity called the "transference number, or transport ratio of ions. The transference number of the cation is defined as

\[ n^+ = \frac{U^+}{U^+ + U^-} \]

and that of the anion as

\[ n^- = \frac{U^-}{U^+ + U^-} \]

Practically, these ratios are measured by observing the equivalents of cation and of anion transferred to, or from, the electrodes at a cell whose known quantity of electricity has been passed through. Then

\[ n^+ = \frac{U^+}{U^+ + U^-} \]

Equivalents of cation transferred to cathode

\[ n^- = \frac{U^-}{U^+ + U^-} \]

Total equivalents of ions transferred in both directions.

From this it is evident that the conductance of a cell is a definite quantity, known as the conductivity of a salt solution, for example, at increasingly higher temperatures and at one gram-equivalent of NaCl, per liter, then the concentration of NaCl is 1-normal, and that of Cl- must also be 1-normal. Moreover, very few electrolytes behave as though they were completely dissociated except at very high dilutions. Since the conductivity and, wholehearted participation of all the ions, however, this phenomenon is quite different in strong and weak electrolytes. Values derived on this assumption give reasonably precise results up to concentrations of about 0.1M. However, other methods were suggested for accounting for the lack of conductivity at higher concentrations, but none of them proved entirely satisfactory. Some characteristic values computed from conductivity ratios are given in the following table:

<table>
<thead>
<tr>
<th>Degree of Dissociation for Different Types of Salts*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Unit-bivalent</td>
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<td></td>
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<tr>
<td>Uni-bivalent</td>
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</tbody>
</table>

The conductance of all electrolytes tends to increase at first with rise of temperature; but as the temperature goes higher, this increase becomes less and less apparent, and at high temperatures, the conductances begin to decrease. This phenomenon is also found that the degree of dissociation decreased more or less steadily with increase in temperature. It was assumed, therefore, that the solution, in this case, is isothermal and that the degree of ionization is relatively related to the increase in fluidity of the water with rise of temperature; but that the ionization tends to decrease with increase in temperature, and that this change in counter-balanced the fluidity factor. Just why ionization should decrease with increase in temperature is a difficult question. However, the ionization is exothermic; from this fact and the Principle of Le Chatelier decrease in ionization might be expected with rise in temperature. Unequivocally, however, the degree of dissociation by the conductance method did not agree too well with similar data derived from measurements on boiling points. But if we consider the apparent, we find that the conductance method displays a certain definite limit, this electron pair may be regarded as the property of the anion alone. Then the positive ion, which is the cation, is held to the symmetrical union of M+ only by the fact that they are oppositely charged. When an electrolyte in one or another of the electric medium approximates to this condition it may be classified as a strong electrolyte.

If then we agree that a strong electrolyte is one which is completely polar, and that the ion be held to the symmetrical un-ionization by the law of electrolytic dissociation, here, we come to our conclusion, that the ions are fixed, or free, and the "spheres of mutual attraction" do not, even in the slightest degree, exist on account of this fact we are purely thermodynamic reasoning. For we can trace out and measure quantities in the system. The question of the mechanism by which the system is made to occupy a certain position is of great importance.

Here DU signifies an increase in total energy, and the rate may be made up of contributions due to the change in the system under its own surroundings. This is a functional function: the change in U between two states of the system and may be expressed by the following equation:

\[ \text{dU} = \text{dU}_{\text{me}} - \text{dU}_{\text{env}} \]

If the change in the system is brought about by some other means, according to how the change is carried out, the values of Q and W may vary greatly and are usually different at the beginning and final states of the system. Hence for a cyclical process, one in which the system returns to its initial state, dU=0. Then

\[ n = \frac{1}{1-n} \]

Similar reasoning would apply to the other phenomena mentioned.

While there can be little doubt that strong electrolytes behave as though they were completely dissociated, it is evident that this phenomenon is quite different in strong and weak electrolytes. For example, "If we have an uni-bivalent electrolyte whose cation is M+ and whose anion is X-, the molecule may be represented by the formula M2X, where the pairs of dots represent the valence electrons or the electrons of the outer shells. The pair lying between the atomic kernels of M and X constitutes the chemical bond. Weak electrolytes, like acetic acid, or mercurochloride, approach to this formal bond of organic chemistry, but as we pass to stronger electrolytes the kernel of the cation is progressively driven away, until, at this limiting product, the pair may be regarded as the property of the anion alone. Then the positive ion, which is the cation, is held to the symmetrical union of M+ only by the fact that they are oppositely charged. When an electrolyte in one or another of the electric medium approximates to this condition it may be classified as a strong electrolyte. If then we agree that a strong electrolyte is one which is completely polar, and that the ion be held to the symmetrical un-ionization by the law of electrolytic dissociation, here, we come to our conclusion, that the ions are fixed, or free, and the "spheres of mutual attraction" do not, even in the slightest degree, exist on account of this fact we are purely thermodynamic reasoning. For we can trace out and measure quantities in the system. The question of the mechanism by which the system is made to occupy a certain position is of great importance.
In particular, we may distinguish between the activity of a solution and the activity of the solvent. Furthermore, we may denote the activity of the solute by \( a_s \), and that of the anion by \( a^- \). Then the activity of the solute is \( a_s \), and that of the solvent is \( a^- \). Hence we may write for the dissociation of a binary electrolyte, such as NaCl,

\[
\ln f = k \frac{a_s}{a^-}
\]

and since at infinite dilution the concentration of the anion and cation are the same (in terms of molality), we have

\[
\ln f = \ln a_s
\]

to constant temperature. At infinite dilution we may then denote the activity of the salt in its dissociated form as \( K \), in turn, by assuming complete dissolution of the salt, becomes equal to the stoichiometric molarity of the solute. Since, however, we do not know how much about the degree of dissociation, we may choose as a standard state of the solute a condition such that \( K = 1 \). Then for a binary electrolyte,*

\[
a_s = a^- = a
\]

and since at infinite dilution the concentration of the anion and cation are the same (in terms of molality), we have

\[
\ln f = \ln a
\]

the work as which can be derived from an isothermal, irreversible process carried out upon or by a perfect gas.

To apply this to solutions, we may use a function called by Lewis and Randall the "activity coefficient," which may now turn out that fugacity has something to do with "escaping tendency;" and, in fact, the "activity of a solution" which in turn, by assuming complete dissolution of the salt, becomes equal to the stoichiometric molarity of the solute. Since, however, we do not know how much about the degree of dissociation, we may choose as a standard state of the solute a condition such that \( K = 1 \). Then for a binary electrolyte,*

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\]
Their villages are everywhere. They live under conditions that in this rugged inaccessible country—their country—and their method of living. No wonder that the war is such a vivid memory to the Spaniards; that they call it still "The Disaster"; and that actually starving them into submission. Up to that time he came to having his own way. The fall of Melilla before the assistance of the French and the introduction of aeroplanes would have written, very possibly, a different story.

The war or, as the Spanish still call it, "The Disaster", might well have ended very differently. A little luck on the other side and it "would have been too late for the events on that page of history. But Melilla held; the French left, half dead, to thirst, and burn, and die. These fifty survivors who are not of the fittest, of course, die very young. Many of the Moors speak Spanish very well—the women seldom. The boys are protected from all this suffering throughout their entire life. They are the chosen ones. They smile rather than cry of their own choice. Life has been much kinder to them. Even now they think builds more for the man than the woman. When they die they are placed in the ground without any casket or protection—they will go to a Heaven. But the women are carefully placed in a protective casket for they are doomed to nothing good in a hereafter—just death.

The Moors greet each other in a very picturesque way. The hand is extended as for our handshake, but actually only a touching of fingers occurs. The hand is then quickly raised to the mouth. Each other in such a formal way. And very seldom do they greet each other in this formal way. One of the most eerie sounds I have ever heard is the Moorish call to prayer. Generally this is heard at sun-down, but during the last few days of the yearly month-long fast of the Moors, during which twenty-eight days they eat nothing from sun-up to sun-down, and which is followed by three days of feasting, the priests call from the roof of their churches early in the morning hours. Each call is preceded by a peculiar high note which seems to be made without effort and which carries very clearly for great distances. Almost impossible to describe, its first bearing sends the cold chills chasing up and down one's spinal column. This ability to make the voice carry seems to be general among the Moors. Often you may see two of them standing a hundred to two hundred yards apart quiet.

Moorish Life and Customs in Morocco

By J. A. Riley, '23

A LITTLE south of Melilla are the two small Moorish towns of Nador ("Lookout" or "Watchtower") and Segangan. Dry, squad little places, unserviceable in the extreme. Nador and Segangan are each new centers of activity and barracks for the Spanish-trained Moorish army. Nador is remembered by the Spaniards as one of the last strongholds against the Moors during their war just before the blackest part of it for them when all that remained in Spanish hands was Melilla. Still standing are the ruins of a two story house in which some fifty Spanish took refuge and elected to fight it out to a finish rather than surrender. Surrender meant death of a kind too horrible to mention. Rather death by Moorish bullets than Moorish torture. To surrender meant to both men and women a slow, cruel death. To surrender meant to both men and women a slow, cruel death.

The war, as the Spanish still call it, "The Disaster," might well have ended very differently. A little luck on the other side and it would have been too late for the events that turned the tide. Few who read in the American papers the activities of Abdul Kemal realize how close he came to carrying his own way. The fall of Melilla before the assistance of the French and the introduction of aeroplanes would have written, very possibly, a different story on that page of history. But Melilla held; the French came in at the right time; and the aeroplanes did the big part in setting fire to the crops and homes of the Moors—actually starving them into submission. Up to that time the Spanish were whipped and badly whipped and it is little wonder that the war was such a vivid memory to the Spaniards; that they call it still "The Disaster"; and that now they bear with pains that the Moors shall not come into possession of arms. And less does one wonder that the Moors were so bold to subdue once you have seen the countryside and their method of living. They are everywhere in this rugged inaccessible country. Their villages are everywhere. They live under conditions and with food that other peoples would find impossible to endure. Lack of transportation facilities make it almost impossible to follow an invading army with food and necessities. To subdue the Moors is a gigantic task of which it is very doubtful that Spain alone is capable.

The boys are protected from all this suffering throughout their entire life. They are the chosen ones. They smile rather than cry of their own choice. Life has been much kinder to them. Even now they think builds more for the man than the woman.

The boys are protected from all this suffering throughout their entire life. They are the chosen ones. They smile rather than cry of their own choice. Life has been much kinder to them. Even as limited as it is possible for him to make it. Attempts to converse with the women have often disclosed that they speak no Spanish and, upon questioning the man of the house, he will usually say, "But they (the women) are not for social usage—their place is in the house and the field—they are for work." And this actually is their life.
The nation are very picturesque, and inside present a paradox of thrift and cleanliness. The villages spring up out of nowhere, on flat or rolling land.

But the rooms leading off from this patio are kept quite spotless, particularly in the southern part. The home has not developed chiefly because the Moor is primarily a wanderer. His "chilaba," the robe the men wear, is his home. He sleeps outdoors, he is content to curl up in this very open space, the same room in which he spent the day. Somehow he has a share of contentment and peace with a big task in their attempt to help them and still not neglect the earth's neglected millions, merely passing the three score and ten in these things which we consider so essential to happiness, in the measure of our Occidental eyes, meanwhile keeping all these things worth while that life offers. Certainly, one cannot help but feel that he is getting something we are missing.

In the new Alumina Directory which came out in September contains the names of many interesting people. It is surprising to note a college school of Mines graduates over the United States. Colorado has the most of the alumni with a total of 350; California has 200 graduates; Texas is next with 150; and the last of the five leading states with 59 Alumni. There are at the present time 141 names of graduates who address cannot be found.

The "low" marked by O is in Cambrian and Lower Ordovician rocks which corresponds to a large area on the southern peninsula of Michigan. The "high" base south of this, marked by T A, is in upper Paleozoic rocks which also corresponds with observations in Michigan southern and southeastern part of the state. The "low" area is in upper Paleozoic and Ordovician areas. Some of the latter are made of as many as fifty to five thousand stones is made to surround the spot. These are stood on stone with flat roofs of what form a repeating cross, the perpendicular bars of which apparently gives rise to some local anomalies which are undoubtedly due to local polarity. A close examination of the isometric map shows that the northeastern part of the earth's magnetic field permeates everything, but this is indeed the best picture of the earth's magnetic field that is not ours. One cannot help but feel that he is getting something we are missing.

The Alumni Association has about 141 names of graduates who address cannot be found. The Alumni Association has about 141 names of graduates which apparently gives rise to some local anomalies which are undoubtedly due to local polarity. A close examination of the isometric map shows that the northeastern part of the earth's magnetic field permeates everything, but this is indeed the best picture of the earth's magnetic field that is not ours. One cannot help but feel that he is getting something we are missing.
The extreme "high" in the southern part is due to only two stations and has no structural significance. The general map shows a "high" which is not well outlined. The Porcupine Dome and Baker Glendive anticline are both in "high" areas but of a different kind, while the "high" areas they are one of which is not well outlined. The Baker Glendive anticline is a ridge between the Mouse Jaw Synclinorium and the Sweetgrass anticline shown on the geologic map, which is pronounced "high" for which no cause can be found on the geologic map. North of the uplift the Missouri area appears as a "low" while west of the uplift the Missouri area is very high. Although the anticline is not well outlined, the "high", "low", and "neutral" areas are distinctly shown. The general map shows the Dakota anticline also as a "low" appearing as a "low" in the northeast and southwest, which corresponds to an area of Paleozoic rocks. It may represent the type of rock from that found in the surrounding region. A "low" in the northwestern part corresponds with the Douglas uplift. This is due to the fact that the formation is magnetically negative, or to local structure. On account of the unexplained features mentioned in the Missouri and Lower Paleozoic areas, the interpretation of this state is not as satisfactory as that of others. In general, although, it appears as if magnetometer work in the northern and western parts would be successful. Glacial drift is reported as far south as the center of the state, and it is possible that some of the anomalies show this magnetic effect, which is caused by the drift. For a more complete account of magnetic effects in glacial areas the reader is referred to a separate report. 

Montana* 

The relatively few stations available in a state as large as Montana naturally permits only a general view of the magnetic structure, plus a few relatively local structures. Even then it is remarkable how much of the subsequent discussion is based on a careful study of the isonormal map. In the western part of the state the Rocky Mountains appear as a "low" which corresponds with similar effects in states to the south. It is probably due to the location of stations in valleys. In the northwestern part the "high" goes northward about three fourths the width of the state, then turns northwest at the southern boundary and one at the southern. A syncline, which, starting near the center of the southern boundary goes northward about three fourths the width of the state, then turns northwest at the southern boundary, and one at the southern. Another "high", which also agrees with the Colorado type. The geologic map shows the eastern part of the state as "high", while the western part also with "low" areas. The "high" region may be due to one station only, it cannot be said to represent structure even though it may actually do so.

New Mexico* 

The chief features of interest in the interpretation of this state are the "high" in the northeastern part, which covers the western half of the state, and the other which is found in the northeast corner. These outline areas in the northeastern part are due to the magnetic effect of the numerous widely scattered stations or else to ones located under different geologic conditions so that their significance is not clear. There are two oil areas in this state, one in the northeast corner and the other in the southeast corner. The southwest corner is shown as a "low" but this anomalous line is due to three stations near Artesia in Eddy county, and one in the Patagonia uplift of Eddy county which does not represent local structure but there is no data for Luna county. In the northwest corner the "high" is from a station at Shiprock. It is due to one station only, it cannot be said to represent structure even though it may actually do so.

New York* 

In the northeastern part of the state in the Adirondack Mountains is a large area of Precambrian rocks surrounded by which are rocks of Silurian age. The Medina (Silurian) formation is found in the eastern part of the state, and from here the formations appear to dip to the south half of the area. The geologic map shows a synclinal structure (Ordovician-Silurian Plateau) extending from north to south an east of Lake Ontario and between it and the Adirondacks. Along the Hudson the rocks are chiefly Silurian with some Triassic appearing at the southern boundary. Long Island formations are chiefly of Cretaceous and Tertiary age. In New York the "highs" show their true magnetic character. The Precambrian region of the Adirondacks is predominately low, this effect being probably due to the bodies of rocks in the state. The area along the south shore of Lake Ontario is "low" but this changes to the "high" in the Adirondack plateau. In this area the formations appear to be due to either sedimentary rocks or volcanic rocks. In New York the "low" area extends from the south shore of Lake Ontario and follows the formations which are dominantly composed of Cretaceous and Tertiary sediments. The "high" also agrees with the Colorado type. There is no "low" where the earlier formations again appear. This "low" area extends about 1/2 the length of the state, and follows the formations which are dominantly composed of Cretaceous and Tertiary sediments. The "high" also agrees with the Colorado type. The "low" area extends about 1/2 the length of the state, and follows the formations which are dominantly composed of Cretaceous and Tertiary sediments. The "high" also agrees with the Colorado type. The "low" area extends about 1/2 the length of the state, and follows the formations which are dominantly composed of Cretaceous and Tertiary sediments. The "high" also agrees with the Colorado type.
The second western third of North Dakota consists chiefly of igneous and highly metamorphosed rocks whose general strike is northeast-southwest. The eastern third, which is made up of sediments which range in age from Cretaceous to Recent, dip to the east or southeast.

The northern part of Ohio was covered by the glacier in Pleistocene times and this area suffered more than any other part of the glaciated area of the United States, excepting perhaps for the northern Ohio area due to glacier ice from the ice sheet which covered the area. The southern boundary of the ice sheet extended from a point near the Kentucky line in the southwest to the Ohio River in the north. The area to the southeast of this boundary was covered by the ice sheet as far as the Ohio River.

The northern part of Ohio is shown as a "low" in the isonomalics map, which is a continuation of Pre-Cambrian ("Laurentian") rocks. The southern part of Ohio is shown as a "high" in the isonomalics map, which is a continuation of the geological structure of the Michigan Basin. This relationship is more clearly shown if one superimposes the isonomalics map on the geologic map of the United States Geological Survey in Figure 7.

According to the government scientists, there are no structural features of significance on the surface. The only structural feature shown on the surface map is a syncline which is a continuation of the one in South Dakota. It passes north and southwest into the northern part of the state. Four minor synclines were also shown on the map. These synclines do not seem to be located in the central part of the state. They are situated high up on the flanks of the depression.

The northern part of Ohio which is a continuation of the isonomalics map shows a line of "highs" in this area adjacent to the igneous and metamorphic rocks, and a line of "lows" along the coast. This apparently indicates the regional dip of the strata according to the Florida type. There are three minor exceptions to the regional structure as stated above. These are, first, a "low" marked by the O of Ohio which extends from the state of Indiana into Kentucky, and second, a "high" that reaches the coast in the southeast part caused by two stations. Third, a small "high" in the eastern part due to one station.

The anomalies in the isonomalics map seem to be caused by local effects in the glacial till rather than by regional structure. Since these irregularities do not seem to occur in other states, they may be due to the method of drawing the isonomalics as there are so few stations that the latter situation does not seem to be true.

According to Huntley's map a syncline enters the state from Ohio, westward through the first O of Ohio into Kentucky is the most important. This syncline seems to be a part of the Cincinnati Arch, the Parkersburg Syncline and the Cambridge anticline. Of these three, the Cincinnati Arch seems to be the most important. It is shown as a "high" that reaches the coast in the southeast part of the state. It is shown as a "low" that extends from the state of Indiana into Kentucky. This syncline is shown as a "high" that reaches the coast in the southeast part caused by two stations. Third, a small "high" in the eastern part due to one station.

The Journal, Engineers of Australia: Sir,

For the past eighteen months I have had the pleasure of acting as the Melbourne Division Correspondent of The Journal.

During that time I have had the opportunity of hearing a large portion of the papers read before the Institution. Most of them were of a high order and were excellently presented.

I would like to add that the presentation of the papers was far too long. Their method of presentation is far too long.

The Ministry of Education in the United Kingdom has been able to provide financial aid to the arts and humanities, but it has not been able to provide financial aid to the sciences. This has led to a situation where the arts and humanities are able to attract more funding than the sciences.

The structure of the geological map of North Dakota is shown by the line of "highs" and "lows" which is a continuation of the geological structure of the Michigan Basin. This relationship is more clearly shown if one superimposes the geological map on the isonomalics map. The northern boundary of the isonomalics map shows a line of "highs" in this area adjacent to the igneous and metamorphic rocks, and a line of "lows" along the coast. This apparently indicates the regional dip of the strata according to the Florida type. There are three minor exceptions to the regional structure as stated above. These are, first, a "low" marked by the O of Ohio which extends from the state of Indiana into Kentucky, and second, a "high" that reaches the coast in the southeast part caused by two stations. Third, a small "high" in the eastern part due to one station.

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Interesting Features—Russia

(The above page 12)

from all parts of the U. S. S. R. Also, I saw a drill core one day to see it and couldn't do it justice. We had only a few hours there, but the core is tremendous, over 100 feet long. It was brought to my attention by a Russian professor and interpreter here in this camp. This is a section of the Caucasus, and many of the geophysical phenomena are evident here.

The region of the Caucasus is entirely volcanic and many good examples of hexagonal basaltic parting are evident here. Many of the students will get a chance to see Mount Ararat, and see where Noah landed the Ark.

Well, Prof., I'm about out of news, so better ring off. Would appreciate hearing from you, if you have the time, as it is a bit lonesome here at times.

With love and Mrs. Johnson, and also the other members of the department, I am,

LETTER TO DIAN MORGAN

I've traveled a lot since leaving Golden and as we are finished with this job now, we will be back on the road once more. I was fortunate to get a trip to Leningrad and there visited the geophysical and the geotechnical institutes and also one of their universities. These all proved very interesting as now I have a much better idea of the educational situation in this country.

It is not an easy matter to gain admission to a university or "high school" as it is called here, and not everyone is allowed the privilege. This is said to be the main cause of the union, or the case in the States. However, children are compelled to go to school, but to a university it is different. Their studies are very similar to ours in most respects. However, a student must go each summer to work at his particular job or profession whether mining, metallurgy, geology or whatever it may be.

A student must have his papers in order to go to college. The system here is much the same as we find in the desert in Arizona. The method of instruction is different, as it is a bit lonesome here at times.

We are treated with utmost courtesy everywhere, and they do not miss more than 15 minutes of play, although the first period on straight football, Deardorff was outstanding in the defense. Eads and Bond were Mines' opponents, while Montana was outstanding in the defense. The Miners again played excellent defensive football, with Pressett and Fallis getting the credit for this.

The Thanksgiving Day game was the last college coming for the minority of the Class of '21 will play. Graduation this spring will eliminate the Oredigger football team.

The Thanksgiving Day game was played between Mines and Colorado College, which was won by the former by a score of 17 to 0. The Miners again played excellent defensive football, with Pressett and Fallis getting the credit for this.

Let's see, didn't we hear something not long ago about Colorado Aggies having too much class for the rest of the Mountain football team? What has become of Harry Hugger plan for Big Six?

Fourteen Miners Play Last College Game

The Thanksgiving Day game was the last college coming for the minority of the Class of '21 will play. Graduation this spring will eliminate the Oredigger football team.

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November Meeting of the Colorado Section of the Colorado School of Mines Alumni Association

The November meeting of the Colorado Section of the Alumni Association was held at the Alumni rooms of the Mines Hotel on Saturday, November 23rd, at 12:31 P. M. In attendance were 95 men and 2 women.

The meeting was opened by the hostess, Mrs. Q. L. M. D. He Ilf, who spoke briefly in appreciation of two things: First, the attendance, which was so small, and second, the attendance in November, which was so large.

The meeting was then called to order by the host, Prof. P. A. C. B. D. Proctor, who introduced the following officers: President, Prof. P. A. C. B. D. Proctor; Vice-President, Prof. P. A. C. B. D. Proctor; Secretary, Prof. P. A. C. B. D. Proctor; Treasurer, Prof. P. A. C. B. D. Proctor; and Recording Secretary, Prof. P. A. C. B. D. Proctor.

The minutes of the last meeting were read and approved.

The financial report was presented by Prof. P. A. C. B. D. Proctor, who stated that the association had a balance of $5,000.00 in the bank.

The program for the evening was announced by Prof. P. A. C. B. D. Proctor, who stated that it would consist of a report on the recent trip to the mining district of New Guinea, by Prof. P. A. C. B. D. Proctor; a report on the recent trip to the mining district of South Africa, by Prof. P. A. C. B. D. Proctor; and a report on the recent trip to the mining district of Central America, by Prof. P. A. C. B. D. Proctor.

The meeting adjourned at 5:00 P. M.

Sincerely,

Prof. P. A. C. B. D. Proctor

M. F. B. J. S. Johnson, Dean, Colorado School of Mines.
My dear Colburn:

This month’s issue of the Magazine but I will discuss the different business propositions of the various fraternities, and H. W. “Pop” Haight and K. Arate letter. L. C. Broun, and Santiago Urtega “Jimmy”, T. J. Skea “Prexy”, G. P. Robinson, “Robbie”, U. H. Berthier “ICiller”, G. F. “Buck” Gonzalez was unable to attend due to “most royal chariots were stuck in the mud was out of time. I think he will be “going wrong” like month at Cerralvo, Nuevo Leon, where coming seance to be held sometime next included. (These guys down here are sure a fine cinegetic get-together could take been raining for about six months. I stead of plain, common “chicken-a la-(That means nowhere in Spanish). L. metal prices. Ben Arkin, representative guess it just don’t know how to quit now. tral America, dropped in about two Tommy is showing the boys how to put everyone.

Great Lakes Section

Great Lakes Section held its first meeting of the season. Thirty present were Lyne 66, Mercer 10, Holmes 24, Solon 15, Peace 72, Miller 22, Fink 46, Swift 23, McCartney 2, waterfall 2, from Milwaukee Alumni Co, Onyx 4, Cadena 27, Bond 22, and Clark 18; we also had a visitor from Mexico. Each man gave a short talk of his particular work, and many old friends were again renewed.

Houston Section

The regular monthly luncheon of the Houston section was held at the Kissel on November 1st. The following were present: Albert G. Wolf, A. L. Leichter, Chas. E. Stewart, Geo. Lemaire, Tom Pulver, R. K. Tracy, Gene Lemaire gave a very interesting talk on petroleum refining which was followed by a general discussion. There has been a second topic which has taken him back on the Houston Meetings and it would planned to continue with these talks since interesting information is being thrown by everyone.

New York Section


Following the dinner President Wolf gave a very interesting talk of the minutes of the meeting. The reading of the minutes of the previous meeting included an explanation of a great deal of the Alumni Association, and amounted to not one of the three to draft a constitution. His every thought was for the interest of the Alumni section, and that its graduates be worthy and future.

A greetings from the New York section was read by the Secretary, and the President attended the meeting of the Alumni Association of the University of Chicago to draft a constitution and its graduates that be worthy and future.

Alumni Letters

Dear Colburn—

Retaining from my Western trip some little time ago, I found ourselves in the Washington, D. C., most wonderful trip—Dr. Chauvenet’s Chemical Arithmetic which he reviews the subject that he so excellently taught us in our school days and his Stoichiometry. The very name Stoichiometry is, in reality, a pronoun to show that we have had a deep feeling of respect and gratitude, our Dear Professor. “Tis true that many of us caused him much worry and tried his patience at times with our boyish results, but, nevertheless, when we sat in his chemistry or stoichiometry classes, we were amazed and amazed at his proficiency, his intense interest in us and his irresistible desire to impart knowledge to us. With infinite pains, he would endeavor to answer a question to be sure that we understood and thus evidence his great interest in us.

Looking back over the gulf of more than 35 years, I realize more fully than ever his goodness and greatness in passing so lightly the many pranks perpetrated, many of which he must have known were mine or planned by me. Because of his wonderful sense of humor, he was easy of forgiveness. He never held grudges nor was the talk of our class during the close of the senior year when I called him to talk over the formation of the Alumni Association, and appointed as one of the three to draft a constitution. His every thought was for the interest of the Alumni section, and that its graduates be worthy and future.

After graduation I was sent to South Africa for a number of years and what a pleasure it was on returning to spend a number of delightful evenings at his home and in company with him on our Dear Wife, companion and helpmate. After various other trips I would forward to my return and a renewal of those delightful evenings at his home. It was a joy to sit up in the Houston Meetings and it would planned to continue with these talks since interesting information is being thrown by everyone.

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Prominent Alumni Sign Register

Among the prominent alumni and friends of the Alumni who have signed their names appear on the Alumni Register are:

William H. Smiley, for seven years a member of the Board of Trustees and a bachelor of science degree in 1899 from Colorado School of Mines.

M. F. Coupland, Miner '76, from the University of Texas.

George A. Parks, '96, Governor of Alaska.

W. D. W. Baldwin, '79, now engages in the oil business at Oklahoma City, Oklahoma.

The Association of Colorado School of Mines and the Empire Oil Company have commissioned Mr. Morgan to execute the work of the Empire Oil Company in the Rocky Mountain states.

In the early part of November, Mr. Morgan was in Denver and lived at 1322 Madison Street.

Edward S. Sackett, 2234 Wheeler Street, Denver, Colorado, is with the Empire Oil Company.

For invitations for the big day.

To Mines football team twenty years, was elected to the house of representatives from Jefferson county.

That he could have acted for me in Helper.

It has always struck me that it has been taken down. It started to Price, and much to my surprise I met some acquaintance of his who said that he had not known his secret.

That he would have made a better job of it, and saved all the walking, but that I return to Price, and much to my surprise I met some acquaintance of his who said that he had not known his secret.

To rent the home in Lynchburg, Virginia, where he is with the company.

Since leaving school, McLaren has worked for the Empire Oil Company in the Rocky Mountain states.

Robert L. McLaren, '28, with the American Petroleum Institute which was held in Chicago, November 11 to 13.

Edward S. Sackett, 2234 Wheeler Street, Denver, Colorado, is with the Empire Oil Company.

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4. Micrometer adjustment gives exact amount required.
5. Adjustable trough regulates the feed of the reagents from 1 to 10 cups per revolution as desired.
6. Revolutions of drum are easily controlled.

Write Today for Bulletin 2902-C

The C. S. M. Magazine

Goodman Acquires New Company

Mr. Eugene McAuliffe, President, announces the sale of the Rock Springs Loader Company, including the rights to manufacture and sell the well known Universal Shaker Loader, or "Duckbill," and the "MacHatson" conveyor trough fastener to the Goodman Manufacturing Company of Chicago.

Requests for information regarding these valuable adjuncts to shaker conveyor equipment should be directed to the new owners.

ALUMNI

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**Believe It or Not**

Division of time is a problem, And yet it's a cold-blooded fact
That time is not used to advantage—
As shown by the way people act.

Just think of the plight of some people
Who worry and fret all day long,
Advising their neighbors and kin-folk
And telling what's right and what's wrong.

This fretting just keeps one awake nights,
Deprives one of long needed rest—
So—follow the plan that is given,
You'll find that it's really the best.

Use eight hours minding your business,
Use eight leaving others alone;
Use eight for refreshing your body
With undisturbed sleep in your home.

Just practice this for a short period,
Then make it a habit intact.
So, doing this, you'll live a life-time,
Believe it or not—it's a fact.

Father: My boy, I hear that you've been smoking. How about it?
Son: Er, ah—yes, Dad.
Father: Well, would you mind smoking El Fumos and give me the coupons? I'm saving up for a smoking stand, and I need help—Missouri Oatmeal.

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**The C. S. M. Magazine**
Bicycle Spoke Sheaves
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James C. Roberts, Ex-Faculty Member, Dies Suddenly
James C. Roberts, three times a member of the faculty of the Colorado School of Mines, died at his home in Golden November 25, after being ill with pneumonia only four days. He was a native of West Virginia, where his mining training and at the time of his death was secretary of the Denver Safety Council.

Jim Roberts was born in Newbern, N. C., 63 years ago. He was graduated from the University of North Carolina and did graduate work at Columbia.

He first came to Golden in 1898, as professor of metalurgy and assaying. He left in 1900 and returned in 1915 in professor of safety engineering and mining until 1920. In 1922-23 he served the school as field secretary.

He served the old Globe smelter in Denver as chief assayer and was chief metallurgist for the Anaconda Copper company. Here, his hobby, welding, was cutting and sawing work. For a long period he was head of rescue work for the United States Bureau of Mines in the Rocky Mountain region. Exposure at the time of the fatal Lode town mine disaster, when he was constantly on duty for almost two weeks, weakened his health. For the past three years he had been a semi-invalid but never once did he complain not allowing it to take much away from his duties with the Denver Safety Council.

Mr. Roberts was president of the Colorado Chapter of the American Institute of Mining Engineers and a member of a number of other scientific societies. He was a Mason and a member of the Alpha Tau Omega fraternity. He was the founder of the Golden Kiwanis club and served the organization for eight years as secretary. He was particularly interested in music. For many years he was a vestryman of Calvary Episcopal church, Golden.

He was buried in Golden, November 29. The Golden Masonic Lodge was in charge of the service at the graveside. He is survived by his widow and one daughter, Miss Alice Roberts of Boston.

Geophysical Seminar
Only seniors and graduate students may enroll for the seminar in the geophysical department by which international literature pertaining to the new science, and discussions on original research, are made.

Students have made reports on the following topics:

"The Effect of Pressure on the Elasticity of Sedimentary Rocks" by J. P. Riggs.
"The Hotchkiss Superdip."" by C. D. Barton.
"A discussion of three papers by N. H. Stearn, two of which were on the Hotchkiss Superdip and the third on depth finding in magnetic trisecting.."
"Two papers by R. Sundberg and W. P. Jenny on electrical prospecting for oil are reviewed.
"Electrical survey of salt flat fields," a paper by H. Pedstrom, and "Geoelectric investigations of non-conductors," by N. Gella were also presented.

A seminar offers unexcelled opportunities for open forum discussions and contact with the latest developments in geophysics.

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DYNAMITE clears the way for modern engineering wonders.
Walker Mining Company Uses Marcy Ball Mills

BACK in 1917 this company bought their first Marcy Ball Mill which they found to be so satisfactory and economical that they placed an order in 1918 for an identical mill. These two mills served them well until 1923 when they wished to increase their grinding capacity. These two small mills were transferred to another property and they installed three large No. 75 Marcy Ball Mills. In 1929 this company added a still larger Marcy Ball Mill, a No. 77, to the battery of three No. 75's. These four mills, electrically operated, are grinding a hard and tough ore and reducing it to flotation feed in “one easy step.”

Repeat orders speak louder than any other advertisement, for they spell satisfied customers. These Marcy Ball Mills are operating in an almost inaccessible mountain fastness, nine miles from Spring Garden, California. In a place like this, stability and durability of a mill mean everything.

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Thus, explosives release the materials which are transformed to living steel—one of the almost limitless ways in which explosives are contributing to the advance of our civilization. In these achievements, Hercules explosives are playing an important part.

As an engineer, you should know more about explosives. Write for a sample copy of The Explosives Engineer, a monthly magazine which records the growing use of explosives in modern civilization.

HERCULES POWDER COMPANY

931 KING STREET
WILMINGTON, DEL.

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