The
COLORADO SCHOOL OF MINES
MAGAZINE

The New Ore Dressing and Metallurgical Experimental Plant of The Colorado School of Mines.*

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The need of working laboratories in metallurgy and ore dressing for schools of mines is generally conceded. As to just what the scope of such laboratories shall be, however, the agreement is not unanimous.

At some schools it is held that the small laboratory, where the gram, ounce or pound is the unit of weight to be operated upon, serves the entire purpose of school instruction, and that principles can be as fully appreciated by well conducted small scale operations as by those conducted upon a working scale.

At other institutions the tendency is in the extremely opposite direction, and commercial scale machines are believed to be the only ones that will serve the purpose.

It may, perhaps, be well to add here that location has much to do with these views, the former opinions generally being held where the laboratory is distant from the ore supply, while the latter is held by the instructors who are able easily to obtain desirable ore in carload lots.

At one well known school the scale for working operations is a matter of departmental opinion only; one department operating on a small laboratory scale, while the other operates on a much larger scale, using many commercial size machines, and adopting that size even though remote from a source of ore supply.

In general it may be said that ore dressing operations are far more flexible than metallurgical, and make possible a commercial scale treatment under conditions approachable in mining schools. This is largely because of the fact that in ore dressing it is possible to work on short shifts because the various machines soon reach conditions of normal running and quickly respond to variations of adjustment, and further, the material undergoing concentration does not lose its identity, and, except for reduction in size, may be restored to its initial condition by careful mixing, when it is ready for another cycle.

On the other hand, the commercial unit of most metallurgical devices is so large, their capacity so great, and the time required to reach a normal condition of operation so long, that aside from other objections, a commercial size machine is almost prohibited. These objections apply especially to furnace operations, but in many other metallurgical operations they are important factors. At the same time, as shown by successful operation in several schools, much valuable experience can be gained by the running of relatively small furnace units. At the Colorado School of Mines, a few years ago, in connection with their thesis work, a small group of seniors made a number of successful matte runs in an eight-inch blast furnace, gaining experience and confidence of great value to them.

Small scale laboratory operations are invaluable and cannot be dispensed with, but wherever possible it seems highly desirable, also to operate on the larger scale.

When the present administration of the Colorado School of Mines took hold of affairs seven years ago the equipment for ore dressing and metallurgical work was extremely meagre, and it became necessary to take steps to improve this condition. Carefully organized inspection trips were instituted, and the especially favorable location of the school with reference to successful operating plants, was made use of to the fullest extent possible. The small scale apparatus was added to, and a course of ore dressing and metallurgical experimentation mapped out.

This was good as far as it went, but still there was something lacking. This want

*From the Western Chemist and Metallurgist, October, 1909, with alterations in the plans since that time.

was partially supplied by the use of a commercial ore-testing plant which was leased for a certain period during the spring of two different years. Ore was treated in carload lots, with the Senior class in charge of the plant. In later years, mills and mines in mining sections were leased, and all operations called for, including repairs, were conducted by the students.

These experiences served to impress us with the absolute necessity of a plant of our own, for no commercial plant can fully meet the needs of a class of students.

In designing our school plant we had several purposes in mind which it must serve. It was to permit:

1. A study of the principles on which ore dressing and metallurgical operations are based. This will be accomplished mainly by small scale apparatus.

2. A study of machines; the construction of machines of various types, with the important parts, and methods of adjustment.

3. A study of the operation of individual machines; the conditions of proper feed, water ratio, capacity, effects of adjustment, and horse power required.

4. A study of operations; especially with reference to variation of conditions and arrangement. This involves preliminary testing with small scale apparatus.

5. For a study of the problems involved in the various theses required of Senior students before graduation, and to afford a means for the study of proposed lines of ore treatment on both small and large scales.

6. A thorough investigation of methods for the treatment of ores by skilled engineers, who are to be allowed the use of the plant under conditions to be determined later, and who would thus have provided them the very best equipment available, and at the same time be able to carry out their own ideas in experimentation without interferences of any sort. It is expected that our students will profit by observation of the methods employed by these men.

7. Finally, and most important of all, is the opportunity for research work that will be possible with an equipment as complete as that here provided.

As earlier stated, the necessity for a suitable plant was recognized long ago, and during a considerable period the various essentials which such a plant should possess had been receiving careful attention. When it was decided to ask the Colorado legislature for an appropriation to build and equip our plant, it was thought best to outline in a few words the scope of work required and the general plan of operation. After the appropriation had been made, the metallurgical department, embracing the subjects of assaying, ore dressing, and metallurgy, got out a series of what might be called "general specifications," in which the particular points necessary in such a plant were mentioned, and most of the more important operations and machines were specified. These specifications were generally distributed with requests for suggestions, and several very important ideas were gleaned as a result.

Matters were then in excellent shape to begin actual planning, and the Board of Trustees appointed Frank E. Shepard of the Denver Engineering Works Company as consulting engineer. The preliminary plans were the result of the work of Mr. Shepard, assisted by P. D. Grommon of the class of 1907 of the Colorado School of Mines, together with frequent conferences with the metallurgical department of the school. These plans are not final, for before the equipment is placed it is expected that criticisms called for in the general distribution of the reduced plans will cause alterations in many particulars. What we want is a building and equipment that will, as completely as possible, meet the needs of a school such as ours, and also permit investigations that shall be of the greatest value to our commonwealth and to the mining fraternity at large.

Detailed Description of Plant.*

Reference to the floor plan will show that the mill is composed of several sections or units, each completely equipped for its own type of work, and all housed in one common building where any unit can readily be reached from any other unit. With the exception of the dry concentrating, smelting and cyanide units, the mill is designed to have an approximate capacity of 50 tons per 24-hour day. The three units mentioned are of such a nature that small lots, say 5 tons maximum, are as large as it will be desirable to run in them.

The ore will be brought to the mill, either over a spur to be run from the railroad tracks, as indicated in the plans, or by an aerial tramway from an unloading station on the main line of the Colorado & Southern Railway. In either case it will be handled so that it can be dumped into any one of the 12 storage bins. These bins are of steel, 25 tons capacity, with hopper bottoms and swinging draw-off gates. They will be used variously for receiving ore, storage of lots after preliminary crushing and sampling, and for the storage of lime and fuel for the smelting unit.

Crushing Unit.

The ore is drawn from the bin into a 16 or 20 cubic foot ore car, trammed over the scales, where it can be weighed if desired, to the platform elevator, elevated and dumped over either the grizzlies into the crusher below. The undersize from the

*Descriptive part by Mr. P. D. Grommon, Colorado School of Mines, 1907.

grizzly and the crushed product can be delivered into separate cars in order to determine the percentage of raw or mine ore that needs no crushing. There is room at this point for four cars, so that if both crushers are running all products can be kept separate; or, if desired, all can be laundered to one or two cars. The crushed ore is trammed out, weighed as above indicated, and elevated either back to another bin, or farther up into the traveling bin of the sampling unit.

The machines of this unit are two 3′ by 8′ taper bar grizzlies, one standard 7″ by 10″ Blake crusher and a No. 2 Gates gyratory crusher or its equivalent. Space has been left for the addition of a third grizzly and crusher, as well as ample floor space for working and making adjustments.

Sampling Unit.

In this unit there is a wide range of possibilities as to flow of ore, so that each machine can be tried out against the others under identical conditions. The ore is received in a hopper-bottom traveling steel bin of 5 tons capacity, moved by a motor, so that it may be discharged by a plunger feeder into any one of the three sampling machines, viz., a Vezin, Brunton or Snyder.

The reject from the samplers passes to an ore car and the sample is ground in a set of 12″ by 20″ rigid rolls with feeder attached. If this sample is small enough, the subsequent cutting down and grinding can then be done by hand; but if too large, the sample can be elevated in a 6″ by 4″ belt and bucket elevator directly into the hopper of one of the other samplers, and the sample there obtained further reground in a Sampson crusher, laboratory crusher or sampler grinder, and finally cut down by Jones rifles or similar devices. In this way a sample of any desired size can be obtained, regardless of whether the lot be so large as to require two or more cuttings, or so small that one cutting will suffice. The traveling bin can deliver to any sampler; any sampler to the rolls; the rolls to the elevator, and the elevator to any sampler again, so that with the exception of the final splitting and grinding of the sample, the entire operation may be made automatic. When the sample is small and it is desirable to omit the use of the belt and bucket elevator, the rolls are high enough to discharge into an ore car which can then be elevated and dumped into the hopper of a sampler. The total reject, or the entire lot minus the sample, can now be returned to the original bin, thence to be drawn off as desired, or it can be sent direct to one of the four bins below.

Stamp Mill Unit.

This unit contains a standard 850-pound 5-stamp battery, and a battery of two Nissen single stamps. Each battery has its own steel bin and feeder, and in front of both runs a track on which the plates are mounted so that they may be used interchangeably with either battery. A Pierce amalgamator and a mercury or amalgam trap form the rest of the equipment of this unit.

It is intended to have the two Nissen stamps of widely different types, and to have the 5-stamp battery of modern construction, and so built that various conditions can be tried, such as height of drop, discharge, etc.

The tailings from the plates or amalgamator will be laundered to a small sump in the floor which feeds a centrifugal pump delivering to the classifier system. The latter will be described under the concentrating unit.

Roll Crushing Unit.

There are so many possibilities for changing the flow of ore through this unit that only a description of the general scheme and a few possible arrangements will be described. The previously crushed and sampled ore is delivered into the 15-ton ore bin, whence it is fed automatically by a plunger feeder to a 10″ belt and bucket elevator and delivered to the first of a train of three 36″ by 6′ revolving screens. Oversize from No. 1 screen or trommel is sent back to a set of 14″ by 27″ spring rolls which discharge into the same elevator. Undersize goes to No. 2 trommel and its undersize to No. 3 trommel. Oversize from No. 2 trommel can be sent to either a 3″ 6-compartment Richards pulsator jig, or a single 4-compartment all-iron Harz jig; or it may be reground in any one of the various regrinding devices to be mentioned later. Oversize from No. 3 trommel will go to the jig not fed by No. 2, while the undersize from No. 3 will go to the classifier system.

Two Impact screens in tandem will be installed as shown, and used interchangeably, or in parallel with No. 2 and No. 3 trommels. The former will be equipped for either wet or dry work, and both they and the three trommels will be provided with extra screens on frames, so that the mesh of any screen can be changed with very little trouble.

Jig middlings or tailings, or both, from either or both jigs can be reground in any one of the following devices:

1. A set of 14″ by 27″ rigid rolls so located as to discharge into either the 10″ elevator or the centrifugal pump sump.
2. A 3½′ Huntington mill discharging as above.
3. A 3½′ Chilian mill discharging as above.
4. A set of 5″ x 8″ Triplex rolls.
5. A small ball mill.

The last two will probably discharge to the sump.

From the general arrangement of this unit it will be seen that:

1. Trommels and Impact screens can be used interchangeably.
2. Either jig may be used as the fine, and the other as the coarse jig.
3. Coarse jig middlings or tailings, or both, can be reground in any one of three machines, and sent back through the screen system to be caught on the fine jig.
4. Fine jig products to be retreated can be reground in any one of five machines, and the product pumped directly to the classifier system.

In short, any two machines of similar character can be used in parallel under exactly the same conditions, or in series, thus giving ample opportunity to compare the advantages of the various machines on different classes of work.

Classifier System and Concentrating Unit.

At the head of the classifier system is a cone thickening tank, 48" in diameter, of the bottom-draw-off, rim-overflow type. As stated before, this tank is fed either directly with the undersize from the last screen, or by a centrifugal pump from the small sump. An exception to this procedure may be made by omitting the thickening, and sending the feed from the screen to a 3-compartment spitzkasten whose products go directly to the tables. When the thickening tank is used, the thickened pulp is fed to a 3" 6-compartment Richards pulsator classifier, a train of two Callow traveling belt screens or two King revolving screens. In any case either of the products can be laundered to any table desired. The overflow from the thickening tank will go to an 8' tank, the overflow from which will probably be clear enough to discard, and the thickened pulp can be sent to the slime tables.

Nine concentrating tables and slimers are shown in the plan, with room provided for several others. The proposed equipment consists of two Wilfley tables, two Card tables, one each of the Overstrom, Deister No. 2, and Deister No. 3 tables, a Johnston or Frue vanner, and an Akins & Evans slimer or some other canvas table.

A 10" by 54" Frenier spiral sand pump will handle any table product for regrinding, pumping it back to any one of the regrinding devices mentioned before, so that it may be prepared for treatment on the slime tables. The table tailings may be sent either to the dump or to the cyanide unit for further treatment. The table concentrates are shoveled from the boxes directly into cars and trammed to a steam drying plate from which they can be transferred to another car and taken to any point desired.

Dry Concentration Unit.

In this unit will be installed various machines for dry concentration. It is arranged so that the bin can discharge directly into the feed hopper of a cylinder which can be used either for drying or for giving a magnetizing roast. This is followed by a cooling cylinder. A fine grinding device of some sort will be installed here, as well as a set of Columbian vibrating screens for dry work. The screened products can then be treated in any one of the machines, being fed by hand if the lot is small, or handled by the overhead track, if large.

The equipment as shown in the plan includes magnetic separators of the Wetherill and Dings type, a Blake-Morscher electrostatic separator, a Sutton, Steele & Steele dry concentrator and a Behrend dry concentrator. All of these machines are of the small, or laboratory size.

The room containing the dry concentration unit probably will be separated from the rest of the mill by a partition constructed for the most part of glass.

Cyanide Unit.

Since commercial cyanide tests can be made satisfactorily on a scale smaller than would be suitable for other tests, the equipment of this unit is designed to handle a charge of about 5 tons. It will be apparent that a 50-ton capacity cyanide unit would occupy needless space.

The grinding equipment of this unit will be a 4' Hardinge conical tube mill, and a 4' by 10' cylindrical, belt-driven tube mill, both for grinding the sand to slime if such treatment is desired. A centrifugal pump, is provided to take the original feed or the tube mill discharge, according to the plan of treatment, delivering the same to either a Dorr classifier or a Richards sand-slime classifier. Both of the latter machines are of laboratory size.

Slime may be treated in a 6' by 5' conical-bottom agitating and thickening tank with a rim overflow, or in a 3½' by 10' Pachuca tank. The thickened product can then be treated in either a Moore or Butters vacuum filter, or in a Burt pressure filter. The three latter machines are small sizes.

The sand may be returned to one of the tube mills if a straight slime treatment is desired, or may be treated in a filter-bottom, sand-leaching tank.

Two solution tanks, 6' by 6', one for barren or dilute solution and the other for gold solution, are set at such a height as to discharge by gravity.

For precipitation of the gold from pregnant solution, zinc shavings may be used in a 6-compartment zinc box mounted directly over the sump tank, or zinc dust precipitation may be used followed by filter pressing. It is further planned to provide means for electrolytic precipitation.

All tailings from this unit will be sluiced out through a large cement-lined launder to be located under the floor.

A small barrel for chlorination work also will be installed in this unit, and space has been provided for additional leaching devices.

Smelting Unit.

As previously stated, a number of bins at the head of the mill will be reserved for the storage of fuel and fluxes. The unit is divided into two sub-units or sections, viz., the roasting section and the smelting section proper.

In the roasting section are a hand reverberatory furnace and an English cupellation furnace. The hand reverberatory will have a hearth area of about 4' by 9' with rabbling doors at each side. The cupellation furnace will be of the type used in the Massachusetts Institute of Technology. It can be adapted to many uses by changing the nature of the hearth, and will be used for high roasts, cupelling, and making blister copper. Both of these furnaces can be charged from cars on an upper level and discharged into others on the ground floor.

The equipment of the smelting section proper has not been decided upon definitely, but it will consist of small furnaces and roasters of various types. The blast furnace will be rectangular, of 18" by 36" cross-section, and water-jacketed in sections to permit of easy dismantling. A track will be placed underneath the furnace, and it will be so arranged that the crucible used in lead smelting can be changed for the hearth used in copper smelting by running the one out and the other into place. This idea will be carried out as far as possible, with a view to making the one furnace serve for either lead or copper work.

A blower for compressed air, and the necessary forehearth, matte and slag pots, and other accessories will be included in the equipment of this unit.

Laboratory Unit.

This unit, located in the corner of the building nearest the present school buildings, and adjoining the sampling unit, will be equipped with desks for chemical work, assay furnaces, balances, etc. The clean-up room for the batteries and cyanide unit also will be in this section, and will include amalgamating pan, clean-up pan and a retort and bullion melting furnace.

The room marked Rare Metals Laboratory in the floor plans will be used, as implied by its name, for experimental work on miscellaneous and rare metals.

Experimental Machines.

The small sized, or experimental machines will be located in either the present ore-dressing laboratories in Stratton Hall of Metallurgy, or moved into the room adjoining the cyanide unit, marked in the plan "Experimental Machines." These machines may be used for preliminary tests prior to the regular mill tests.

General Considerations.

Ample space has been provided in the mill to include newly installed machines in any flow-sheet. Besides the water piping necessary for the operation of individual machines, valves and nipples will be provided at convenient places for flushing and cleaning, and all floors are designed with drains and sufficient slope to take care of the water. Air will be on tap for cleaning up machines operating on dry ore. A heating plant of ample size will be installed as shown in the plan. The mill will have ample natural light and ventilation, but electric lights will be distributed at convenient places so that there will be perfect light at all times. Inasmuch as in a mill of this kind a considerable portion of the plan will be idle at various times, all launders, tanks and frames supporting machinery doing wet work will be constructed of steel, as wood would either rot or warp badly. The water supply will be from wells sunk near the bed of Clear Creek, whence it can be elevated to tanks commanding the entire plant. Settling ponds and sump tanks can be provided below the mill, for the settling of tailings and recovery of water.

Electrical power is supplied from the central power plant of the school. Special care has been exercised to make sampling accurate and absolutely free from the possibility of self-salting. Independent motors will be used freely and weighing and measuring apparatus provided generously in order to determine power and water consumption and actual capacities of the various machines in use. Comparison of machines will be possible under identical conditions, and all possible variations of practice, logical and illogical, will be made possible by the scheme of installation, the keynote of which is "flexibility."

When we finally have adopted our plans, and have erected and equipped our buildings, we feel that the Colorado School of Mines will be in a position to render to the mining industry such services as shall place her name high on the roll of honor.

After considerable delay machinery and structural steel are rapidly being delivered at the site, where foundations and sumps are already completed, but without doubt the building will be enclosed and under roof before winter and much of the installation will be in place by early spring.

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Editorial

As a majority of the members of the Alumni Association are probably uninformed in regard to the new work and plans of the Association, a brief resumé of the work outlined by the Executive Committee will not be out of place in the initial number of the Magazine. At a meeting of the Association last spring it was decided to try to organize the graduates of the school into a solid body for the mutual benefit of the members themselves and the general welfare of the school. To do this it was decided to employ an alumnus of the school to act as Assistant Secretary, one who could devote sufficient time to the work to carry it to the desired end.

The duties of the Assistant Secretary are to take care of the correspondence, conduct the affairs of the Capability Exchange, edit and manage the Magazine. The Magazine is to be a monthly paper devoted to technical articles, an abstract of new books and current articles, school affairs, athletics, and alumni notes. For the present it will be published monthly during the college year. It is expected that the Magazine will be the means of bringing the members of the Association closer together. To make this work possible the Board of Trustees have agreed to pay the greater part of the Assistant Secretary's salary, the Association paying the balance. As the salary is small, the returns from advertising above expenses of publication are to be given the Assistant Secretary to help out his salary.

To help make the Magazine a success, President Alderson and members of the Faculty are aiding in every way possible. A valuable part of the paper will be the abstract of current articles prepared by members of the Faculty. The graduates of the school are urged to do their part and contribute articles which will be of interest to the alumni and under graduates. Each graduate of the school will receive a copy of the paper each month. To insure receiving the Magazine it will be necessary for them to send a postal card notifying the Assistant Secretary of changes and address.

So far the Capability Exchange has been successful in a limited way only. To make it successful every member of the Association must, while seeking a place, keep the Assistant Secretary informed of his movements and the results of communications with prospective employers. If you should leave a place notify him of the vacancy at once, giving a brief description of the duties, conditions, and wages paid. The Assistant Secretary will try to locate you in another place, and the information concerning your old position will be of benefit to another member of the Association.

A remark made by one employer will best illustrate why the department has not been a complete success His remark was this: "The trouble with your Capability Exchange is that when we want a man, you are not in touch with a suitable one. You ask us to wait several weeks before you can even get in communication with one. When we need a man we want him at once."

Another important thing to be noted is this: In filling out the registration blank do not neglect the details of your experience. If you have mucked, trammed, sorted ore, drilled, timbered, or handled machinery, write it on the blank under "Remarks," giving also the name and location of the mine. The same is necessary in regard to milling, smelting, and engineering in general. If you have letters of recommendation send copies of them for filing with your blank. This applies more particularly to the younger graduates.

Athletic News

THE NEW FOOTBALL RULES.

By Coach Stuart.

The football rules governing the play of the 1910 season mark a distinctive and far-reaching step in the development of the "new" or 'open game," and at the same time practically deal a death blow to the "old game" of mass plays and the "push and pull" game. To a player of the "old guard" the game will now present many queer features, combining some elements of basket ball, soccer and English rugby, to the exclusion of nearly every semblance of the game he knew; while to the spectator who has been a devotee of the game during the last few years, the game this fall will bring added delight through its innumerable kicks and passes and its many opportunities for open field running.

To understand and appreciate fully the play of 1910 it will be necessary for the spectators to have a fair understanding of the rules, particularly the new features, as many of them are distinctly new and some quite inconsistent with the former general understanding of the game as viewed from the public eye. The purpose of this article will be to point out only the new features and changes in the 1910 rules compared with the rules of 1909. In doing this we will first take up those rules affecting the general character of the game; second, those affecting the "old game," and third, those affecting the "new game"; stating all rules as briefly as possible.

Taking up the changes affecting the general character of the game, the marking of the field returns to its gridiron appearance of 1902 with cross field marks at intervals of five yards, and no intersecting lines parallel to the side lines. The length of the game has been reduced to sixty minutes and divided into four periods of fifteen minutes each, instead of two equal halves. At the end of the first and third periods there is a three minutes' rest, during which the teams change goals. No kick-off is made at the beginning of play after these rests, but the possession of the ball, relative spot and number of down and the distance to be gained for first down remain the same as at the end of the preceding period. Between the second and third periods there is a fifteen minute rest, at the expiration of which the teams change goals and play is started with a kick-off; the side that kicked off at the beginning of the game then having the option of kicking off or receiving the kick. The teams do not change goals following a touchdown or goal from the field, as before, but the side scored upon has the option of kicking off or receiving the kick. A player who has been removed from the game for any cause, except one suspended or disqualified by the officials, may be returned once at the beginning of any subsequent period. Crawling has been defined as an attempt to advance the ball after it has been declared dead, and is now penalized.

The following new rules affect the "old game": No players of the offense—the side in possession of the ball—may use their hands, arms, or body to push, pull or hold on his feet, their teammate carrying the ball and players on said side shall not interlock in forming interference. Any player making a tackle must have one foot on the ground when tackling. At least seven men of the offense must be on the line of scrimmage when the ball is put in play. Any player on the offense, except the two occupying the customary guard's positions, may receive the ball directly from the center and advance with it across the line of scrimmage at any point. Any kick made from a scrimmage must be made from a point at least five yards back of the line of scrimmage.

The following new rules affect the "new game" and create a new phase of football: A forward pass may cross the line of scrimmage at any point, but the player making the pass must be at least five yards behind the line when the pass is made. This rule is simply a reversal of the constituent parts of the 1909 rule that allowed a forward pass to be thrown from any spot in rear of the line of scrimmage, but required that it cross said line at least five yards out from the center. A forward pass must not cross a line twenty yards in advance of the spot where the ball was put in play, otherwise it becomes dead as it crosses said line. These two rules, together with the one requiring a kick from a scrimmage to be made at least five yards back of the line of scrimmage, above stated, create two imaginary lines known as the "imaginary five yard line" and the "imaginary twenty yard line." The former will be purely imaginary, but it is the duty of the field judge to mark the latter with a small flag twenty yards in advance of the ball after each play. The territory between the defensive scrimmage line and the imaginary twenty yard line is known as the "twenty yard zone" and during kicks and forward passes it acquires an unusual significance and might then be termed a "neutral zone." That is, when the offense tries a kick from scrimmage players of neither side may interfere in any manner with their opponents within the "twenty yard zone," and when the offense tries a forward pass, players of neither side may in any manner interfere with their opponents within said "twenty yards zone" until the ball is caught, except such interference as is necessarily incident to bona fide attempts to catch the ball themselves.

It thus develops that players of the offense running down under a kick from scrimmage cannot be interfered with after

Reverberatory Furnace

Roasting Section.

English Cupellation Furnace

Smelting Section.

Blower

Additional Concentrating Tables.

Additional Leaching Devices.

Pulp Classifiers & Thickeners Erected over Cyanide Section.

Water Supply Tank. (Bottom of Tower.)

Crusher Floor.

Platform Elevator

Platform (Closed)

Sampler Floor.

Roll Crushing Section.

Laboratory Section.

Miscellaneous and Rare Metals, Etc.

Dry Conc.

Cyanide Section.

Platform.

Railroad Siding.

Ben'ds 140 Centers.

This Space for Experimental Machines.

Coal Bin.

Heating Boiler.

Feed Pump.

See Dwg. B178-33 Elevation through D.D.
" " B178-33 " " GG.
" " B180-33 Perspective View of Plant.

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Colorado School of Mines Ore Dressing & Metallurgical Experimental Plant, Golden, Colo.	
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they have crossed the scrimmage line and until they cross the "imaginary twenty yard line"; also that on a forward pass the efforts of all the players within said "twenty yard zone" must be directed only toward catching the ball. Another rule that should have the effect of preventing injuries provides that no player of either side, while in the act of catching a forward pass, shall be tackled, thrown, or practically in any manner interfered with until he has caught the ball and taken more than one step, except such interference as is necessarily incident to the bona fide attempt of an opponent to catch or intercept the pass himself. This rule is carried even farther in providing that if a player touches and fumbles the pass, still all efforts of the players must be directed toward securing the ball and no players can interfere with opponents until the ball is actually recovered. Another significance attached to the "imaginary twenty yard line" in that no kick from scrimmage puts the kickers' side "on side," thus entitling them to recover the ball before it has been touched by an opponent, unless it strikes the field of play beyond the "imaginary twenty yard line."

From these rules it will be seen that while a forward pass and kick are both made from at least five yards behind the line of scrimmage, the pass must be completed before the "imaginary twenty yard line" is reached, but the kick does not become "an outside kick" unless it crosses and strikes the ground beyond said imaginary twenty yard line.

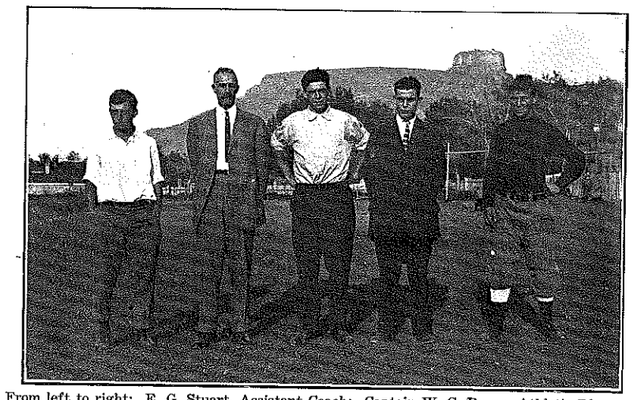
These rules create the "new football" of 1910, and coaches and players find themselves facing absolutely new and untried conditions, demanding, possibly, radical changes in the formations, and with no precedents of experience on which to base their plays. It is probable that several seasons will be found necessary to test thoroughly the new rules and to determine whether or not they serve the purpose for which they were enacted, that of eliminating injuries. In the meanwhile it would be best for all those who have the best interests of football at heart to reserve their judgment on the game.
thoroughly the new rules and to determine whether or not they serve the purpose for which they were enacted, that of eliminating injuries. In the meanwhile it would be best for all those who have the best interests of football at heart to reserve their judgment on the game.

FOOTBALL AT MINES.

One month ago the feeling at the School of Mines on the football situation was one of doubt and uncertainty, but now it is different, for there are 50 candidates out for practice, 32 of whom are eligible for the team, while the others are fine looking Freshmen, who will make good material for a Varsity Eleven.

Leidbetter and Slattery returned last week, which gave great joy to the student body. Captain Douglas, Mertes, Cadot, Calvert and Woolf of last year's team are back. Myers, Navarro, Newman—new men—are giants, weighing over 190 pounds each.

Coach Ted Stuart is working like a Trojan whipping the men into shape, and he, with Captain Bryan as trainer, should make as good a team as Colorado boasts this year. Every one is doing his best; every one is in harmony with every other; there is no pulling against each other; in consequence, the outlook looks good, very good.



From left to right: E. G. Stuart, Assistant Coach; Captain W. C. Bryan, Athletic Director; Ted Stuart, Coach; E. J. Dittus, Manager; Wm. Douglas, Captain.

On Monday, September 19, the men will get their first hard knocks, and in another week a good line will be had on the prospective Varsity Eleven. Every man says he will make the other man work for his place on the team; that is the spirit that wins. On October 13 the team leaves for Salt Lake to play Utah on the 15th, so hard work is the motto from now on, to make a winning team in so short a time.

The schedule for 1910 is a very bad one as the mistake was made in making the hard games so early in the season and leaving the dates from November 5 to November 24 without a game. This is to be regretted as the team will go stale for good hard work. There should be a championship game on November 12 to keep the team on its feet. But nothing can be done now. It is too late.

Football Schedule for 1910.

October 15—University of Utah (Logan).
October 22—Aggies (at Denver).
October 29—C. C. (at Colorado Springs).
November 5—D. U. (at Denver).
November 8—Wyoming.
November 12—Practice Games.
November 19—Practice Games.
November 21—University of Colorado (at Denver).

College Notes

The annual "Barbecue" between the Freshman and Sophomore classes took place on the lawn in front of Stratton Hall about 8 o'clock Wednesday night, September 7, as scheduled. As soon as a Freshman was tied, he was carried to one side by upper classmen, and cut loose either by the town girls or some upper classman. When loose he was sent into the fray again. After tying the Freshmen several times, the Sophomores were declared the victors. The whole affair, gathered from comments of the spectators, was more of an endurance contest and photographic venture than a "Barbecue," neither class, having a chance to demonstrate its real superiority, due to the interference of outsiders. Several members of the Alumni Association came from Denver to witness the event.

The Chinese Empire has taken a step along progressive lines, which, if followed, will cause her to be recognized as one of the great powers of the future. The immense undeveloped resources of the country only await the guidance of educated, well trained men to produce untold wealth. The Chinese Government has undertaken to educate her young men along such lines as will enable her to develop these resources without the aid of foreign engineers or professional men. The indemnity money paid by the foreign powers for destruction of property following the Boxer troubles several years ago made this great educational movement possible. Several hundred young men have been selected by competitive examinations. Each man was allowed to select his course of study. These students were then sent to the large universities and colleges of this country and Europe. The Colorado School of Mines has been selected as one of the schools, ten Chinese students being now registered in the several classes.

CLUB NOTES.

The Integral Club held their "first night" reception in the club rooms in the gymnasium Friday night, September 16. The reception was in the nature of a football rally. Addresses were made by faculty members, prominent guests, and the several heads of athletic affairs of the school. Coach Ted Stuart, in a stirring talk, impressed upon the men the absolute necessity of all who were physically able putting on a suit and coming out and trying for the team and staying out. He stated emphatically that he did not want "quitters," but wanted men with the "Mines Spirit." President Alderson, Dr. Fleck, Richard Broad, Jr., Captain Bryan, Assistant Coach Stuart, Captain Douglas, Manager Dittus, and ex-Captain Spring ably supported Coach Stuart with remarks along the same general line. The managers of the Integral Club provided music and refreshments. All present spent a very pleasant evening and departed after the entertainment filled with "Mines Spirit" and delicacies of the caterer's art. These affairs are to be held every Friday evening during football season. Alumni members are requested to attend when possible.

DANCES.

The first dance of the season took place Saturday evening, September 24, at Guggenheim Hall. Music was furnished by the C. S. M. orchestra.

The first Social Club Dance of the season will be held in Guggenheim Hall, Saturday evening, October, 15, 1910 Time, 8:45. Music by Lohman's orchestra.

CLASS NOTES.

1911.

Irving B. Williams received the nomination for county surveyor of Jefferson County on the Republican ticket at the Republican County Convention held in Golden, September 14. Thomas Wright, '13, was also out for the nomination.

The class has elected the following men to act as officers for the coming year:

Thomas H. Garnett, President; Karl V. Geib, Vice-President; and W. J. Mayer, Secretary-Treasurer.

1912.

The class officers for the coming year are as follows: Hugh D. Linn, President; Clarence E. Copeland, Vice-President; Frank B. Harris, Treasurer; and Verne R. Langdon, Secretary.

1913.

On September 12 the class got together and elected officers for the coming year. Alfred Flinn, who as Vice-President last year so capably took charge of the affairs of the class in the absence of the President, was rewarded for his work by being elected to fill the latter office. John F. Myers was re-elected Treasurer. The others officers are: George Wilfley, Vice-President; Howard C. Smith, Secretary. Whitney Newton, Jr., was chosen to represent the class on the Athletic Board.

1914.

The class officers for the coming year are as follows: Crit. C. Tolman, President; Stanton E. Winston, Vice President; Russel P. Luke, Secretary; Frank L. Pittman, Treasurer.

TECHNICAL AND ENGINEERING SOCIETY.

The "Bulletin" formerly published by the society has been discontinued. In the future the Colorado School of Mines Magazine will publish their notices and proceedings.

Y. M. C. A. NOTES.

The activities of the Young Men's Christian Association began with the work for new students. Several days before the opening of school three of the Association men made a list of the vacant rooms that would be suitable for students, collecting all information that would help a man in the selection of a room. This list was kept in the Y. M. C. A. office in Guggenheim Hall, together with a list of Boarding Clubs. A number of the members of the New Student Committee were present to help the men to find the rooms they desired to inspect. As a result of this work 98 men were placed in rooms and Boarding Clubs.

Early in August a letter was written and sent to every man who had expressed his intention of entering the School of Mines, either as Freshman or Postgraduate. This letter told the men that the Christian Association welcomed him to the school and would stand ready to help him in every possible way while he remained in Golden. With this letter was sent a copy of the Mines Hand-Book, the annual publication of the Y. M. C., which contains a fund of useful information, especially for the new men, and which is a useful memorandum as well.

The Reception to New Students.

The first social function of the year is the Y. M. C. A. Reception, given in honor of the new students, which is held on the evening of the first Friday of the school year. This gives the new men their first opportunity of meeting the members of the Faculty and their wives, the old students, and their classmates. Prominent members of the Faculty and the student body give the men a correct idea of the life that is before them while here; music by the school organizations is given a conspicuous place during the evening, and refreshments are never the least enjoyable part of the Reception.

This year the Reception was given September 9th, from 8 until 11, and about 175 people were present. The Reception Committee numbered 25 of the leading men in the school and they were kept busy introducing the new students to the old men and to the Faculty. A short program had been arranged and was carried out by the President of the Christian Association, R. V. Thurston, 1911, presiding. Dr. Fleck spoke as a representative of the Faculty and made a splendid address; Captain Douglass of the football team, and our coach, "Ted" Stuart, made stirring appeals for the hearty support of every student for the entire season; Jay Lonergan, '05, told of the new Alumni publication. J. W. Nipps, Washburn, 1910, who is the new State Student Secretary of Colorado, gave a snappy five-minute talk on the growth and present magnitude of the work done by the Christian Association in the colleges of the world. The program was concluded by a fine though brief address by Dr. Alderson, in which he gave the new men some of the helpful advice they so much need at this period of their lives. The music was furnished by the "Beta" string quartette, songs by the Y. M. C. A. quartette, and several selections by the Mines Orchestra. An innovation was introduced in the cafeteria service of the refreshments, which consisted of ice cream, cakes and cocoa. This was a fitting close to a very enjoyable evening.

Religious Meetings.

There were 62 men present at the first meeting of the Christian Association, including the coach and most of the football squad, when Dr. F. T. Bayley spoke on the theme: "How Can a Young Man Make the Most of Himself?" This establishes a record for attendance at a regular meeting of the Association. Dr. Bayley's talk was one of the best, yet one of the simplest and most practical that have been given before the School of Mines Y. M. C. A., and we sincerely hope that he may return.

Rev. P. V. Jenness, of Denver, who was formerly a Y. M. C. A. Secretary, addressed

the meeting of September 20 on the subject: "The Heart of a Man." It is needless to say that the men heard a fine talk, for the speaker has had much experience in dealing with men and knew what would appeal to college fellows.

Mr. William E. Sweet, one of the prominent business men of Denver, was the speaker at the meeting of September 27. Mr. Sweet is a graduate of Swarthmore College in Pennsylvania and is a firm friend of the Young Men's Christian Association. He is President of the City Y. M. C. A. in Denver, and has contributed over $35,000 toward the erecton and equipment of the beautiful building in that city. We are very fortunate in having secured his services, for he has just returned from Europe, and his business requires his attention at this time.

Rev. Joel Harper, of the City Park Congregational Church of Denver, will be the speaker at the first meeting in October. Rev. Harper is an accomplished vocalist and will sing for us while here. Having had much experience in speaking to men, there is no doubt that he will make an interesting and helpful address to our men at the "Mines."

The time of the regular Tuesday evening meetings has been set at 6:45 p. m., and they will close at 7:30 sharp. This has been done to give the men an opportunity to attend without breaking up the evening, and it is hoped that the men will come early, so the meetings may start on time.

Bible Study.

The Bible Study canvass is now under way and will be completed this week. At present there are about sixty men enrolled and many men have not been seen. The Fraternities will be canvassed separately at a later date, so we expect to have at least one hundred men in Bible Study this year.

Membership.

There are at present 130 members in the Christian Association. Of this number 94 were members last year and the remaining 36 have joined this year. The regular canvass has not been made, so we cannot give final results in this issue, but we expect to enroll 50 men during the next month.

Entertainment Course.

The first of the five numbers in the Y. M. C. A. Entertainment Course will appear on the 14th of October. John B. Ratto, Reader and Impersonator, will be the attraction. Mr. Ratto is so skilful in his impersonation of the various characters that one sees, not Ratto, but the man in the story. His "making up" is done in plain sight of the audience; this adds greatly to the interest, and is in itself a very unique part of the program.

The other numbers are: The Kellogg-Haines Singing Party, a mixed quartette with an accompanist; The Houston Musical Magician Entertainers, who mix music and magic in an inimitable manner; Mr. Lee Francis Lybarger, Orator; and for the closing number of the course we will have the Dunbar Company, Male Quartette and Bell Ringers, a company which has given over 3,000 concerts in North America and in Europe. Too much cannot be said in praise of this group of accomplished men. The rates will be the same as last year—Season ticket, unreserved, $1.50; reserved, $2.00; single admission, unreserved, 35c; reserved, 50c. All of the entertainments will be held in Guggenheim Hall, beginning promptly at 8:00 p. m., doors open at 7:30 p. m.

Y. M. C. A. Officers.

The work of the Young Men's Christian Association is carried on by the students, under the direction of a General Secretary, and with the counsel of an Advisory Board composed of two professors, one town pastor, one town business man, and one alumnus. J. B. Watson, Penn State, '09, is the General Secretary, and devotes all of his time to the work. The officers are: R. V. Thurston, '11, President; W. C. Huntington, '12, Vice-President; A. W. Harris, '12, Secretary; C. D. Grier, '12, Treasurer.

The Alumni

PERSONALS.

1891.

C. Dupree Smith is now located at Mocorito, Sonora, Mexico, as General Manager for the Palmarito Mining Company.

1895.

Charles T. Durell is now General Manager for the Headquarters Mining Company, located at Baguio, Philippine Island.

1896.

William J. Barenscheer is permanently located in Denver at 333 Railway Exchange Building. He is Chief Engineer for the Grand River, Meeker & Salt Lake Railroad, and is now at Rifle, Colo., in charge of location work.

1897.

We are in receipt of a card announcing the formation of a partnership between Marshall D. Draper and John Gross, with offices at 746 Equitable Building, Denver, Colo.

William A. Kelly has been in Denver during the past month.

1899.

Frederick C. Steinhauer, of the City Engineer's office, has earned a well-deserved promotion to the position of Superintendent of Parks for the City of Denver.

1900.

Frank M. Dresher, who has been a member of the firm of Elliot and Dresher, Mining Engineers, with offices in Denver, Colo., and Prescott, Arizona, has formed a new partnership to be known as Dresher and Wolfersberger, Mining Engineers, with offices at 321 Mack Block, Denver, Colo.

Thomas B. Crowe, Superintendent of the New Portland Mill, Victor, Colo., was recently in Goldfield, Nev., making an examination of a mining property.

1901.

Mark Ehle, Jr., Professor of Mining in the South Dakota School of Mines, Rapid City, South Dakota, was here to visit the school before starting his year's work for Dakota.

1904.

Henry P. Nagel has recently returned from Mexico, and is now with the Vindicator Mining Company, Victor, Colo.

1905.

Frederick C. Carstarphen, with offices in the Ideal Building, Denver, left on September 14 for the Uintah Reservation, where he will make a reconnaissance survey of the hydro-carbon fields of that section. He will be gone about four weeks.

Ernest F. Stoeckley and Edward Frank have for some time past been operating a lease on a mine near Caborca, Sonora, Mexico.

1906.

Ernest E. Thum, who has been located at Tooele, Utah, is again with the Anaconda Copper Company at the Boston & Montana Reduction Works, Great Falls, Mont.

James H. Hensley is with the Miami Copper Company, Miami, Ariz., and for the past month has been in Denver on a vacation.

1907.

Charles A. Filteau, left Denver on September 9 for San Jose de Gracia, Sinaloa, Mexico. He will be associated with William B. Rhodes, '03, Superintendent of the Cia Minera Jesus Maria y Anexas Cyanide Mill.

1908.

Charles F. A. Reno is now located at Cosala, Sinaloa, Mexico.

1909.

Ernest B. Woods is now located at Wall Street, Boulder County, Colo.

William B. Patrick was in Golden on a short visit and is now in Goldfield, Nev.

1910.

D. Ford McCormick is with the Socorro Mines Company, Mogollon, New Mexico.

J. Courtenay Ballagh is now assayer and chemist for the El Tigre Mining Company, Yzabal, Sonora, Mexico.

John R. West is Manager for the West Placer Mine, Grant's Pass, Oregon.

Vincent K. Jones is Chief Engineer for the Placita Ranch and Beck Grant Irrigation Projects, East Las Vegas, New Mexico.

All graduates of the school are requested to send in notes for this department. Get some "class spirit" and see that your class is represented.

ALUMNI ASSOCIATION MEETING.

The Executive Committee met Monday afternoon, September 19, 1910, in the office of F. S. Titsworth, 404 Equitable Building, Denver, for the consideration of business. The following members were present: President, F. S. Titsworth; Treasurer, F. C. Steinhauer; Secretary, Arthur R. Hodgson; Junius W. Johnson; Jay Lonergan, Assistant Secretary.

After discussion it was agreed to send to all graduates of the school an announcement drafted by President Titsworth, of the plans concerning the Alumni Magazine and urge the alumni to do all in their power to contribute to its success.

It was decided to name the paper the "Colorado School of Mines Magazine," the same to be published monthly during the college year (nine months) with a subscription price of $1.25 per annum.

The question of holding the annual banquet on Commencement Day in Golden, instead of in Denver, was brought up for consideration, but nothing was decided on.

The committee was favorably inclined towards giving a luncheon some time in the spring to the members of the graduating class, but took no definite step in the matter. Junius W. Johnson was appointed to make arrangements for a luncheon to be held at the University Club for the Alumni.

AN OPEN LETTER.

Denver, Colo., August 29, 1910.

Dear Brother Alumnus:

It is a great pleasure to announce to you that Jay Lonergan, '05, has accepted the position of Assistant Secretary of the Alumni Association, and is now in Golden ready for business. It will be his duty to keep in close touch with the members of this association and enable each member to keep in touch with all the others. It will also be his duty to edit an Alumni Monthly Magazine, the first number of which will be distributed October 1. This magazine will be full of interesting reading about the Alumni and their work, and will be the official organ of the department of business opportunities.

I commend Mr. Lonergan to you, and earnestly request that you co-operate with him in every way possible. Send him news items concerning yourself and others. Write him about your work, and contribute to the magazine technical and descriptive articles covering your occupation. If you meet any unusual or knotty problems in your business, put them up to your fellow Alumni in a letter to the magazine. They can and will help you to a solution. We want to get closer together and help each other, and we need your support.

Watch for the first number of the magazine (it will be sent you free for a few months), and write to Lonergan at your first opportunity.

With best wishes for your continued success and prosperity, I am,

Faithfully yours,
F. S. TITSWORTH,
President Alumni Association,
Colorado School of Mines.

Abstracts of Current Articles and New Books

GEOLOGY.

Professor G. Montague Butler.

Differential Pressure on Minerals and Rocks, by Frank D. Adams.

Journal of Geology, Vol. XVIII, No. 6, Sept.-Oct., p. 498.

Description of tests which demonstrate that, under conditions which may be supposed to duplicate those existing at some depth within the earth, gypsum, rock salt, calcite, and fluorite crystals may be greatly deformed without rupture. It is also shown that pressure alone may change the color of fluorite from green to purple, and may produce cleavage laminæ in some brittle minerals.

Geology and Ore Deposits of Goldfield District, Nevada, by F. L. Ransome.

"Economic Geology," Vol. 5, No. 5, July-Aug., p. 438.

A condensation of Professional Paper No. 66 of the U. S. Geological Survey, by the same author. This is the second and concluding part of the paper; the first appeared in the May-June number of the same journal.

An admirable and trustworthy presentation of all essential features, which should be read and studied by all mining engineers.

Keweenawan Copper Deposits, by Frank F. Grout.

"Economic Geology," Vol. 5, No. 5, July-Aug., p. 471.

A brief statement of the possible sources of copper and a description of some tests made which give support to the theory that this metal, as a silicate, formed a primary constituent of all types of Keweenawan lava, the ore deposits being formed by concentration of this disseminated material.

Discussions of paper by F. L. Ransome, on "The Criteria of Downward Sulphide Enrichment," which appears in the same volume, beginning at page 205.

"Economic Geology," Vol. V, No. 5, July-Aug., p. 477.

These discussions and the original paper present a mass of invaluable information on the subject of secondary enrichment and the criteria for judging whether such action has taken place.

On the Glacial Origin of Huronian Rocks of Nipissing, Ontario, by R. E. Hore.

Journal of Geology, Vol. XVIII, No. 5, July-Aug., p. 459.

A discussion of the features indicating that portions of the beds discussed are the result of ice action, forming the oldest known glacial deposits.

MINING.

Professor Arthur J. Hoskin.

"Top Slicing Mining Methods at Cananea, Mexico," by Courtenay DeKalb.

"Mining and Scientific Press," Aug. 20, p. 230.

Explains the adaptation of the scheme in the Oversight mine; illustrated.

"Underground Methods on the Gogebic Range," by Percival S. Williams.

"Mining World," Sept. 10, p. 451.

Gives details of under-hand and sub-level systems in the iron mines, with seven illustrations.

"Mining and Stoping Methods in the Coeur d'Alenes," by John Tyssowski.
"Engineering & Mining Journal," Sept. 3, p. 452.
The timbering, sorting, drilling and shoveling methods and costs, and the stoping schemes of the Last Chance, Bunker Hill and Sullivan, Mace, Hecla and Snow Storm mines are given. Illustrated by four diagrams.

"Stoping at the Homestake Mine, South Dakota," by John Tyssowski.
"Engineering & Mining Journal," July 9, p. 74.
The stope and pillar method invented in this mine is explained and liberally illustrated by photographs and diagrams.

"Copper Mining in the Metcalf District, Arizona," by Peter B. Scotland.
"Engineering & Mining Journal," July 16, p. 118.
This five-page article ably covers, in addition to geological features, the stripping, overhand stoping, pillar and shrinkage, top slicing, filling, timbering and haulage methods as practiced in such mines as the Coronado, Metcalf, and King.

"Ore Mining methods." by W. R. Crane.
Wiley & Sons, New York; 219 pp., $3.00; illustrated.

There has, at last, been produced the book which has long been needed by the men who really desire to post themselves on the methods practiced throughout the mining world in the attack on, and the extraction of, ore bodies. Professor Crane has made a consistent study of stoping and has personally inspected such methods in all of the districts of the United States. He has also drawn from miscellaneous, but reliable, sources, data concerning such mining work in foreign districts.
The book is liberally illustrated and the text is so carefully worded that the reader, be he college student or practical miner, cannot fail in understanding even the most complex systems.
A fair idea of the scope of this excellent work may be gained from noting the following headings: Support of Workings; Methods of Stoping and Handling Ore in Stopes; Mining in Narrow Veins and Bedded Deposits; Mining in Wide Veins and Masses; Open-cut Mining; Cost of Stoping.
Overhand, underhand, breast, side, long-wall and shrinkage stoping; square setting, stulling, filling, caving and milling are all explained clearly, and examples of their use in well-known mines are given in detail. All kinds of metal mines, with the various types of ore bodies are covered. One very praiseworthy feature of the book is in its conciseness. All of the material is given in such a systematic and simple manner that it is a pleasure to use it even as a reference book, and it is predicted that its consultation by busy mining men will be common. The items of actual working costs will be read by many operators.

METALLURGY, CHEMISTRY AND ASSAYING.

The Effect on the Solubility of Gold When Ore is Crushed Between Iron Surfaces, by J. M. Tippet.
Met. & Chem. Eng., Vol. VIII, No. 8, p. 519.
Experiments on Portland dump material gave 50 per cent. extraction on iron, but when ground in tube mills with Silex linings gave from 70 to 80 per cent. extraction. "Probably due to a film of iron glazing the gold particles."

Crushing by Stamps, by J. H. Oates.
Mex. M. J., Vol. II, No. 3, p. 30.
An article giving valuable information in regard to the care of the various parts of a stamp battery, and methods of removing and repairing broken parts.

The Treatment of Accumulated Slimes, by John O'Hara.
Mex. M. J., Vol. II, No. 3, p. 17.
The treatment of slimes by filter press compared with decantation and Adair-Usher process. The results in favor of the Adair-Usher Process, which is considered a quick washing process not effective for dissolving gold, but only displaces the rich gold solutions.

Comparison of Gyratory and Jaw Crushers, by H. L. Wollenberg.
E. & M. J., Vol. 90, No. 11, p. 509.
A three-page article in which the author gives the advantages and disadvantages of both types.

Classifier for Use Before Concentration, by E. W. Durfee.
E. & M. J., Vol. 90, No. 11, p. 499.
Gives a description of the water classifier installed at the Daly-Judge mill, Park City, Utah, with reasons for its adoption.

Recent Practice in Copper Matte Smelting, by Redrick R. Moore.
E. & M. J., Vol. 90, No. 10, p. 460.
Ferric Iron Determination, by A. F. Joseph.
Journal Soc. of Chemical Industry, Feb. 21, 1910, p. 187.
This method is an iodometric method which does not involve reduction.

"Manual for Assayers and Chemists," by W. H. Seaman.
Wiley & Sons, New York; 250 pp; $2.50.
Says the writer of this book: "I write principally for the young graduate of the mining school, thrown upon his own resources for the first time, and brought face to face with conditions and problems un-

known to the schools, which he can solve only after years of experience, unless he is given the experience of those who have preceded him."
Of this book Professor Hoskin says:
"It is quite true that every alumnus of a technical school, when employed as an assayer or chemist at some industrial plant, is required to learn and practice methods that were not taught him in college. This is no argument against the courses given him in college. The mining schools, in particular, endeavor to teach not only reliable, but accurate schemes; but, as Professor Seamen correctly states, the conventional methods often fail to meet the conditions prevailing in commercial establishments or even around small mines or metallurgical plants. Results need not always be absolutely exact, and laborious, time-consuming methods will not then be tolerated. Again, very precise results may be demanded, but they must be derived by quick methods.
The author questions the criticisms that have been made by so-called scientific analysis against the practices of the technical analysts, and he maintains that there may be imperfections on both sides. His conclusions are drawn from years of experience in both capacities.
Methods are given for the determinations of all the ordinary metals, as well as for various non-metallic elements and substances. In addition to these analytical methods, there is a considerable portion of the book devoted to schemes for analyzing industrial products and by-products, such as clays, cements, coal, coke, slag, cyanide and water. General information along such related lines as sampling ores and making settlements on shipments is given, and the book concludes with many tables which are occasionally useful in an assay office or laboratory."