HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(9232) G. B. E. asks: Will you kindly inform me if the current going over a telephone line when a person speaks into a battery transmitter is a direct or an alternating one? A. With an induction coil, the transmitting telephone being in the primary circuit, the current in the secondary is alternating, since an increase of the lines of force takes place when the diaphragm is approaching the magnet of the telephone transmitter, and a decrease takes place while the diaphragm is receding from the magnets.

(9233) C. D. R. M. writes: Since air freezes at about 310 degrees below zero, and since the temperature falls one degree for every 333 feet of ascent from the earth, or about 15¾ degrees to the mile, it is clear that air must be frozen at less than 20 miles ascent from the earth, and if frozen, it must fall, and friction, heat, and electric phenomena must result. If it is said that 800 cubic feet of air must be compressed into one foot of liquid air, I reply more than 1,700 feet of vapor must be condensed into one cubic foot of rain water, but nature has an easy way of doing it. If it is said, again, that the air is far too rare to be frozen at such a height, I reply, if this were true in general, which is not proven, yet with the wind blowing 50 to 70 miles an hour, as it sweeps upward from the earth, it must carry plenty of common air up into those unexplored regions. A. The constituents of the atmosphere are all of them unsaturated gases at the surface of the earth. As their density is produced by gravity, it follows that they are less saturated at a higher altitude than they are at any lower place, and therefore farther from the point of liquefaction. The contraction produced by cooling is less than that produced by the pressure of gravity. There is, so far as we can see, no reason to suppose that there is liquid air in the higher layers of the atmosphere. It would seem that it should be detected by optical methods, by its effect upon the light, if it were present anywhere in the atmosphere.

(9234) E. P. J. writes: Please give in your inquiry column the number of pounds of lifting power exerted by 10,000 (or 100,000) cubic feet of pure hydrogen gas. Great interest is now manifested by the general public in the possibilities of aerial navigation. There seems, however, to be considerable disagreement in regard to the facts pertaining to the subject. I recently submitted to two supposed scientists the question as to what the lifting power of the hydrogen gas contained in a cylinder 100 feet long and 40 feet in diameter would be, and one gave the answer as 3,000 pounds, and the other 8,000 pounds. Of course, one of them must be wrong, and perhaps both of them. I would be glad to know what your estimate would be. A. The usual allowance for the lifting power of hydrogen gas is 70 pounds per 1,000 cubic feet at the normal pressure of the atmosphere. A balloon 100 feet long and 40 feet in diameter will contain 125,000 cubic feet, and will therefore lift about 8,750 pounds at the start. This includes all weights, bag, car, ballast, aeronauts, food, etc. The answer 3,000 may allow for all these and leave the excess of lifting power. The answer 8,000 evidently is a round number, and includes all weights.

(9235) R. J. L. says: I want to ask you the following question: How to demagnetize a watch? I am working in an electric light plant, and recently my watch became magnetized. Our dynamos are 110-volt, General Electric machines. I have worked around them, and have been leaning on the frame and had the watch close to the field coils many times, but have never had the watch affected before, so I am not sure whether the machines or having the watch close to pieces of magnetized iron is responsible for the trouble. I see jewelers use a coil of wire with a hole in the center large enough to admit a watch, which is connected to an alternating current, and the watch is dropped in the coil and pulled out and it is demagnetized. Now our machines are direct current, and I would like to know if it is possible to do it with our machines, and what the outfit would consist of. I have been taking your paper for about three years, and have never noticed any information of that kind in your question column. A. A watch may be demagnetized by a direct-current dynamo by hanging it by a string and twisting the string so as to rotate the watch rapidly, near to the pole of a strong magnet. While it is whirling, gradually remove it from the neighborhood of the magnet. The method you describe with an alternating current is far more effective and reliable. You cannot bring the watch into the positions you describe without magnetizing it.

(9236) J. M. M. asks: Will you please to state the approximate weight of water, and also the weight of the iron jackets required to cool a 60-horsepower automobile motor? A. The amount of water required for cooling automobile motors depends upon the tank air surface that can be obtained in location and design of the automobile parts. In the best designs of the present date, about two gallons of water per horse power is used with a rib pipe cooling tank weighing about six pounds per horse power.

(9237) C. E. B. asks: 1. Is it at present practicable to run an automobile with compressed air? A. The operation of automobiles by compressed air has not been a success. It requires expensive machinery to compress the air, and the system is considered too limited in a single run for its successful operation. 2. Could I make a working model of tin? A. You can make a tin model of an invention, but not a proper working model. 3. Have any large corporations experimented with compressed air for a motor power for automobiles, street cars, etc.? A. Compressed air is in use for motive power for railways and street cars, factory tramways, and many other uses requiring transmission of power to considerable distances. 4. Would five or six hundred dollars be enough to perfect it? A. Five or six hundred dollars will be of little account in perfecting a compressed-air plant, on which millions have been spent with but indifferent success.

NEW BOOKS, ETC.

DIE ASSANIERUNG VON WIEN. Bearbeitet von Paul Kortz, H. Schneider, H. Goldemund, Dr. med. Alois Grünberg und Dr. med. Alfred Freund. Herausgegeben von Dr. Th. Weyl. Mit einem Vorwort von Franz Berger und Dr. med. A. Löffler. Mit 76 Textfiguren und 14 Tafeln. Leipzig: Verlag von Wilhelm Engelmann. 1902. Pp. 194. Price $4.

DIE ASSANIERUNG VON ZÜRICH. Bearbeitet von Bühler, Dr. Alf. Bertschinger, J. Fluck, H. Peter, G. Fr. Rothpletz, H. Schatzmann, V. Wenner, E. Wüst. Herausgegeben von Dr. Th. Weyl. Mit einem Vorwort von Dr. Th. Weyl. Mit 41 Textfiguren und 10 Tafeln. Leipzig: Verlag von Wilhelm Engelmann. 1903. Pp. 120. Price $4.

The publication of monographs on the sanitary systems of the larger European cities will doubtless be welcomed by those who have the interests of municipal engineering at all at heart. Data which have hitherto not been available, either because they have not been published, or because they are to be found only in widely-scattered periodical literature, are here collected for practical utilization; municipal officers are given the opportunity of studying with the greatest convenience the improvements which have been made in the sanitation of the leading cities of the world.

The first of these monographs, dealing with the sanitation of Vienna, shows how difficult a task was encountered in that city by engineers. With municipal traditions extending back for hundreds of years, it was no light task to undertake a complete renovation. It is, therefore, not to be wondered at that Vienna was transformed into a modern metropolis only after it had outgrown its city walls, which happened about forty years ago. Even in that brief space of time the city has not been quite able to counterbalance the losses which its previous tardiness had entailed; still, a city of its size more than deserves the attention of the municipal engineer.

The city of Zürich, which forms the subject of the second monograph, has progressed far more rapidly in the same period. The town has been provided with a good supply of drinking water. An admirable drainage system has been installed. Large sums of money have been appropriated for the extension of the water system and for the building of broad streets. The administration of the health board of the town is admirable. Unfortunately, the rather defective vital statistics of the town render it impossible to prove the effect which these sanitary conditions must have had upon the health of the community.

TELEPHONY. Part III. The Construction of Cable Plant. By Arthur Vaughan Abbott, C.E. New York: McGraw Publishing Company. 1903. 12mo. Pp. 142. Price $1.50.

The appearance of the third part of this excellent work will be welcome to electrical engineers. The subject is a very important one, and as far as our knowledge of the subject goes, is well treated. The contract and specifications for cable construction occupies more than half the book. We have already called attention to the very lucid nature of the contracts outlined in the previous volumes. It would be wise if every industry had similar contracts adapted to its own peculiar line of business.

HANDBUCH DER INGENIEURWISSENSCHAFTEN. Zweiter Band. Der Brückenbau Sechste Abteilung: Eiserne Brückenpfeiler, Ausführung und Unterhaltung der eisernen Brücken. Bearbeitet von G. Mantel und W. Hinrichs. Herausgegeben von Th. Landsberg, Dr. Th. Schäffer, und Ed. Sonne. Dritte vermehrte Auflage. Mit 275 Textfiguren, Sachregister und 13 lithographierten Tafeln. Leipzig: Verlag von Wilhelm Engelmann. 1903. Pp. 371.

The second volume of this admirable handbook of civil engineering (which may be regarded more as an exhaustive treatise than as a handbook) deals with certain important questions in bridge construction, notably iron bridge piers, and the construction and maintenance of iron bridges. Particularly in the chapter on Iron Piers is to be noted an excellent theoretical discussion as well as a description of practical improvements which have been made within the last decade. The late W. Hinrichs prepared the chapter on Bridge Maintenance with praiseworthy thoroughness.

YOUNG IVY ON OLD WALLS. A Book of Verses. By H. Arthur Powell. Boston: Richard G. Badger. 1903. Pp. 57.

Mr. Powell has here collected several poems which have appeared in the popular magazines of the day, and has added thereto verses which have hitherto not been published. Although it hardly falls within our province to pass upon the poetical merits of his verses, to us it seems that he is at his best in his descriptions of nature. Particularly happy seem to us the poems entitled "After the Rain" and the "Mummers."

LIGHT WAVES AND THEIR USES. By Albert A. Michelson. Chicago: The University of Chicago Press. 1903. 8vo. Pp. 164. Price $2.

This book contains a course of eight lectures delivered before the Lowell Institute at Boston in the year 1899. In these lectures the results of the investigations with which the author has been engaged for the last twenty years are presented in language as free from technicality as possible. They contain much information about light waves which is to be found only in scientific periodicals. The subject while of great scientific interest is presented in such simple form that comparatively little training is needed to enable one to comprehend the essential facts and fundamental principles involved. The three colored plates are admirably executed.

THE WELLCOME PHYSIOLOGICAL LABORATORIES. By Walter Dawson, M.A., M.D. Brockwell Hall, Herne Hill, London, S. C., England. 12mo. Pp. 36.

It was for the purpose of participating in the inevitable advances of scientific thought and discovery, which concern not merely institutions and individual scientific workers, but upon which the progress and intellectual status of mankind so largely depend, that the Wellcome Physiological Laboratories were founded. Mr. Wellcome, who established the laboratories, while a manufacturer of drugs, keeps this institution entirely separate and distinct from his business and under independent direction. The work which these laboratories are doing is very valuable.

THE MECHANICAL ENGINEER'S POCKET-BOOK OF TABLES, FORMULÆ, RULES, AND DATA. By D. K. Clark, M. I., C. E. New York: D. Van Nostrand Company. 1903. 18mo. Pp. 692. Price $3.

The fifth edition of Clark's Pocket-Book will be warmly welcomed by engineers. It has already stood the test of time, and has proved itself to be an accurate and useful book. It would be almost useless to give any account of its contents; as far as this goes, it resembles other well-known pocket-books. It deals with mathematics, mensuration, metals, alloys, strength of materials, heat, fuels, steam, steam engines, boilers, railways, steamships, gas, compressed air, windmills, water powers, electrical engineering, and allied subjects.

FÜNFUNDZWANZIG JAHRE IM DIENSTE DER SACCHARIN-INDUSTRIE UNTER BERUCKSICHTIGUNG DER HEUTIGEN SACCHARIN-GESETZGEBUNG. Votrag gehalten von Dr. Constantin Fahlberg vor dem V. Internationalen Kongress für angewandte Chemie, Reichstagsgebäude. Berlin. 1903. Pp. 38.

GOVERNORS AND GOVERNING MECHANISM. By H. R. Hall. Manchester, England: The Technical Publishing Company, Ltd. 1903. 16mo. Pp. 119, 76 illustrations. Price $1.

The subject of the governing of engines by mechanical means is a most important one, and the writer has done a distinct service to mechanical engineering in the preparation of the present lucid volume, which is admirably illustrated by engravings and folding plates. Some of the types of governors shown are most novel, and are not used at all in American practice.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending November 24, 1903,

AND EACH BEARING THAT DATE

(See note at end of list about copies of these patents.)

Abrading wheel truing tool, L. A. Sherman 745,1..
Accumulator plate, F. W. Buhne ..... 745,2..
Acid, preparing dialkyl barbituric, M. Engelmann ..... 744,7..
Acid vat, T. W. Ruffner ..... 744,2..
Adjustable table, G. H. Cummings 745,160
Advertising envelop, F. Howey 745,187
Air or other aeriform bodies, compressor for, Sergeant & Raymond 745,298
Alkalies and alkali earths, manufacturing hydrates of, F. Jahn 744,920
Alumina and by-products, making, L. R. Keogh 744,765
Amalagamator, G. Fletcher et al 745,047
Angle chair, G. A. Weber 744,833
Animal trap, W. H. Reiff 745,118
Apron guiding mechanism, W. J. Asher, reissue 12,173
Atomizing device, W. Sams, reissue 12,176
Automobile controller, L. Mott 745,226
Automatic sprinkler, H. C. Perham 744,791
Awning, M. F. Wiedemann 744,844, 744,845
Awning, C. W. Monroe 744,971
Axle and wheel, vehicle, B. B. Gilmore .. 745,009
Bags, self-closing mouth for, G. W. Williams 744,846
Balance staff, D. H. Church 744,719
Balls, manufacture of golf, P. A. Martin. 745,213
Balls, manufacture of the cores of golf or like, P. A. Martin 745,212
Barrel lifter, W. J. Stewart 744,813
Bath tub, collapsible, W. G. Gittings..... 744,745
Battery. See Galvanic battery.
Battery connector, flexible, P. Kennedy... 745,193
Battery plate, storage, J. Bijur 744,895
Bearing plate, center, C. A. Lindstrom..... 744,922
Bearing, roller, W. Houldsworth 744,917
Bearing, roller, E. Klahn 745,198
Bearing, thrust, J. T. Cowley 744,906
Bed rest. J. A. Palitzsch 745,234
Bell, electric, P. G. Tismer 744,944
Belt and fastener therefor, conveyor, A. Rasmussen 744,979
Bicycle attachment, C. G. Hightower 745,185
Billiard chalk holder, J. Pejchar 744,935
Binder or file, loose leaf, C. F. W. Graun. 744,749
Binder tension, C. J. Tuseth 745,123
Blind and curtain fixture, adjustable, W. E. Wilson 745,129
Block mold, J. C. Miller 744,970
Block signaling system and apparatus therefor, J. E. Allison 744,706
Boat, illusion, M. E. Smith 744,880
Body protector, J. Gamble 745,007
Boiler compound, J. I. Broughton 745,147
Bolt holding tool, M. C. McDaniel 744,930
Book, account, J. H. Rand 744,793
Book handle or carrier, A. J. Sleght 745,251
Boots or shoes, article for use in the manufacture of, E. P. Worth 744,850
Boring apparatus boring tube or rod, McNamara & Schanke 744,873
Boring or drilling machine, multiple spindle horizontal, F. L. Eberhardt 744,859
Bottle closure, milk, J. C. Kimsey 745,195
Bottle filler. S. B. Goff 745,051
Bottle, non-refillable, B. W. Glass 744,746
Bottle stopper, A. Fredericksen 745,185
Bottle stopper, self-closing, F. W. Johnson 745,191
Box, Becker & Sprenger 744,855
Box fastener, C. W. Beehler 745,138
Brace, J. Holley 745,059
Brake, J. H. Pick 744,792
Brake beam, S. A. Crone 744,723
Bread making machine, C. Kessler 745,018
Breast strap, J. W. Kavetzki 744,967
Bridge, floating, H. Kampmann..... 745,192
Brush or broom, . M. Musgrave 744,784
Building construction, A. Menczarski 745,068
Buckle, harness, F., E. & H. Boldt 744,714
Burner, S. A. Rosenthal 744,800
Burner grate, J. F. Swarens 744,883
Button, separable, C. Yoemans 745,089
Cabinet, kitchen, M. H. Shanley..... 744,808
Calcining apparatus, A. Lawrence..... 745,067
Calculating machine, J. Mallmann 745,024
Calculating machine, A. R. Boynton 745,144
Calculating machine, Bundy & Boynton 745,149
Calculator, E. C. Duncan 745,167
Calipers, W. A. Mcdonald 745,229
Calipers or gage, W. Reilly 744,796
Camera attachment, W. E. Mulhollan 744,783
Camera, panoramic, C. Mills 744,928
Camera sighting device, F. M. Steadman... 745,258
Can. See Creaming can.
Can, J. C. Achterman 744,991
Can opener, M. L. Hawks 744,914
Candle attachment, M. L. Bush 745,151
Cane fabrics, machine for inserting diagonal strands in woven, L. Janson 745,062
Car bolster, railway, A. Stucki 745,262
Car brake, W. D. Rearwin 744,981
Car brake beam, railway, S. A. Crone 744,722
Car coupling, C. A. Tower 745,265
Car coupling, McConway & Kelso, reissue. 12,175
Car coupling, emergency, Carlisle & Elder, . 745,093
Car door, grain, A. G. Steinbrenner 745,259
Car fender, T. J. Glynn 744,913
Car frame, motor, J. J. MacMulkin 744,775
Car, mine, W. H. Morris 744,872
Car moving mechanism, J. Barnes 745,034
Car, ore, G. G. Newcomb 745,113
Car registering and annunciating device, A. G. Abizaid 744,704
Car, street, W. P. Michel 744,780
Carbureter, E. D. Parrott 744,877
Carbureter, gasolene engine, P. Jenness.. 745,063
Carpet cleaner, G. A. Cowgill 744,721
Carpet holder, stair, J. D. Miller..... 745,220
Carriage, combination cutunder, M. H. Kashian 745,108
Carriage step, C. E. Hopper 744,863
Casein, preparing fat free, O. Eberhard.. 745,097
Castings, mold for making brass, Friese & Gilbert 745,005
Cement pipes or the like, apparatus for manufacturing, B. Noldner 745,291
Cement post, H. McMaster 744,976
Centrifugal drier, H. Monk 745,223
Centrifugal separators, driving mechanism for, M. L. Hoyt 744,966
Chair, G. H. Hersey 745,104
Chariot, cycloidal, W. D. Cronin 745,159
Cigar bunching machine, H. W. Albright.. 744,951
Cigar piercer, W. J. Bailey 744,893
Cleaver and knife, E. P. Donnelly 745,162
Clevis, plow, J. L. Bay 744,851
Cloth treating machine, D. Gessner 744,744
Clothes drier, S. Butterworth..... 744,901
Clover buncher, Wheeler & Boice 744,840
Coin operated machine, Jarboe & Keller.... 744,921
Coke, apparatus for the manufacture of, P. Naef 745,290
Collar fastener, W. J. Baker 745,135
Collar or cuff, woven, A. L. Willard 745,305
Comb, J. Koenig 744,768
Comb, H. Prevear 745,073
Combustion in coal, compound for promoting, G. M. Dallas 744,908
Composition, L. C. Gauvreau 745,050
Compositor's stick and type chase, combined, F. W. Weeks 744,838
Concentrating apparatus, Tucker & Goddard 744,823
Condenser, steam, R. H. Hornbrook 745,186
Conveyer, dumping, F. Head 745,183
Conveyers, device for operating trippers for belt, A. M. Acklin 745,031, 745,032
Conveying apparatus, G. W. Smith 745,253
Cooking utensils, jacket attachment for steam, W. F. Stubinger 745,261
Cooling jacket, W. R. Hamm 745,054
Coop for poultry, folding, W. H. Warner, Jr. 744,827
Cordage machine, J. P. Tolman 744,987
Corn shelling machines, automatic corn feeder and regulator for, C. Petersen 745,116