ALBERT BENJAMIN PRESCOTT.

Thirty-seven years ago, the American Association for the Advancement of Science held its eighth meeting in Washington. During the last week in August, for a second time in its history, this, the greatest of our scientific societies, meets in the capital city of the Union. Then its members were a thousand, and now they are more than double that number. As the years have come and gone, we have reported its peripatetic gatherings in these columns, and have given brief sketches of the distinguished men who have presided over its deliberations. An unwritten law of the association provides that the selection of its chief officer shall pass from a representative of the physical sciences to one of the natural sciences and then back again. In 1888, Powell, the geologist, succeeded Langley, the astronomer, and later, Mendenhall, the physicist, gave place to Goodale, the botanist, who, at the present meeting, will yield the chair to Prescott, the chemist.

Albert Benjamin Prescott was born in Hastings, N. Y., on December 12, 1832, and is of the ninth generation from John Prescott, of Standish, Lancashire, England. The latter served under Cromwell at home, and in 1640 came to Boston. Afterward he settled in Lancaster, Mass., and was active in the war against King Philip. His grandson was Col. William Prescott, who commanded the American soldiers at Bunker Hill, and of whom it is said that in reply to a question of Gen. Gage as to who he was, the answer came: "That is Col. Prescott. He is an old soldier, and will fight as long as a drop of blood remains in his veins." Gen. Oliver Prescott, who saw much military service during the revolution, was a brother of his, and his grandson, William H. Prescott, is distinguished for his famous historical works.

The career of Professor Prescott shows him to be a worthy descendant of so renowned an ancestry. His early education was obtained by the aid of private tutors, from whose care he passed to the University of Michigan and there was graduated from its medical department in 1864. The civil war was then in progress and he at once entered the United States Volunteer Service as assistant surgeon. He had charge successively of Foundry General Hospital in Louisville, Ky., and of General Hospital No. 16, in Jeffersonville, Ind., and served meantime, during 1864 and 1865, as a member of the board of examination for appointment of surgeons in Louisville.

In 1865, at the close of the war, he returned to Ann Arbor to accept the place of assistant professor of chemistry and lecturer on organic chemistry in the University of Michigan, and five years later was made professor of organic and applied chemistry and of pharmacy. Meanwhile in 1868 the School of Pharmacy was organized and charge of its instruction was at once given to Professor Prescott, and since 1876, when the school was made a distinct department of the University, he has held the office of Dean of its Faculty. Until about 1880 the greater portion of the special and practical pharmaceutical instruction, including the laboratory work, as well as the lectures, was given by him personally. During this period nearly 140 contributions of original investigations, representing work done by the students and graduates of this school, were published in various technical journals. All of these researches were made under the supervision of Professor Prescott.

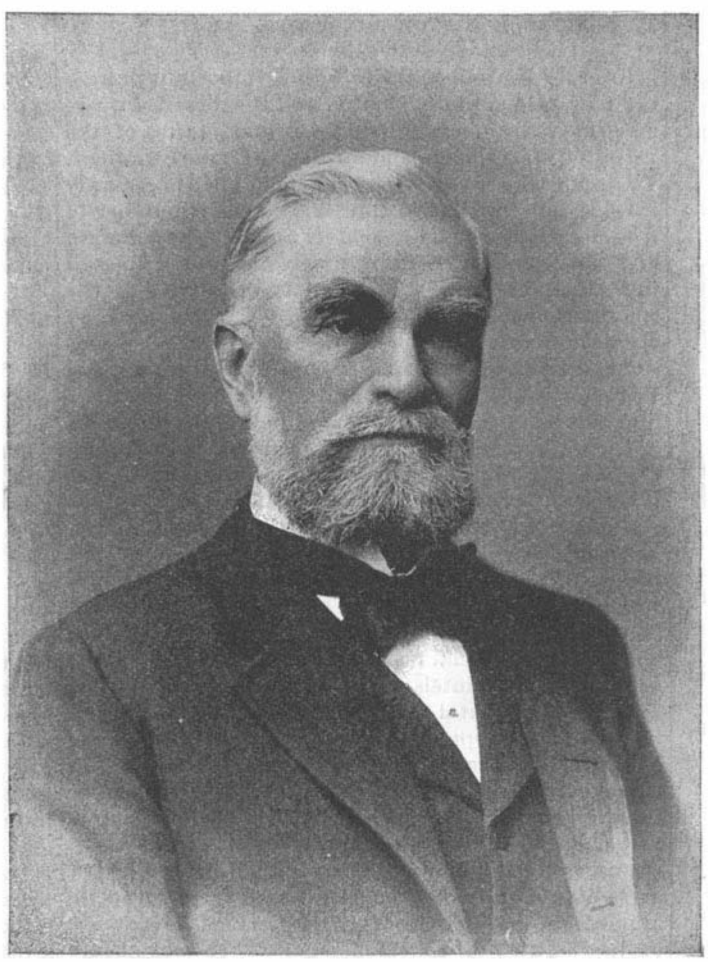
At present his personal teaching is confined to organic chemistry. In this subject he begins a course of lectures to students in science in the first semester and a course to medical students in the second semester. He also gives a course of lectures on organic analysis and one on organic synthesis during the second semester; besides which he has charge of the original investigations in operation in the chemical laboratory, which is used by the students of all the departments of the university. Since 1876 he has been professor in charge of this laboratory, and since 1884 with the special title of Director of the Chemical Laboratory.

The researches conducted in the chemical laboratory under his direction have been published, with the title of "Contributions from the Chemical Laboratory of the University of Michigan." During 1875–78 they appeared in the *American Chemist* and *Chemical News*; in 1880 in the *Journal of the American Chemical Society* and the *American Chemical Journal;* and in 1883 and 1884 as separate publications in association with Professor Victor C. Vaughan. The latter are octavo pamphlets, averaging fifty pages each.

While Professor Prescott is distinctly a chemist, still his investigations have naturally been in the direction of the application of his chosen service to that of pharmacy, and much of the work executed under his eye has been published in the *American Journal of Pharmacy*. During 1876–78 portions of this work appeared with the title of "Contributions of the School of Pharmacy of the University of Michigan," but since then they have been published with separate titles.

He has been very active in the work connected with the revisions of the "Pharmacopœia of the United States." He served as a member of the revision of that work in 1880, when he was made chairman of the sub-committee on descriptive chemistry, and furnished the assay methods for opium and cinchona, as well as the body of volumetric tests, which in that revision appeared for the first time. The general introduction of qualitative test limits, to fix the quantitative standards of medicinal purity of the chemicals of the Pharmacopœia, was first undertaken in this country by his sub-committee.

In connection with the revision of the Pharmacopœia in 1890 he has also shown considerable activity, and prepared an "Index of Contributions from the Michigan State Pharmaceutical Association, and the School of Pharmacy of the University of Michigan," to aid the national committee. It covers the time between the years 1853 and 1890, and includes over ninety papers that represent work done under his supervision in the School of Pharmacy. Professor Prescott has been an active member of the Michigan State Pharmaceutical Association since its organization in 1883, and in 1886 contributed to its "Proceedings" an "Outline of a Plan of Study for the Assistant in Pharmacy," which has been extensively circulated in reprint form in response to a continuous demand for it.



ALBERT BENJAMIN PRESCOTT.

Among his more popular contributions to current scientific literature are papers on "The Material Resources of Life;" "The Aromatic Group in the Chemistry of Plants;" "The Chemistry of Coffee and Tea;" "The Chemistry of Fruit Ripening;" "Nostrums in their Relation to Public Health;" and "Poisons and their Antidotes." The foregoing are a few of the titles that have appeared in *Popular Science Monthly*, *Pharmaceutical Journal and Transactions*, "Proceedings of the Michigan State Board of Health," and Wood's "Household Practice of Medicine," and he has also written for other more technical journals, such as the London *Chemical News* and the *Engineering and Mining Journal.*

A contemporary of his has well said: "His writings inspire respect for their author, for they are always important, thorough, and conclusive in their scope."

His text books are well known, and include "Qualitative Chemical Analysis," with Silas H. Douglas (Ann Arbor, 1874; fourth edition with Otis C. Johnson, New York, 1888); "Outlines of Proximate Organic Analysis" (New York, 1875); "Chemical Examination of Alcoholic Liquors" (1875); "First Book in Qualitative Chemistry" (1879); and "Organic Chemistry: A Manual of the Descriptive and Analytical Chemistry of Certain Carbon Compounds in Common Use" (1887).

The last named, which is his largest work, is undoubtedly the most complete and valuable book on the subject that has as yet been written by an American chemist.

Besides his degree of M.D. taken in course, he has received that of Ph.D., and in 1876 he was elected a Fellow of the London Chemical Society. He early joined the American Chemical Society, and in 1886 was chosen president of that body.

In the movement which was started several years ago, at the meeting of the Chemical Section of the American Association, for the purpose of organizing a national chemical society, he has been very prominent, and his influence has been potent in producing the conservative feeling that has marked the meetings that have been held.

In 1874 he was elected a member of the American Association for the Advancement of Science at its Hartford meeting, a year later he was advanced to the grade of fellow, and in 1887 he presided over the chemical section at the New York meeting. His retiring address on this occasion was entitled "The Chemistry of Nitrogen as Disclosed in the Constitution of the Alkaloids."

In personal appearance, Professor Prescott is rather tall, and a man of pleasing presence. He moves his audiences with a sweet persuasive way that is irresistible. His expressions are apt and to the point, while his manner commands attention. He is never obtrusive, but his advice is eagerly sought, and many of the graduates of the School of Pharmacy owe their success to his wise counsel.

Another Navy Vessel under Contract.

By the 1st of August, 1893, the Philadelphia shipbuilding firm of William Cramp & Sons has contracted to deliver to the government one of the most important of the ships thus far designed for our navy, at present known as cruiser No. 13. Proposals for the building of this vessel were invited by the navy department several weeks ago, and the bids received were, Union Works, San Francisco, $2,793,000; William Cramp & Sons, $2,745,000; Bath (Me.) Shipbuilding Works, $2,690,000. The latter firm could not, however, complete the vessel in the contract time of two years, and William Cramp & Sons agreeing to reduce their bid by $55,000, were awarded the contract.

The new vessel will be in almost all respects similar to cruiser No. 12, now being built by the Philadelphia firm, and which Secretary Tracy has styled as being "absolutely without parallel among the war ships of the world." She is to be primarily what has been designated as a "commerce destroyer," in contradistinction to the heavy armored battle ship, and is designed for a sustained speed of twenty-one to twenty-two knots an hour, with engines to indicate 20,500 horse power. She will have a coal-carrying capacity of 2,000 tons, and be able to steam around the world at a ten knot rate. Perhaps her most novel feature will be her three screws, one placed centrally, as in ordinary single screw vessels, and two others a little forward of this screw, one on each side, in slightly recessed portions of the stern of the vessel. The center screw will be about 4 ft. 6 in. below the other two.

The principal dimensions are: Length on mean load line, 400 ft.; extreme breadth of beam, 58 ft. 2¼ in.; depth of hold from top of main deck beams to inner bottom, 29 ft. 1⅝ in.; displacement, 7,350 tons. There will be eight main double-ended boilers, in four water-tight compartments, and two single-ended auxiliary boilers on the berth deck, the air-tight fire room system of forced draught being used. All the boilers are of steel, and their working pressure will be 160 pounds. There will be three sets of triple expansion vertical inverted cylinder engines. The cylinders are of 42, 59, and 92 inches diameter respectively, and the stroke (common) is 42 in.

The vital portions of the vessel will be protected by a sloping armored deck 4 in. thick near the sides and 2½ in. thick in the middle, the space beneath being divided into coal bunkers. There will also be a 5 ft. wide coffer dam next the ship's side for its full length, to be filled with woodite or a similar water-excluding substance. The battery is designed to consist of one 8-in., two 6-in., and twelve 4-in. breech-loading rifles; sixteen 6-pound and eight 1-pound rapid-firing guns, four Gatling guns, and four torpedo launching tubes.

A premium will be paid by the government of $50,000 for every quarter of a knot of speed made by the vessel over twenty-one knots per hour, and $25,000 will be deducted from the contract price for every quarter of a knot she falls below this rate. If she should not be completed within the limit of time of the contract, $75 a day for the three months next succeeding the period of limit will be deducted; $150 a day during the second three months, and $200 a day penalty after that time.

To take grease out of white marble, apply a little pile of whiting or fuller's earth saturated with benzine, and allow it to stand some time. Or apply a mixture of 2 parts washing soda, 1 part pumice stone, and 1 part chalk, all first finely powdered and made into a paste with water; rub well over the marble, and finally wash off with soap and water.

Shoring and Underpinning Buildings.*

The essential object of shoring is to afford temporary security to dangerous buildings by arresting unsafe displacements, or to afford temporary support to buildings abutting on those which have to be taken down and rebuilt, or raised and underpinned with additional stories underneath them, or moved away to another site, or abutting on those which from their mere dangerous character require to be demolished. If there is no immediate prospect of the re-erection of buildings thus removed, the shoring should be of a more permanent character.

PHOTOGRAPHS OF SHORED BUILDINGS.

An essential preliminary proceeding to the actual work of shoring preparations in important cases is to photograph the elevations of the abutting buildings, and make written notes and sketches of details, careful measurements, and all essential particulars by which any observed peculiarities and phenomena relating to or explaining the precise character and condition of the building may be distinctly understood. All such observations should be put together in a convenient form, to be readily available for evidence in the event of litigious proceedings arising in which these facts would be important. It may also be desirable to photograph exposed division and party walls after the adjacent building has been demolished or removed, as it would be serviceable if deep excavations require to be made for deepening basements or obtaining sub-basements, cellars, or removing ballast, sand, or for any other purpose which would disturb the adjacent or subjacent soil.

ABUTTING SUPPORT OF ADJOINING BUILDINGS.

In making excavations for foundations, basements, cellars, sub-basements, drains, or for the purpose of obtaining sand, ballast, etc., the removal or weakening of the abutting natural support of adjoining buildings renders the offending party liable for consequential damages by accident or failure of party walls thereby, and hence for neglecting to apply adequate shoring and skillful underpinning.—"Miller *v.* Long," January, 1890. Judgment for $325, with costs.

DETAILED SURVEY OF EVIDENCES OF DANGEROUS SUBSIDENCES.

In practice it is essential to make a careful survey of the evidences of danger, as these may be manifested and can be estimated from the nature and condition of the materials of the parts of the building affected by unequal subsidences or displacements, ruptures or bulgings. The state of decay or other visible evidences of deterioration or dilapidation should be noted, especially anything of an insidious character which may ultimately tend to disastrous consequences. Faulty work, as well as materials, should be detected, and the characteristics noted. The statical condition of the masses of the ruptured walling, as they at present exist, should be considered in relation to the probable effect of the action of the shoring to be erected should displacements continue. The physical effect of the operations connected with the new erections to be built on the premises, in disturbance of the present equilibrium, should not be overlooked, such as pile driving, quarrying and blasting operations, drainage works or the escape of ground waters, the excessive sinking of more ponderous buildings erected on adjacent sites.

PRACTICAL DISPLACEMENTS—VERTICAL AND HORIZONTAL.

If there be any unequal displacement of portions of walls or of features, etc., of buildings, the comparative locations and directions of such displacements should be distinctly noted, with a statement appended of any special provision which may be needed for effecting its replacement or protection, or the arrest of the displacements if of a progressive character.

OVERHANGING WALLS.

If the displacement be in the nature of the wall overhanging its base, and that it is intended to be brought back to the plumb, the needling which is resorted to must be placed low enough to include above it all of the displaced portion, and then a pressure as nearly horizontal as possible is brought against it at an effective point; at the same time wedges of slate and a rather quick-setting cement should be ready for wedging up the horizontal joints of the brickwork, which have been opened by the operation of plumbing up the overhanging portion. The overhang is often irregular in different portions, and hence the treatment with needling and wedging must be adjusted to the variations needed for effecting the straightening also.

IRREGULAR SUBSIDENCES.

When irregular subsidences have taken place in consequence of the difference of weights in the bays and pier portions of fenestrated walls, or produced by difference of heights in the bays and piers, or difference of massiveness, or difference in the bearing power of the soils at different points of the foundations, and that the wall at different parts requires to be raised to reach the normal level—for this purpose needle holes must be cut through the wall at convenient points along its solid or pier portions; but not under voids or in the bay portions of fenestrations. When there is a ground floor near the level of the ground, it is generally best to cut the needle holes through the wall in its pier portions only, and underneath the ground floor. The screw jacks are set under the ends of the needles on the inside and on the outside of the walls, and when the building is thus raised up bodily, it should be supported firmly by being made solid upon the underpinning or the built up substructure by means of close wedging with hard slate in Portland cement, so that it will maintain its raised position without subsequent subsidence. In the above it is implied that due consideration is given to the fact that the depth of the screw jacks below the ends of the needles must be obtained by excavations, etc., if this clear space does not already exist.

PERIODICAL OBSERVATIONS TO DETECT SUBSIDENCES.

All important new or raised structures should be carefully examined from time to time to immediately detect any subsidences which may occur. The nature, directions and extents of such subsidences should be carefully obtained, the practical inferences considered and duly noted, and the necessary provision made for adopting all needful precautionary measures adapted to stop further movements. The needles, screws, etc., should not be withdrawn until all subsidences have permanently ceased. The withdrawals should, in all cases, be done gradually.

INTELLIGENCE IN OBSERVATIONS NECESSARY TO EFFICIENCY.

In order that all of the foregoing important procedure may be done intelligently, and the remedies prove efficient, the amount, directions, and nature of the various displacements should be particularly noticed. To acquire the intuitive power here implied necessarily involves an intelligent appreciation of a number of considerations which are seldom apparent at a glance, and must be the result of practical training in such investigations, with the aid of the theories of the composition and resolution of various predetermined active forces that are present. It must also be considered whether the displacements be in the nature of single lean over, or of various degrees of inclination at different heights, or at different points in the length of the wall, or whether it be an incurvation or a bulging of the section of the wall, and, if the latter, whether it is regular or irregular, or compounded of straight sections and curves, and where they lie horizontally, vertically, or obliquely. Also note the extent of the inequalities of displacements in the same direction when these are in the nature of unequal subsidences from the original plumb or level position. The lines and arrises of special features, such as pilasters, piers, columns, jambs, lintels, sill and string courses, plinths, and other horizontal and vertical features of a building, afford good opportunities of detecting the presence of contorting forces. Any abnormal irregularity in the curved features, or in the curved portions of features, should also be noted. All of the foregoing is assumed as essential for a single inspection; but where the occasion admits of, or necessitates, testing the progress of abnormal movements, there should also be applied suitable gauges for registering the extents or inequalities of subsidences or other movements which take place in fixed intervals of times of systematically arranged observation. Thus, for showing any alterations in the width of a fissure or crack, or a lateral movement of one side over the other, paper pasted at several points is the best and simplest. When applied to external fissures the paper, and the cement with which it is fastened, should be such as not to be affected by damp. The effect of damp, and stretching or elasticity, on all papers, even when used for internal fissures, should be duly regarded, as otherwise the information afforded by the tests may be misleading. A lateral movement of one side of a fissure will produce a wrinkling of the paper. The direction of the wrinkle will not indicate which of the sides has moved; that must be determined from a consideration of other indications present which clearly point out the direction, or, as it is called in the language of graphics, the "sense" of the direction of movement.

Rod struts or laths, which bend under a slight pressure of abnormal thrusts, have been used to test the precise direction and extent of movements of central towers at the intersection of nave and transepts. These must be placed in the direction of suspected or apparent movement, and carefully observed from time to time.

It is also important to observe in all tests or series of tests whether the rate of movement is unvarying in equal times, or whether there is an acceleration or a retardation in the rate of displacement. When it is one of acceleration, it requires the prompt application of very effective measures for arresting the progressive movement. It is also important to note all evidences of changes in the direction of the action with which the abnormal forces operate, and whether any new forces or resultants have been created by the incidental changes of conditions which may attend building operations

DIRECTION IN WHICH FORCES OPERATE INFERRED FROM DIRECTIONS OF RUPTURING.

By a careful consideration of the elementary ideas of the nature of the forces of displacement, these principles can be applied to the interpretation of the fissures, cracks, ruptures, bulges, etc., which are the evidences of the action of disturbing forces, in direction and in extent, which affect any particular wall or building that we are about to investigate. Starting from the primary idea that all movements, however complex, are compounded of horizontal and vertical motion or active forces in various constant or changing ratios of combination, producing various oblique directions, we can thence form an estimate of these relative balances, or unbalanced portions, of disturbing forces, and the resistances of the tenacity of the materials, and of the construction of the building, by means of the displacements which they produce measured in these directions, then complete the graphic parallelogram of forces, and draw the diagonal as their resultant. If such measurements were constant, either in a single or compound direction, at different points of the fissure, the movements would either be horizontal, vertical, or diagonal to these two as the adjacent sides of a parallelogram. But if the measurements varied at different points of the fi sure with a constantly increasing divergence—as, for instance, it showed an increase upward—it would be interpreted as a tilting action round a low fulcrum.

* By Alex. Black, C.E., architect, in the *Builders' Magazine*, F. V. Strauss publisher, New York.

Ammonite, a New Explosive.

The qualifications it claims to possess are complete safety in conjunction with an explosive force slightly exceeding that of dynamite of the first quality.

Ammonite is described as consisting of pure ammonium nitrate and nitro-naphthaline, the two ingredients being thoroughly dried, ground, and afterward incorporated in heated edge runner mills. It is then sifted and fitted into metallic cartridge cases of various sizes, which effectually protect it from the absorption of moisture. These cases are completely water tight, and may consequently be immersed in water for an indefinite time. The successful use of ammonite depends on the employment of this water tight case, which, it appears, is the invention of the late M. Favier. Whether in large or small quantities, the charges of ammonite are invariably made up in these cases. If tons were supplied, the whole would be contained in such cases. There is some variation in size. The favorite and usual size, however, is a case 8½ inches long, containing 4 ounces of ammonite, the empty case weighing 1¼ ounces. The case is of soft white metal, very closely resembling, on a large scale, the tubes in which artists use oil colors, the main difference being that the small neck which carries the screw cap in the artist's oil color tube is here closed up without opening, being cut open when required for use, while the large base, instead of being closed in a folded edge like the oil tube, preserves its cylindrical form, and is closed with a screw cover, waxed and made water tight. As to character and softness of metal, the oil paint tube and ammonite case closely resemble each other. The principle on which safety is secured by ammonite is that it can only be fired by a detonator of mercury. The material may be burned freely in a furnace, when it melts and smokes and gradually consumes, and it may be struck to any extent without ignition of any kind, whether iron or any other substance be used. When fired by its own detonator, explosion is communicated from case to case, even when an interval of perhaps nearly an inch is left between them, the fact appearing to be that ammonite, like wet gun-cotton, requires a certain sort of wave impulse to bring about its explosion, but when that wave is imparted, it explodes readily.

Phosphograms.

The invention of M. Lipmann for producing colored photographs has received wide publicity, and excited a great deal of interesting discussion. Numerous photographers and physicists have followed M. Lipmann's example in applying themselves to the solution of the problem, and many curious facts bearing on the subject are being made known in the scientific periodicals. One of the latest contributions is by Mr. W. Ainsley Hollis, who has discovered that if a plate of glass or other suitable substance be coated with phosphorescent calcium sulphide and exposed in a photographic camera, so that the image of a well illuminated landscape or other brightly colored object may be focused on it, after a time a kind of phosphorescent negative is produced. This "phosphogram," as Mr. Hollis calls it, may be photographed by applying it to a sensitized film, and the negative when developed shows distinct signs of color. Whether this idea will bear working up for practical purposes remains to be seen, but the experiment is at any rate an interesting one, and might be made the subject of further investigation.—*Freeman's Journal.*