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**FUSIBILITY OF ASH FROM COALS
OF THE UNITED STATES**

BY

W. A. SELVIG and A. C. FIELDNER



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FUSIBILITY OF ASH FROM COALS OF THE UNITED STATES.

By W. A. SELVIG and A. C. FIELDNER.

INTRODUCTION.

Information concerning the fusibility of coal ash has become of considerable value to the consumer of coal, mainly in connection with the troublesome formation of clinker resulting from the melting of the ash constituents of the burning coal. The growing interest in such data has led the Bureau of Mines to make a general survey of the "fusing" or "softening" temperatures of the ash from coals of the United States. It is hoped that this information when used together with the large number of coal analyses published¹ by the bureau will assist the consumer of coal in comparing different coals, and in selecting the coal best adapted for his purpose.

ACKNOWLEDGMENTS.

The laboratory fusibility tests were made by A. E. Hall, V. C. Allison, W. A. Selvig, C. R. Locke, C. S. Purcell, W. C. Ratliff, O. C. Brown, W. F. Holbrook, and A. M. Ondrejco, all of the chemical laboratory of the Bureau of Mines.

SOURCE AND COMPOSITION OF COAL ASH.

Coal ash is the incombustible residue remaining after the complete combustion of coal; it is derived from the inorganic mineral constituents of the coal. The ash-forming constituents are (1) inherent or intrinsic impurities that are present in an intimate mixture with the coal substance, and are derived either from the original material or from external sources such as sedimentation and precipitation while the coal-forming plant remains accumulated; (2) impurities, formed either during the laying down of the coal bed or subsequently, that occur in the form of partings, veins, and nodules of clay, shale, "slate," pyrite, and calcite; and (3) impurities that become intimately mixed with the coal in the process of mining, such as fragments of roof and floor.

¹ Lord, N. W., and others, Analyses of coals in the United States, with descriptions of mine and field samples collected between July 1, 1904, and June 30, 1910: Bull. 22, Bureau of Mines, 1913, 1,200 pp. (in two parts).

Fieldner, A. C., and others, Analyses of mine and car samples collected in the fiscal years 1911 to 1913: Bull. 85, Bureau of Mines, 1914, 444 pp.

Fieldner, A. C., and others, Analyses of mine and car samples collected in the fiscal years 1913 to 1916: Bull. 123, Bureau of Mines, 1917, 456 pp.

Fieldner, A. C., and others, Analyses of mine and car samples collected in the fiscal years 1916 to 1919: Bull. 193, Bureau of Mines (in press).

Coal ash is composed largely of compounds of silica, alumina, lime, and iron, with smaller quantities of magnesia, titanium, and alkali compounds. The chemical composition varies so widely that no typical composition can be given. In general the analyses of most coal ash will probably come between the following limits:

Typical limits of ash analyses.

Constituent.	Per cent.	Constituent.	Per cent.
SiO ₂	40-60	CaO.....	1-15
Al ₂ O ₃	20-35	MgO.....	.5-4
Fe ₂ O ₃	5-25	Na ₂ O+K ₂ O.....	1-4

This list of constituents shows that coal ash contains relatively large proportions of SiO₂ and Al₂O₃, and smaller proportions of the other oxides.

RELATION BETWEEN CHEMICAL COMPOSITION AND FUSIBILITY OF COAL ASH.

The fusibility of coal ash depends on several factors, such as the ratio of the silica to the bases present, the particular bases, and the percentage of alumina present. Mixtures extremely high in silica or extremely high in bases are not readily fusible. Ash that is low in iron is usually so highly siliceous that it is not readily fusible. Ash from coals high in pyrite is necessarily high in iron, and the ratio between the bases and silica is often such that easily fusible compounds may be formed. As a rule, coals containing considerable sulphur in the form of pyrite are apt to give trouble from clinker formation. Under conditions of the fuel bed the iron of the pyrite is apt to be converted to ferrous oxide, which with the silica present forms ferrous silicates that fuse at comparatively low temperatures. The chemical analyses of a series of five coal ashes ranging from very fusible (softening at 2,060° F.) to highly refractory (softening above 2,900° F.) is as follows:

Chemical analyses of five coal ashes covering a wide range of fusibility.

Sample No. ^a	Softening temperature, ° F.	Analyses of ash, percentage of—								
		SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Na ₂ O	K ₂ O	SO ₂
1.....	2,060	30.7	19.6	18.9	1.1	11.3	3.7	1.9	0.5	12.2
2.....	2,320	46.2	22.9	7.7	1.0	10.1	1.6	.7	.8	8.9
3.....	2,500	49.7	26.8	11.4	1.2	4.2	.8	1.6	1.3	2.5
4.....	2,730	51.0	30.9	10.7	1.9	2.1	.9	1.0	.4	.6
5.....	+2,900	58.5	30.6	4.2	1.8	2.0	.4	.7	.9	.9

^a Sample No. 1, subbituminous coal, No. 3 bed, Montana; No. 2, bituminous coal, No. 6 bed, Illinois; No. 3, bituminous coal, Pittsburgh bed, Pennsylvania; No. 4, semibituminous coal, Pocahontas No. 3 bed, West Virginia; No. 5, bituminous coal, Dean bed, Kentucky.

RELATION OF FUSIBILITY TESTS TO CLINKER FORMATION.

It is well to bear in mind that the conditions of fusibility tests in the laboratory may not be directly comparable to the conditions in the fuel bed of a furnace. In a laboratory test the ash-forming constituents are intimately mixed, whereas there is usually no such uniform distribution of the ash-forming constituents in coal fire.

Some coal ash is so infusible that little trouble is experienced from the formation of clinker. Ash that is slightly more fusible will often form a porous, spongy clinker which does not seriously obstruct the flow of air through the fuel bed and is easily removed. Coal ash with a low fusing temperature, say $2,100^{\circ}$ F., not only melts in the average fire box, but is heated several hundred degrees above its melting temperature, becoming quite fluid and spreading out in a thin sheet over the grate, thereby obstructing the flow of air and localizing the heat in the fuel bed.

The method adopted for making fusibility tests was the result of considerable experimental work,² by the Bureau of Mines on the nature of the fusion of coal ash and the influence of various oxidizing, reducing, and neutral atmospheres on the softening temperature of ash molded in the form of Seger cones. The method takes into consideration the various factors that influence the result obtained, with special reference to the atmosphere surrounding the ash during the test. The atmosphere in which the ash is heated is controlled by burning an excess of gas; a reducing atmosphere is thus obtained by which the iron in the ash is reduced mainly to the ferrous state, giving the lowest temperature at which clinkering may result.

This change in the iron is of special importance in testing coals that contain a relatively large proportion of iron in the form of pyrite. Higher softening temperatures may be expected with such coals in tests using oxidizing atmospheres which would oxidize the iron mainly to ferric oxide, or in tests using strongly reducing atmospheres which would reduce the iron largely to the metallic state. Under both conditions a more refractory slag is formed than would result if the atmosphere were such as to reduce the iron in the ash to ferrous oxide, which, with the silica present, would form readily fusible silicates. Ferric oxide forms with silica compounds that require a high temperature for fusion; on the other hand, if the iron is reduced to the metallic state, one of the most active fluxing constituents is removed from the system and high-fusing points result.

Analyses of clinkers from boiler furnaces indicated that fuel-bed conditions favored the formation of clinkers in which the iron was chiefly in the ferrous state; consequently the values obtained in the

² Fieldner, A. C., Hall, A. E., and Feild, A. L., The fusibility of coal ash and the determination of the softening temperature: Bull. 129, Bureau of Mines, 1918, 146 pp.

laboratory tests are, in this respect, comparable to such conditions, and the tests give the lowest temperatures at which the intimately mixed ash will soften with the formation of clinker.

GAS FURNACE METHOD FOR DETERMINATION OF FUSIBILITY OF COAL ASH.

FURNACE.

The No. 3 melter's furnace of the American Gas-Furnace Co. was used in the tests. This furnace is a type of pot furnace especially suitable for fusion determination, as the three burners arranged on a tangent near the base of the furnace produce a rotary flame that completely surrounds the crucible in which the cones are placed. The whirling flame heats the crucible uniformly, and when an excess of gas is used, a reducing atmosphere is maintained within the crucible, giving the lowest point at which the ash fuses. The air is supplied at an approximate pressure of 3 pounds per square inch, and the gas used may be either natural or artificial.

The furnace proper consists of three easily replaceable parts of fire clay, namely, a lower cylinder containing the three tangential tuyeres and forming the bottom of the furnace; a removable upper cylinder 7 inches in internal diameter and 7 inches high; and a cover plate $1\frac{1}{2}$ inches thick having a vent hole in the center for the flue gas.

The stock design was modified by providing the upper cylinder with two holes in the side; one was a 2-inch observation hole with its center 4 inches from the top of the cylinder (excluding the cover plate) and the other was a 1-inch thermocouple hole 90° to the right of the observation hole. The bottoms of these two holes were in the same horizontal plane. The interior of the furnace is cylindrical and approximately 7 inches in diameter and 11 inches high. A counterbalanced sheet-iron canopy is connected with a telescopic 8-inch flue to an exhaust system for conducting the hot gases out of the room. Two melter's No. 3 furnaces and accessories are shown in Plate I.

The joint between the upper and lower cylinder is made fairly gas-tight by spreading on the top of the lower cylinder a thick paste of alundum cement to a depth of one-half inch and then firmly pressing the upper cylinder into place. The outer part of the joint is also smoothed over with alundum cement. The fire-clay cylinders and cover will withstand a temperature of about $1,650^\circ\text{C}$.

REFRACTORY CRUCIBLES.

The interior of the furnace as arranged for making a test is shown in figure 1. The ash cones *a* are supported on a plate of alundum cement serving as a cover for the crucible, *b*, which is a Denver fire-

clay hard-burned crucible, No. E, 4 inches high and 3 inches in diameter at the top. An alundum tube of the proper height may be used in place of crucible *b*. Crucible *d* is a Denver fire-clay hard-burned crucible, No. K, $7\frac{1}{2}$ inches high and $4\frac{5}{8}$ inches in diameter at the top; it has observation and thermocouple holes corresponding to those in the furnace cylinder, and it rests on a fire-clay support. The thermo element is protected by a glazed Marquadt porcelain tube, *e*, one-fourth inch in diameter. A fused silica tube, $1\frac{7}{8}$ inches in external diameter and 6 inches long, is placed in the observation hole of the furnace, the inner end being flush with the inside furnace wall and the other end projecting from the furnace. This crucible should be provided with two holes in the side, an observation hole 2 inches in diameter with its center 2 inches from the top of the crucible and a thermocouple hole 1 inch in diameter, 90° to the right of the observation hole. The bottom of this hole should be in the same horizontal plane as the bottom of the observation hole. The hard-burned fire-clay crucibles will not withstand a temperature exceeding $1,500^\circ\text{C}$. The average life of a fire-clay crucible under these conditions is about six runs.

Corundite crucibles and covers made by the Massillon Stone & Fire Brick Co. are longer lived than the fire-clay crucibles, being

good for about 50 runs to temperatures not exceeding $1,500^\circ\text{C}$. A special form used by the Bureau of Mines is 3 inches inside diameter, $4\frac{1}{2}$ inches high outside, with a wall about one-fourth inch thick. The crucibles should be provided with two holes in the side—an observation hole 2 inches in diameter with its center $1\frac{3}{4}$ inches above the bottom of the crucible, and a thermocouple hole 1 inch in diameter, 90° to the right of the observation hole. The bottom of this hole should be in the same horizontal plane as the bottom of the observation hole.

Recent tests with Zirkite crucibles of the Foote Mineral Co. show that they are longer lived than the fire-clay crucibles. A stock Zirkite crucible was used for 70 runs before failure, the temperatures being carried up to $1,500^\circ\text{C}$.

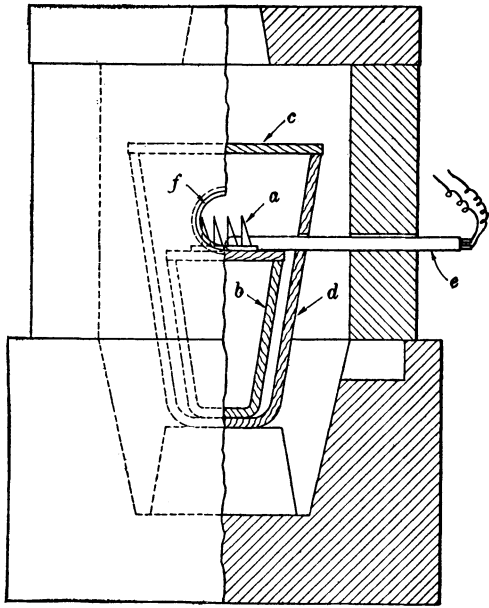


FIGURE 1.—Section of No. 3 melter's furnace arranged for fusion tests.

OBSERVATION TUBE.

A fused silica, refractory porcelain, or alundum tube, $1\frac{7}{8}$ inches in external diameter and 6 inches long, is placed in the 2-inch observation hole of the furnace, the inner end being flush with the inside furnace wall and the other end projecting out of the furnace. A brass sleeve carrying a thin clear glass window is slipped on the outer end of the observation tube to prevent the escape of burning gas, which would hinder convenient observation of the cones. When observations at high temperatures are made the cones are viewed through a piece of colored glass, such as Corning No. 6 shade, Noviweld.

BLOWING TUBE.

At furnace temperatures above $1,000^{\circ}$ C. observation of the ash cones is difficult. A Marquadt, Usalite, Impervite, or equal quality porcelain blowing tube one-fourth inch in diameter is inserted through the same hole as the thermocouple tube. This tube has small perforations along one side by which air may be forced upon the cones at the time of making the observation, thus momentarily cooling the ash cones and rendering them visible. The blowing tube is connected to the compressed-air line by means of rubber tubing, and the air is let into the tube at the time of observation by means of a pinchcock.

CONE MOLD.

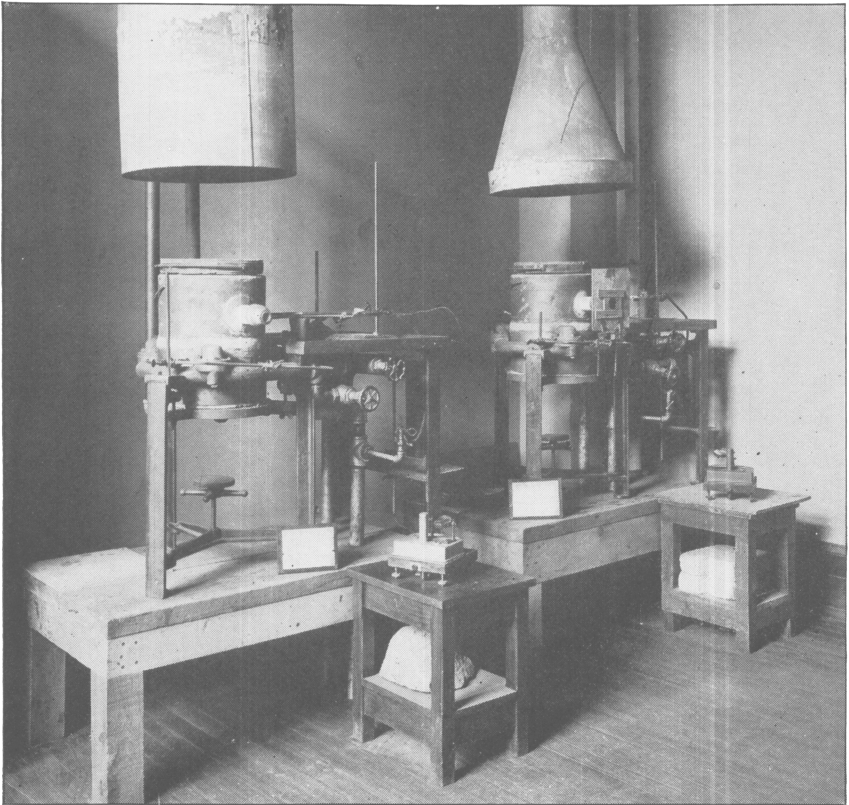
Figure 2 shows a brass cone mold for making ash cones, three-fourths inch high and one-fourth inch at each side of the base, which is an equilateral triangle.

PYROMETER.

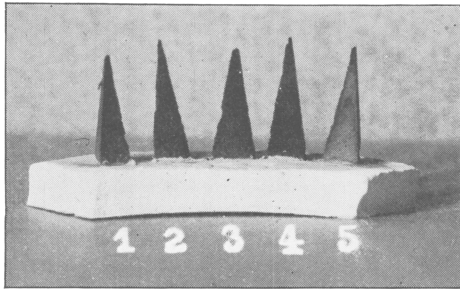
Temperature measurements may be made with a thermocouple of platinum and platinum-rhodium, protected from the furnace gases by a glazed Marquadt, Usalite, Impervite, or equal quality porcelain tube and a high resistance millivoltmeter; or with an optical pyrometer preferably of the Leeds & Northrup or Wanner type. This equipment should be checked frequently by mounting pieces of pure gold and nickel in the same manner as the cones. With a strong reducing atmosphere $1,452^{\circ}$ C. should be obtained for the melting point of nickel and $1,063^{\circ}$ C. for the gold. The pyrometer equipment should also be standardized from time to time through the temperature range for which it is used by a suitably equipped standardizing laboratory, such as that of the United States Bureau of Standards.

PREPARATION OF COAL ASH.

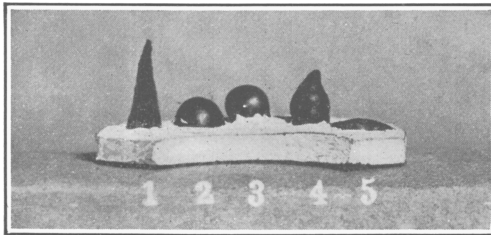
Spread out 50 to 100 grams of 60-mesh coal on a 5-inch fire-clay roasting dish, and completely convert it to ash in a muffle furnace at a temperature of 800° to 900° C. Transfer 5 to 10 grams of this ash



NO. 3 MELTER'S FURNACES AND ACCESSORIES.



A. CONES MOUNTED ON BASE.



B. TYPICAL FORM OF CONES FUSED IN NO. 3 MELTER'S FURNACE.

to an agate mortar and grind to a fineness of 200-mesh. A mechanical agate-mortar grinder will save time where many determinations are made. Place the finely ground ash in a silica or porcelain capsule, about five-eighths of an inch deep and $1\frac{1}{4}$ inches in diameter, and ignite for two hours in a current of oxygen, at a temperature of 800° to 850° C. The purpose of this ignition is to insure complete and uniform oxidation of the ash.

PREPARATION OF THE CONES.

Moisten the ignited ash with a 10 per cent dextrin solution, containing a small amount of salicylic acid as a preservative, and work into a plastic mass with a spatula. Mold the plastic material into small triangular pyramids three-fourths of an inch high and one-fourth inch wide at each side of the base. The pyramids are made by firmly pressing the plastic material with a steel spatula into a brass mold of the dimensions mentioned, the mold being similar to that shown in figure 2. Strike off the surface smooth and remove the cone from the mold by applying a small knife blade at the base.

Mount the cones when dry in a refractory base composed of a mixture of equal parts of kaolin and calcined alumina. Moisten the base mixture to make it workable, and spread a part of it out on a sheet-iron plate. Then mount the cone in a vertical position in a small

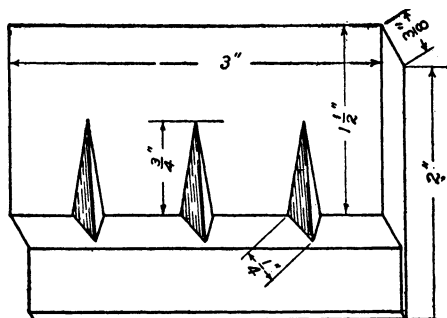


FIGURE 2.—Brass cone mold for making ash cones.

hole made in the base, and put a little of the base material into the hole around the bottom of the cone to fill the crevices and to make the cone stand firmly. Usually five cones are mounted on one base in the manner shown in Plate II, A. Dry the sheet-iron plate with the test piece on a hot plate, then ignite the cones at a dull red heat for 30 minutes in an open muffle to remove carbonaceous material.

METHOD OF HEATING.

Put the test piece in the muffle furnace in the position shown in figure 1, place the loosely fitting cover *c* on the crucible, and ignite the gas. It is necessary to let the gas burn about 10 minutes to heat the furnace parts before the large cover plate of the furnace is replaced; otherwise the flame is apt to blow out. After the cover plate of the furnace has been put in position, the flow of gas and air is increased enough to cause combustion to take place just above the tuyeres and yet maintain a yellowish flame at least 6 inches above the opening in the furnace cover plate. While such a flame is main-

tained above the furnace, gradually increase the temperature by a suitable adjustment of gas and air to 800°C ., then reduce the rate

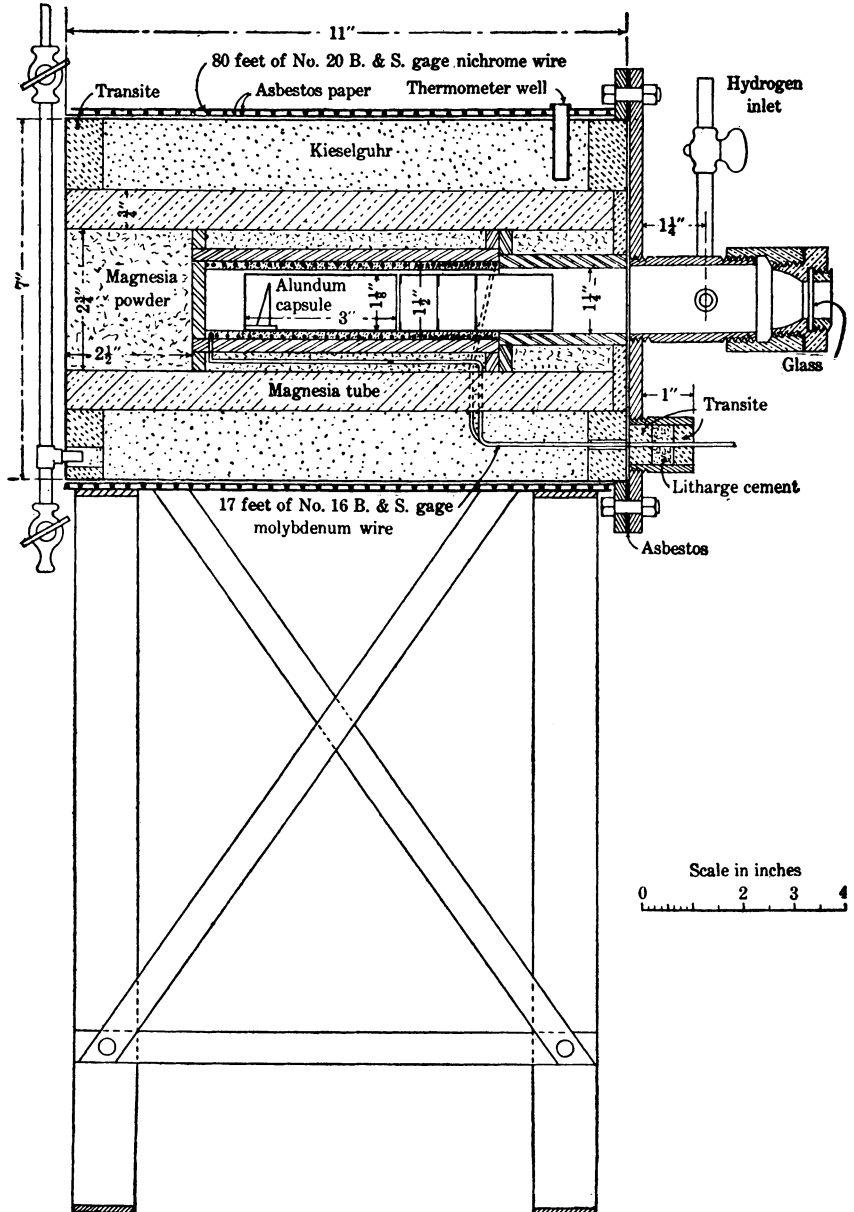


FIGURE 3.—Vertical longitudinal section through molybdenum furnace.

of heat increase to not less than 5°C . and not more than 10°C . per minute. Maintain this rate until the end of the test.

It is important that the 6-inch reducing flame be maintained at the furnace vent throughout the test, if possible, and at all events up to a temperature of 1,450° C. Temperatures above 1,450° C. require larger proportions of air to gas; however, a strongly reducing atmosphere is not so essential at the higher temperatures, because refractory ashes, on account of their low iron-oxide content, are only slightly affected by oxidizing or reducing atmospheres. After a test has been completed, turn the supply of gas and air off gradually to avoid cracking the muffle crucible.

The softening temperature is defined as the temperature at which the cone has fused down to a spherical lump, as shown in cones 2 and 3 of Plate II, *B*. Cone 4 has almost reached the softening temperature.

Critical points other than the softening temperature may be observed during the test and may be of value. They are as follows:

The initial deformation temperature—the temperature at which the first rounding or bending of the apex of the cone takes place, as shown in cone 1 of Plate II, *B*. Such bending must not be confused with a shrinking or warping of the cone.

The fluid temperature—the temperature at which the cone has spread over the base in a flat layer, as represented by cone 5 of Plate II, *B*.

The permissible differences of the softening temperature point in duplicate determinations are as follows: Same analyst, 30° C.; different analysts, 50° C.

MOLYBDENUM-WIRE RESISTANCE FURNACE.

Owing to the short life of the refractory crucibles used when heated to temperatures higher than 1,500° C., ashes that did not fuse at 1,500° C. were heated in a molybdenum-wire resistance furnace³ in an atmosphere of hydrogen gas to a temperature of 1,650° C. A vertical longitudinal section of the molybdenum-wire resistance furnace is shown in figure 3. Hydrogen gas is used in this type of furnace to prevent oxidation of the molybdenum resistance wire. Ashes softening above 1,500° C. have as a rule such a low iron content that the nature of the atmosphere surrounding the ash cones during the test has little influence on the fusibility.

INTERPRETATION OF THE FUSIBILITY TABLE.

With the exception of a few car samples of coal, the samples listed are all standard mine samples collected by representatives of the Bureau of Mines, the United States Geological Survey, or by various State geological surveys, according to methods used by the Bureau of

³ Fieldner, A. C., Hall, A. E., and Feild, A. L., The fusibility of coal ash and the determination of the softening temperature: Bureau of Mines, Bull. 129, 1918, pp. 74-79.

Mines.⁴ The car samples were collected by representatives of the Bureau of Mines according to standard methods.⁵ Car samples are designated as such in the table under the name of the mine.

The arrangement of the samples in Table I is alphabetical according to State, county, town, mine, and coal bed. The laboratory numbers of the samples collected from each mine are given; by means of these numbers the chemical analysis and the description of the samples can be obtained by reference to bulletins of the Bureau of Mines. (See footnote, p. 1.)

In classifying the coals according to rank the usage of the United States Geological Survey⁶ has been followed. In order to attain brevity, this rank is abbreviated. Thus, A signifies anthracite; S. A., semianthracite; S. B., semibituminous; B, bituminous; Sb. B., subbituminous; L., lignite; and N. C., natural coke.

The number of samples, the lowest, highest, and average softening temperatures in degrees Fahrenheit, and the percentage of ash and sulphur in the dry coal are tabulated for each mine. Samples remaining unfused at 3,010° F., which was the highest temperature attained in the tests, are marked by plus 3,010 (+3,010) and used as such in figuring the average values for the mine.

DISCUSSION OF FUSIBILITY VALUES.

CLASSES OF FUSIBILITY.

In general, the softening temperature of coal ash from the coals of the United States ranges from 1,900° to 3,100° F. For convenience in discussion, the order of fusibility of ash may be expressed by subdividing this range of softening temperature into three groups, as follows:

Class 1, refractory ashes, softening above 2,600° F.

Class 2, ashes of medium fusibility, softening between 2,200° and 2,600° F.

Class 3, easily fusible ashes, softening below 2,200° F.

EASTERN COALS.

The coals of Ohio which were tested gave ash of medium fusibility, mainly in class 2.

The bituminous and semibituminous coals of Pennsylvania that were tested gave refractory class 1 ash and medium fusible class 2 ash, chiefly the latter. Only a small number of coals from the Pennsylvania anthracite region were tested; these gave refractory ash in class 1.

⁴ Holmes, J. A., *The sampling of coal in the mine*; Tech. Paper 1, Bureau of Mines, 1911, 18 pp.

⁵ Pope, G. S., *Directions for sampling coal for shipment or delivery*; Tech. Paper 133, Bureau of Mines, 1917, 15 pp.

⁶ Campbell, M. R., *The coal fields of the United States*; U. S. Geological Survey Prof. Paper 100-A, 1917, pp. 3-9.

The West Virginia coals represent all three classes of fusibility. The semibituminous coals of West Virginia come principally in class 1 and class 2. Some very refractory class 1 coals are found in the Beckley bed in Raleigh County.

Many of the coals of Maryland that were tested gave a refractory ash coming in class 1 or in the upper part of class 2.

The softening temperature of the ash from coals of eastern Kentucky and of Virginia cover a wide range of fusibility from readily fusible ash, class 3, to refractory ash, class 1.

The coals tested from Tennessee and Alabama come mainly in class 2, having ash of medium fusibility, but both class 1 and class 3 are represented.

COALS OF THE INTERIOR PROVINCE.

Coals from Illinois, Indiana, western Kentucky, Kansas, Missouri, Oklahoma, and Arkansas are represented in Table I. The softening temperature of the ash from these coals is uniformly low, practically all of the coals tested coming in class 3. The uniformly low softening temperature of the ash is unquestionably due to the rather general distribution of pyrite, calcite, and frequently gypsum in the coal beds. Usually the percentage of iron and lime in the ash is high, and in general mines producing coal lower in sulphur than the average for the bed also produced coal having ash of higher fusibility than the average for the bed.

As may be expected, samples from the same mine do not show ash of uniform fusibility because the composition of the ash-forming constituents included in the samples differ. This variation of fusibility of samples of coal from the same mine in the interior province is not large, averaging but 140° F. for the mines represented in the table. In only a few instances is the difference between the lowest and highest softening temperatures of a number of samples from the same mine more than 300° F. The majority of mines gave samples coming within the average difference of 140° F. between the lowest and highest values.

WESTERN COALS.

A great variety of coal is found in the West, ranging from lignite to anthracite. In the table are listed coals from Alaska, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Utah, Washington, and Wyoming.

Most of the samples of Alaska coal listed were taken from outcrops or prospects, and range from refractory class 1 ash to ash of medium fusibility of class 2.

The coals from Washington show all three classes of fusibility. The majority of the samples, however, come in class 1 and class 2.

These coals have a high ash content, but in many the ash is refractory. Oregon and California contain little coal.

The coals tested from Colorado and New Mexico range from refractory class 1 ash to easily fusible class 3 ash, the majority of the samples tested coming in class 1 and class 2.

Many of the coals from Utah showed ash of comparatively low fusibility, in the upper part of class 3; a considerable number of samples gave ash of medium fusibility, in class 2. A few samples gave refractory class 1 ash.

Idaho and Nevada are of no commercial importance as coal producers, for only a little coal is found in these States.

The lignites tested, from North Dakota, South Dakota, and Montana, have ash of rather low fusibility, the majority of the samples coming in class 3 or the lower part of class 2.

The subbituminous coals tested from Montana and Wyoming also gave ash of rather low fusibility, most of the samples coming in class 3 and the lower part of class 2.

Most of the lignites and subbituminous coals listed in the table have a fairly low sulphur content, consequently the low melting points of the ash from these fuels can not be attributed to the presence of large amounts of iron in the form of pyrite, but rather to the presence of other mineral constituents in the proper proportion to form readily fusible mixtures.

FUSIBILITY OF COAL ASH FROM MINE AND FROM CAR SAMPLES.

In collecting mine samples of coal the Bureau of Mines endeavors to have the samples represent as nearly as possible the coal that is produced commercially; car samples as a rule, however, have a higher ash content than mine samples from the same mine because of impurities that become mixed with the coal in mining. Theoretically the extraneous impurities that are included in the coal as mined may either lower or raise the fusibility of the coal ash. If these impurities consist of substances such as pyrite, the ash of the coal mined would probably be more fusible than the ash of the mine samples; on the other hand, an addition of shale may make the ash more refractory, especially in coals having ash of rather low fusibility.

Table II lists all mines from which both mine and car samples have been collected, and gives the ash fusibility of mine and car samples from the same mine. A study of this table is of interest in connection with the variation of ash fusibility of mine and car samples. If the difference between the softening temperatures of coal ash from mine and car samples does not exceed 100° F., it may be considered that the degree of fusibility is substantially the same. Data in Table II have been summarized below to show the number of mines from

which the fusibility of ash of mine and car samples were substantially the same; that is, within 100° F. The number of mines from which the ash of the car samples was more refractory and the number of mines from which the ash from the mine samples was more refractory is as follows:

Summary of Table II comparing fusibility of ash from mine and car samples.

State.	Number of mines from which ash of car and mine samples was substantially of the same fusibility—within 100° F.	Number of mines from which ash of car samples was more refractory.	Number of mines from which ash of mine samples was more refractory.
Illinois.....		1	2
Maryland.....	1		
Pennsylvania.....	2	1	3
Virginia.....			1
West Virginia.....	32	9	15

TABLE I.—Softening temperatures of coal ash from coals of the United States.

Locality.	Mine.	Coal bed.	Rank of coal. ^a	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
ALABAMA.										
BIBB COUNTY.										
Belle Ellen.....	Belle Ellen.....	Youngblood.....	B.	26276-80.....	5	2,010	2,220	2,070	5.29	1.37
Coleman.....	Coleman.....	Thompson.....	B.	20132-34, 42.....	4	2,060	2,150	2,110	8.24	.58
Garnsey.....	Garnsey.....	do.....	B.	25431-33.....	3	2,370	2,400	2,380	11.69	.49
Marvel.....	Marvel.....	Youngblood.....	B.	9666.....	1	.....	.....	2,190	11.95	.78
Do.....	Marvel.....	Clark.....	B.	25379-81, 84.....	4	2,180	2,500	2,320	7.20	.66
Do.....	do.....	Gholson.....	B.	10460-61, 65.....	3	2,180	2,310	2,230	9.20	.87
Piper.....	Piper No. 1.....	Thompson.....	B.	25383, 85-86.....	3	2,130	2,320	2,200	6.61	.49
DEKALB COUNTY.										
Blanche.....	Underwood Prospect.....	Unnamed.....	S. B.	18282.....	1	.....	.....	2,280	11.46	2.74
Do.....	Yellow Creek.....	Yellow Creek.....	S. B.	18280, 33-34.....	3	2,570	2,700	2,620	13.41	1.44
Fort Payne.....	Beeson Gap.....	Unnamed.....	S. B.	18281.....	1	.....	.....	2,210	16.84	4.56
JEFFERSON COUNTY.										
Bessemer.....	Virginia.....	Nickle Plate.....	B.	26217-20, 22.....	5	2,470	2,800	2,620	4.73	.75
Littleton.....	Banner.....	Mary Lee ("Big").....	B.	12083-85.....	3	2,740	2,960	2,770	11.52	.84
Majestic.....	Majestic.....	Black Creek.....	B.	32070-73.....	4	2,460	2,730	2,600	3.96	.60
Morris.....	Indio.....	Jefferson.....	B.	10683-86.....	4	2,060	2,220	2,120	7.45	1.86
Mt. Ulla.....	Mt. Ulla.....	Pratt.....	B.	18970-71, 78-80.....	7	2,280	2,850	2,450	6.49	.50
Palos.....	Bessemer.....	Mary Lee ("Big").....	B.	26600-02, 14-16.....	6	2,380	2,950	2,670	10.44	.58
Do.....	do.....	do.....	B.	10593-06.....	2	2,870	2,870	2,870	7.26	.58
Pinson.....	Dixana No. 4.....	Black Creek.....	B.	26487-70.....	4	2,460	2,750	2,600	10.73	.77
Sayreton.....	Sayreton.....	Mary Lee ("Big").....	B.	20983-84, 86.....	3	2,670	2,850	2,770	10.47	.77
ST. CLAIR COUNTY.										
Coal City.....	Coal Branch.....	Coal City.....	B.	12440-42.....	3	2,180	2,330	2,250	4.35	1.19
Do.....	Vulcan No. 4.....	Broken Arrow.....	B.	12437-38.....	2	2,350	2,400	2,380	10.16	1.46
Parsons.....	Aconet.....	Harness.....	B.	18853-54.....	2	2,650	2,660	2,660	10.73	.90
Sandia.....	Margaret No. 1.....	do.....	B.	18540-51.....	2	2,270	2,300	2,280	12.62	2.01
Do.....	Margaret No. 2.....	do.....	B.	28374-76.....	3	2,340	2,660	2,450	10.19	1.81

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
ALASKA—Contd.					2						
MATANUSKA FIELD—continued.											
Chickaloon River...	U. S. N. A. C. I. E., tunnel B...	Lower No. 5.....	S. B.	18148.....	1			3,000	9.55	0.58	
Do.	do.	No. 5A.....	B.	18141.....	1			2,040	8.14	.62	
Do.	do.	No. 6.....	B.	18143.....	1			2,270	3.07	.69	
Do.	do.	No. 9.....	S. B.	18150.....	1			+3,000	20.54	.55	
Do.	U. S. N. A. C. I. E., tunnel D	D.....	S. B.	17793.....	1			2,980	12.23	.54	
Do.	do.	E.....	S. B.	18046.....	1			2,250	11.13	1.51	
Do.	U. S. N. A. C. I. E., tunnel 1	No. 8.....	S. B.	18093, 101,	2		2,420	2,890	10.19	.64	
Do.	Chickaloon.	No. 8.....	S. B.	31236-37	2		2,370	2,600	11.94	.43	
Do.	U. S. N. A. C. I. E., tunnel 2	Upper No. 5	S. B.	18153.....	1			2,980	7.89	.57	
Do.	U. S. N. A. C. I. E., tunnel 3	No. 3.....	S. B.	18095.....	1			2,640	5.78	.69	
Do.	do.	No. 4.....	S. B.	18138.....	1			2,230	9.49	.65	
Do.	U. S. N. A. C. I. E., tunnel 4	D.....	S. B.	18100.....	1			2,980	11.03	.51	
Do.	Outcrop.	C.....	B.	18321.....	1			2,380	3.47	.33	
Do.	do.	No. 2.....	S. B.	18094.....	1			2,490	4.65	.41	
Do.	do.	do.	S. B.	18040.....	1			2,660	9.77	.43	
Do.	do.	No. 3.....	S. B.	18103.....	1			2,890	10.31	.36	
Do.	do.	do.	B.	18041.....	1			2,510	5.93	.40	
Do.	do.	do.	S. B.	18320.....	1			2,270	6.82	.52	
Do.	do.	No. 5.....	S. B.	18322.....	1			3,000	9.88	.40	
Do.	do.	No. 6.....	S. B.	18092.....	1			3,000	11.94	.45	
Do.	do.	do.	S. B.	18109.....	1			2,980	9.65	.46	
Do.	U. S. N. A. C. I. E., tunnel A	No. 8.....	S. B.	18104, 05, 39,	3		2,290	2,520	5.62	.47	
Do.	do.	No. 8.....	S. B.	18107.....	3			2,950	9.21	.62	
Do.	U. S. N. A. C. I. E., Grift 1	No. 1.....	B.	18096.....	1			2,520	13.44	.62	
Do.	U. S. N. A. C. I. E., Grift 2	No. 4.....	B.	28731-32	2		2,210	2,660	2.40	8.27	
Do.	Kelly	Kelly	B.	28733	1			2,740	5.79	.55	
Do.	David	David	B.	28735	1			2,740	19.26	.55	
Do.	Emery	Emery	B.	28736	1			2,690	7.62	.39	
Do.	Esley	Esley	B.	28734	1			2,570	7.62	.40	
Do.	Mathland	Mathland	B.	28734	1			2,570	7.62	.40	
Do.	McCaughey prospect	McCaughey	B.	28836	1			+3,010	9.90	.57	

Kings River.....	Outcrop.....	No. 1.....	B.	18137.....	1	2,570	11.18	.51	
Do.....	do.....	do.....	N. C.	18319.....	1	2,310	8.73	.58	
Do.....	do.....	do.....	B.	18136.....	1	2,610	12.76	.20	
Matanuska River.....	do.....	No. 2.....	B.	18151.....	1	2,620	16.47	.54	
Do.....	do.....	do.....	B.	18144.....	1	2,680	20.72	.51	
Moose Creek.....	do.....	do.....	B.	28837.....	1	2,300	9.37	.36	
Young Creek.....	do.....	do.....	B.	11382.....	1	2,450	5.66	.26	
NENANA FIELD.									
California Creek.....	Outcrop.....	Unnamed.....	L.	26359.....	1	2,350	25.56	.58	
Do.....	do.....	do.....	L.	26360-61.....	1	2,370	34.11	.27	
Healy Creek.....	do.....	do.....	L.	17796.....	1	2,450	7.52	.32	
Do.....	do.....	do.....	L.	26368.....	2	2,400	7.52	.32	
Igloo Creek.....	do.....	do.....	L.	17794-95.....	2	2,500	4.78	.14	
Lignite Creek.....	do.....	do.....	L.	26362.....	1	2,340	13.90	.24	
Do.....	do.....	do.....	L.	26588.....	1	2,150	9.93	.21	
Do.....	do.....	No. 5.....	L.	26363.....	1	2,450	7.18	.22	
Do.....	do.....	do.....	L.	26364.....	1	2,370	16.42	.26	
Do.....	do.....	do.....	L.	26365.....	1	2,450	5.52	.18	
Do.....	do.....	do.....	L.	26366.....	1	2,210	11.07	.25	
Do.....	do.....	do.....	L.	26367.....	1	2,390	8.01	.35	
Do.....	do.....	do.....	L.	26369.....	1	2,300	15.43	.54	
Nenana River.....	do.....	do.....	L.	23042.....	1	2,370	5.07	.21	
Tatlanika River.....	do.....	do.....	L.	17797.....	1	2,670	22.55	.32	
YAKATAGA FIELD.									
Duktoth Valley.....	Outcrop.....	Unnamed.....	S. B.	19345.....	1	+3,000	23.69	.67	
ARKANSAS.									
FRANKLIN COUNTY.									
Denning.....	Denning No. 2.....	Denning (Hartshorne?).....	S. B.	18746-48.....	3	2,180	2,230	7.38	
LOGAN COUNTY.									
Paris.....	Grand No. 1.....	Paris.....	S. B.	18750-52.....	3	2,130	2,160	10.12	
POPE COUNTY.									
Russellville.....	Bernice.....	Shinn Basin.....	S. A.	18755, 57.....	2	2,180	2,370	10.36	
SEBASTIAN COUNTY.									
Hackett.....	Branner No. 2.....	Hartshorne.....	S. B.	19092-93.....	2	2,310	2,340	17.30	
Hartford.....	Central No. 10.....	do.....	S. B.	26836.....	1	2,090	11.27	1.15	
Do.....	do.....	do.....	S. B.	26837.....	1	2,000	10.07	.82	
Huntington.....	Central No. 6.....	Upper and Lower Hartshorne.....	S. B.	27613-16.....	4	2,060	2,120	2.01	
Jenny Lind.....	Jenny Lind No. 17.....	Hartshorne.....	S. B.	16297.....	1	2,110	9.70	1.42	

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
CALIFORNIA.					2		3	4	5	6	7
MENDOCINO COUNTY.											
Dos Rios.....	Outcrop.....	Unnamed.....	S. B.	31139.....	1				2, 220	6. 91	2. 98
MONTEREY COUNTY.											
Stone Canon.....	Stone Canon.....	Unnamed.....	B.	31100-01.....	2	2, 210	2, 470	2, 340		11. 26	4. 62
COLORADO.											
ADAMS COUNTY.											
Bennett.....	Thomas.....	Unnamed.....	Sb. B.	13141.....	1				2, 120	11. 35	. 48
BOULDER COUNTY.											
Broomfield.....	Monarch No. 2.....	Unnamed.....	Sb. B.	31314-15.....	2	1, 960	2, 030	2, 030	2, 010	6. 54	. 33
Lafayette.....	Simpson.....	Simpson.....	Sb. B.	13165, 31391.....	2	2, 030	2, 130	2, 080	2, 080	4. 45	. 48
Louisville.....	Acme.....	Lower Acme.....	Sb. B.	31384.....	1				2, 040	3. 46	. 30
Superior.....	Industrial.....	Unnamed.....	Sb. B.	33253-55.....	3	2, 060	2, 140	2, 100		6. 89	. 37
DELTA COUNTY.											
Bowie.....	King.....	"King".....	B.	15213, 28920.....	2	2, 470	2, 740	2, 600	2, 600	5. 06	. 60
Dominguez.....	Wells Gulch.....	Unnamed.....	B.	11106.....	1				2, 160	6. 20	1. 01
EL PASO COUNTY.											
Calhan.....	Mesby.....	Mesby.....	Sb. B.	10732.....	1				2, 520	20. 77	. 45
Corral Springs.....	"A".....	"A".....	Sb. B.	28907-09.....	3	2, 190	2, 260	2, 230	2, 230	7. 99	. 43
Pike View.....	"do".....	"do".....	Sb. B.	12000, 28911-15.....	6	2, 070	2, 350	2, 250	2, 250	7. 37	. 41
Ranah.....	Purdon.....	Purdon.....	Sb. B.	10741.....	1				2, 510	27. 45	. 48

FREMONT COUNTY.		Chandler.....	Chandler.....	75376-79.....	4	2,060	2,060	2,060	7.94	.52
		Do.....	Canon.....	13393-94.....	2	2,130	2,100	2,080	7.25	.49
		Rockvale.....	Rockvale.....	11938-39.....	2	2,080	2,350	2,220	10.43	.65
		Williamsburg.....	Magnet.....	10127-28.....	2	2,030	2,130	2,060	7.90	.99
GARFIELD COUNTY.										
		New Castle.....	Allen.....	12325-26, 220, 13866, 376.....	5	2,060	2,370	2,220	5.75	.50
		South Canon.....	Wheeler.....	15166-67.....	2	2,360	2,410	2,380	8.78	.58
GUNNISON COUNTY.										
		Mount Carbon.....	No. 2.....	10692.....	1	.....	.....	2,310	7.30	1.05
		Do.....	Kniber.....	10691.....	1	.....	.....	2,380	8.51	.49
		Somersel.....	Unnsamed.....	12322-23.....	2	2,240	2,240	2,240	9.74	.46
HUERFANO COUNTY.										
		Camp Shunway.....	Cameron.....	33564-65.....	2	2,280	2,300	2,290	11.48	.94
		Do.....	Walsen.....	33567.....	1	.....	.....	2,670	8.89	.68
		Del Carbon.....	Robinson.....	33567-62.....	2	2,180	2,350	2,260	9.09	.72
		Do.....	Cameron.....	33651.....	1	.....	.....	2,240	7.33	.71
		Do.....	Walsen.....	33645-49.....	5	2,330	2,430	2,330	11.29	.66
		Farr.....	do.....	34239-41.....	3	2,430	2,620	2,510	15.43	.50
		Lester.....	do.....	34193-94.....	2	2,400	2,640	2,520	11.08	.54
		Maitland.....	Lenox.....	33818.....	1	.....	.....	2,680	13.70	.76
		Do.....	Robinson.....	33817.....	1	.....	.....	2,400	15.31	.64
		McGutre.....	Cameron.....	10189-90.....	2	2,330	2,340	2,340	10.30	.50
		Oakdale.....	Unnsamed.....	13526-28.....	3	2,130	2,690	2,360	10.50	.78
		Do.....	Marmouth.....	34161.....	1	.....	.....	2,330	8.19	.57
		Pictou.....	Walsen.....	33497.....	1	.....	.....	2,670	11.62	.70
		Do.....	Walsen and Robinson.....	33496.....	1	.....	.....	2,210	10.48	.59
		Ravenwood.....	Cameron.....	31406-07.....	2	2,500	2,520	2,510	8.38	.77
		Strong.....	Walsen.....	33655-56.....	2	2,530	2,530	2,500	9.24	.65
		Tloga.....	Robinson.....	33734-35.....	2	2,100	2,150	2,120	8.29	.56
		Kebler No. 2.....	Cameron.....	33493.....	1	.....	.....	2,380	10.51	1.01
		Toltec.....	Walsen.....	33492.....	1	.....	.....	2,700	10.43	.81
		Do.....	Robinson No. 1.....	33897-99.....	3	2,400	2,440	2,410	11.65	.54
		Walsen.....	Robinson No. 2.....	33893-95.....	3	2,280	2,360	2,340	10.84	.56
		Do.....	Walsen.....	33949.....	1	.....	.....	2,500	15.63	.47
		Walsenberg.....	do.....							
JACKSON COUNTY.										
		Coalmont.....	Riach.....	12601.....	1	.....	.....	2,580	8.94	.91
		Do.....	Mitchell.....	12539.....	1	.....	.....	2,270	12.96	1.05
		Walden.....	Marr.....	12415.....	1	.....	.....	2,440	4.51	.59
		Do.....	Recalum.....	12774.....	1	2,370	7.78	.53
		Do.....	Sudduth.....	12414.....	1	2,440	6.25	.53
		Do.....	Winscom.....	12775.....	1	2,190	14.80	.98

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Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
COLORADO—Continued.										
JEFFERSON COUNTY.										
Morrison.....	White Ash.....	Jumbo.....	Sb. B.	16615.....	1					1.05
LA PLATA COUNTY.										
Durango.....	Cinder Butte.....	B.....	Sb. B.	17747.....	1	2,990	3,010	+3,010	19.13	.68
Do.....	San Juan.....	Unnamed.....	B.....	14770-71.....	2			3,000	7.05	.74
Do.....	Soda Springs.....	B.....	B.....	17748.....	1			2,550	15.74	.72
Hesperus.....	Hesperus.....	B.....	B.....	14773-74.....	2	2,710	3,000	2,860	6.37	.71
Do.....	Morron.....	Unnamed.....	B.....	17745.....	1			+3,010	14.18	.90
Marcos.....	Wheeler.....	"Upper No. 5".....	B.....	17855.....	1			2,950	7.12	.62
Perins.....	Haupt.....	Spencer.....	B.....	20288.....	1			+3,010	9.57	.69
	Perins Peak.....	Peacock.....	B.....	14776-78.....	3	2,060	2,540	2,320	5.88	2.42
LAS ANIMAS COUNTY.										
Aguilar.....	Empire.....	Walsen.....	B.....	32931.....	1			2,360	13.39	.69
Do.....	Royal.....	Peeries.....	B.....	32932.....	1			2,500	11.53	.73
Do.....	Do.....	Walsen.....	B.....	32933.....	1			2,420	11.30	.65
Broadhead.....	Temple No. 9.....	Broadhead No. 4.....	B.....	32932.....	1			2,320	8.50	.46
Do.....	Temple No. 10.....	Rugby.....	B.....	32933.....	1			2,430	11.13	.46
Cokedale.....	Bon Carbo.....	Primero.....	B.....	31451.....	1			2,300	14.17	.50
Do.....	Cokedale.....	Cokedale.....	B.....	11768-70.....	3	2,710	2,990	2,890	17.64	.52
Delagua.....	Cass.....	do.....	B.....	31432.....	2			2,430	8.65	.75
Do.....	Do.....	do.....	B.....	11435-37, 29351.....	4			2,420	11.51	.56
Do.....	Do.....	do.....	B.....	31423-25.....	3			2,570	7.51	.66
Do.....	Do.....	do.....	B.....	31427.....	2			2,300	8.63	.53
Forbes.....	Delagua No. 1.....	do.....	B.....	11926-29.....	4			2,400	10.04	.73
Hastings.....	Forbes No. 9.....	Walsen.....	B.....	29277-78, 29465.....	4			2,710	12.53	.68
Morley.....	A and B.....	A and B.....	B.....	13361-63, 32046-47.....	5			2,660	15.01	.78
Primero.....	Morley.....	Engle-StarKville.....	B.....	12027, 34096-97.....	3			2,460	13.57	.51
Sopris.....	Primero.....	Trinidad.....	B.....	10209-10.....	2			2,930	15.02	.66
Do.....	Piedmont.....	"Lower".....	B.....		2			2,790	18.11	.75
Do.....	Sopris No. 2.....	Cameron.....	B.....	31949.....	1					

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
COLORADO—										
Continued.										
BOULT COUNTY.										
Coalview.....	Routt-Pinnacle.	Bear Run.	B. B.	32987	1			2,400	7.84	0.54
Hayden.....	Carey.	Unnamed.	Sb. B.	22775	1			2,480	6.52	.47
Do.....	Dry Creek.	do.	Sb. B.	23024	1			2,340	4.54	.45
Do.....	Green.	do.	Sb. B.	9693	1			2,250	5.26	.50
McGregor.....	McNeil No. 1.	Wolf Creek.	B.	32974	1			2,780	12.07	.53
Do.....	McNeil No. 3.	Wadge	B.	32975	1			2,660	7.46	.73
Milner.....	Curtis No. 1.	Curtis.	B.	22750	1			2,420	8.53	.73
Do.....	Chergo.	Wadge.	B.	31038	1			2,430	6.41	.49
Do.....	Elk Creek.	Wolf Creek.	B.	32971-72.	2		2,540	2,980	10.72	.50
Do.....	Schuster.	Unnamed.	B.	22749	1			2,600	6.01	.55
Mount Harris.....	Bear River.	do.	B.	22774	1			2,420	5.64	.57
Do.....	Colorado & Utah No. 1.	Harris.	B.	22737-39.	3		2,580	2,870	7.10	.49
Do.....	International.	Wolf Creek.	B.	22736	1			2,940	13.98	.49
Do.....	Mount Harris.	Wadge.	B.	31189-206.	8		2,570	2,710	6.80	.46
Do.....	Wadge.	do.	B.	31233-34.	2		2,540	2,710	5.84	.49
Oak Creek.....	Argo.	Argo or Pinnacle.	B.	31130-33.	4		2,330	2,520	4.62	.50
WELD COUNTY.										
Frederick.....	Baum.	Unnamed.	Sb. B. (?)	31344	1			2,030	5.29	.49
Puritan.....	Puritan.	do.	Sb. B.	31323	1			2,170	4.75	.45
IDAHO.										
BOISE COUNTY.										
Horseshoe Bend.....	Henry.....	Unnamed.	Sb. B.	12391,703.....	2		2,480	2,810	30.90	.49
CASSIA COUNTY.										
Oakley.....	Worthington.....	Worthington.....	L.	12643.....	1			2,130	27.54	.96

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
						3	4	5	6	7
I										
ILLINOIS—Contd.										
M'DONOUGH COUNTY.										
Industry.	Burdick.	No. 2.	B.	15117-18.	2	2,140	2,240	2,190	7.55	3.26
Plymouth.	Stoneking.	do.	B.	14972-73.	2	1,970	2,120	2,050	6.76	3.68
M'LEAN COUNTY.										
Bloomington.		No. 2.	B.	14664-68.	5	1,960	2,030	2,000	10.82	3.32
MACOUPIN COUNTY.										
Gillespie.	Superior No. 1.	No. 6 (Herrin).	B.	18545-46.	2	2,140	2,160	2,150	11.36	4.59
Do.	Superior No. 1 (car sample, run-of-mine).	do.	B.	18910.	1			2,040	15.11	5.76
MADISON COUNTY.										
Collinsville.	Cantine No. 3.	do.	B.	10936-58.	3	1,970	2,020	1,990	10.67	4.01
MENARD COUNTY.										
Athens.	Wabash No. 2.	No. 5.	B.	12506-07.	2	1,890	1,970	1,930	11.47	3.44
MERCER COUNTY.										
Matherville.	Alden No. 7.	No. 1.	B.	14606-11.	6	2,040	2,180	2,110	11.74	4.86
MONTGOMERY COUNTY.										
Panama.	Shoal Creek No. 1.	No. 6.	B.	21903-05, 01, 11352-53.	6	2,010	2,170	2,060	13.49	4.54
PEORIA COUNTY.										
Bartonville.	Collier.	No. 5.	B.	21032-34.	3	1,900	1,970	1,950	11.61	3.35
Hanna City.	Hanna City.	do.	B.	22982-85.	4	1,910	2,030	1,950	13.72	3.42

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
I										
INDIANA—Contd.										
PIKE COUNTY.										
Winslow.....		Ayrshire No. 7 (car sample, 35 cars, 2-inch lump).	No. 5.	30228-31.....	4	2,480	2,560	2,530	6.40	1.06
SULLIVAN COUNTY.										
Carlisle.....		Viola.....	No. 5.	22217-19.....	3	1,990	2,200	2,090	10.26	3.27
Dugger.....		Ayrdale No. 27.....	No. 4.	31290-93.....	4	2,350	2,710	2,490	8.20	1.42
Do.....		Vandalia No. 10.....	do.	10990-61, 23225-26, 31282-66.	9	2,150	2,390	2,290	7.01	1.45
Do.....		Vandalia No. 22.....	do.	31274-76.....	3	2,080	2,340	2,170	8.91	2.93
Sullivan.....		Vandalia No. 17.....	No. 6.	31268-72.....	5	2,010	2,120	2,040	9.91	2.65
Do.....		Vandalia No. 28.....	No. 4.	31282-84.....	3	2,300	2,420	2,350	7.81	1.43
VANDERBURG COUNTY.										
Evansville.....		Sunnyside.....	No. 5.	20250-51.....	2	2,080	2,100	2,090	10.31	2.97
VERMILION COUNTY.										
Blanford.....		West Clinton No. 1.....	No. 5.	21874-75.....	2	1,800	2,070	1,980	10.49	3.65
Clinton.....		Clinton No. 4.....	No. 6.	31257-60.....	4	2,250	2,320	2,290	8.50	1.26
Do.....		Crown Hill No. 3.....	No. 3.	23212-13, 15-16.....	4	2,040	2,220	2,140	9.92	3.64
Do.....		Dering No. 1.....	do.	23346-48, 45.....	4	1,990	2,070	2,050	9.83	3.86
VIGO COUNTY.										
Coal Bluff.....		Vigo No. 74.....	Minshall.	26124.....	1			2,120	9.60	2.99
Liggitt.....		Vandalia No. 82.....	No. 3.	31286-88.....	3	2,030	2,100	2,080	12.08	5.51
Do.....		do.....	No. 5.	23113-16, 24063-64.	6	1,950	2,060	2,040	10.82	3.45
WARRICK COUNTY.										
Elberfeld.....		Elberfeld.....	No. 5.	16578.....	1			2,190	11.83	5.30

BAFON COUNTY. Mulberry.....	Carney Cherokee No. 2.....	Weir-Pittsburg.....	B.	75557.....	1	1,960	13.94	5.33
CHEROKEE COUNTY. Stone City.....	Mayer No. 9.....	Cherokee.....	B.	27222-25.....	4	1,950	8.72	3.30
CRAWFORD COUNTY. Edison.....	Weir No. 21.....	Cherokee.....	B.	30292-94.....	2	2,090	12.33	4.96
Franklin.....	Western No. 16.....	do.....	B.	17032.....	3	2,150	12.67	5.63
Franklin.....	Sheidan No. 2.....	do.....	B.	11181-83.....	3	2,110	9.56	5.23
Pittsburg.....	Central (strip pit).....	do.....	B.	23238-39, 44.....	1	2,390	6.89	1.19
Do.....	Patron.....	Unnamed.....	B.	23237.....	1	1,920	13.56	3.45
Yale.....	Western No. 13.....	Weir-Pittsburg.....	B.	11209-11.....	3	2,040	12.81	5.08
LEAVENWORTH COUNTY. Lansing.....	Penitentiary.....	Bevier.....	B.	12841-43.....	3	2,070	14.08	4.47
Leavenworth.....	Home Riverside No. 1.....	do.....	B.	12849-51.....	3	1,810	15.58	4.95
Do.....	Home Riverside No. 3.....	do.....	B.	12845-47.....	3	1,860	18.26	5.46
KENTUCKY. BELL COUNTY. Atjay.....	Glendon.....	Straight Creek.....	B.	2,557-60.....	4	2,100	3.12	.90
Chenoo.....	Chenoo Hignite.....	Lower Hignite.....	B.	21787-89.....	2	2,370	4.57	1.10
Do.....	Log Mountain No. 1.....	Mason.....	B.	21781-84.....	4	2,140	2.53	.85
Comar.....	Emrr.....	do.....	B.	21682-84.....	2	2,390	6.09	1.61
Fountain.....	East Jellico.....	Fireday (Dean or No. 4).....	B.	21796-97.....	2	2,910	7.92	1.02
Do.....	Mag et.....	do.....	B.	21799-94.....	3	2,850	6.71	1.10
Fox Ridge.....	Fox Ridge.....	Straight Creek.....	B.	21791.....	2	2,070	1.98	1.07
Harrison.....	Log Mountain No. 52.....	Highlight Creek.....	B.	21617-20.....	4	2,440	5.30	1.05
Kettle Island.....	Highlight Creek.....	Highlight Creek.....	B.	21552-55.....	4	2,960	8.70	1.38
Rum.....	Rum No. 4.....	Hickory.....	B.	21547-50.....	4	2,380	4.85	1.07
Straight Creek.....	Barter Nos. 2 and 3.....	Straight Creek.....	B.	21622-25.....	4	2,490	5.37	1.07
Tejay.....	Tejay.....	Mason.....	B.	21567-69, 71.....	4	2,110	3.66	1.33
Varilla.....	Varilla.....	Upper Hance.....	B.	21562-65.....	4	2,320	3.18	.97
Do.....	Do.....	Do.....	B.	21776-79.....	4	2,150	4.74	1.61
BUTLER COUNTY. Morgantown.....	Gillam (country bank).....	Not classified.....	B.	19399-400.....	2	2,180	8.33	3.7
CHRISTIAN COUNTY. Empire.....	Empire.....	Empire.....	B.	19294-96.....	3	1,880	5.10	2.31
CHITTENDEN COUNTY. Sullivan.....	Barnaby.....	Bell (?).....	B.	22804.....	1	2,160	8.05	3.59
Do.....	Newcome.....	Unnamed.....	B.	22895.....	1	2,220	7.11	3.59

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.				Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
KENTUCKY—Con.											
DAVIESS COUNTY.											
Owensboro.....	Fulkerson.....	No. 9.....	B.	18970-71.....	2	2,080	2,080	2,060	12.18	4.31	
Do.....	George Rudy.....	do.....	B.	18958-60.....	3	2,060	2,190	2,100	10.76	3.63	
HARLAN COUNTY.											
Benham.....	Benham.....	Kelloks (C).....	B.	24838.....	1	2,510	2,030	2,230	2.21	.49	
Do.....	Clover Fork.....	Harlan.....	B.	24728-29, 31.....	3	2,520	2,930	2,720	2.95	.75	
Do.....	Coxton.....	do.....	B.	24714-15.....	2	2,600	2,550	2,540	3.52	.88	
Do.....	Wood.....	do.....	B.	24770-72.....	3	2,600	+3,010	+2,540	3.36	.92	
HENDERSON COUNTY.											
Baskett.....	No. 1.....	No. 9.....	B.	18962-64.....	3	2,020	2,100	2,050	11.53	3.14	
Do.....	Corydon.....	No. 12.....	B.	19103-06.....	4	1,860	2,030	1,970	12.72	3.39	
Henderson.....	Nicholson.....	No. 9.....	B.	18973-74.....	2	2,080	2,480	2,280	12.31	3.56	
Do.....	Panama.....	do.....	B.	18976-77.....	2	1,990	2,070	2,030	11.41	4.12	
Smith Mills.....	Smith Mills.....	No. 12.....	B.	19108-11.....	4	1,990	2,140	2,070	9.41	2.03	
HOPKINS COUNTY.											
Dawson Springs.....	Workman.....	Dawson.....	B.	19298-301.....	4	2,000	2,250	2,100	5.49	3.11	
Do.....	Arnold No. 9.....	No. 9.....	B.	19204-11.....	9	1,980	2,310	2,090	9.96	3.78	
Madisonville.....	Reinecke.....	No. 11.....	B.	19194-202.....	9	1,960	2,070	2,070	7.95	4.00	
Do.....	Nebo.....	No. 14.....	B.	19230-35.....	6	1,900	2,380	2,070	9.17	3.02	
Nortonville.....	Norton No. 1.....	No. 11.....	B.	19237-42.....	6	1,950	2,130	2,040	7.46	3.77	
Do.....	St. Charles.....	No. 9.....	B.	19261-66.....	6	1,910	2,190	2,020	9.05	3.59	
Do.....	Fox Run.....	do.....	B.	19252-59.....	8	1,930	2,170	2,030	10.03	3.43	
JOHNSON COUNTY.											
Van Lear.....	Van Lear No. 1.....	Millers Creek (No. 1).....	B.	10548-49.....	2	2,010	2,280	2,150	3.90	1.17	
Do.....	Van Lear No. 2.....	do.....	B.	10551.....	1	.....	.....	2,030	3.94	1.90
Do.....	Van Lear No. 3.....	do.....	B.	10552.....	1	.....	.....	2,080	3.94	1.90
Do.....	Van Lear No. 4.....	do.....	B.	10553.....	1	.....	.....	2,400	2.46	.....

KNOX COUNTY.										
Bradel.....	Bennett No. 1.....	B.	21537-39-40.....	3	2,840	2,840	2,960	2,910	6.42	.78
Elys.....	New Hughes.....	B.	21542-43.....	4	2,360	2,360	2,590	2,460	6.92	1.56
LAUREL COUNTY.										
East Barnstead.....	Millers Creek (No. 1).....	B.	21429-32.....	4	2,020	2,460	2,220	2,220	4.97	2.40
Pittsburg.....	do.....	B.	21339-42.....	4	1,980	2,120	2,060	2,060	7.39	3.70
LETCHER COUNTY.										
Flat Gap (Va.).....	Lower Standiford.....	B.	15172.....	1				2,260	5.24	1.81
Do.....	Lower Bolling.....	B.	15173.....	2				2,580	11.65	1.61
Fleming.....	Elkhorn.....	B.	29345-46.....	1	2,300	2,300	2,390	2,590	3.18	.63
Do.....	do.....	B.	21308-11.....	4	2,580	2,640	2,590	2,590	4.13	.54
Jenkins.....	Consolidation No. 204.....	B.	14904-05.....	4	2,480	2,660	2,660	2,520	3.02	.86
Do.....	do.....	B.	21303.....	1				2,450	4.16	1.02
Meter.....	Lower Elkhorn.....	B.	21303-08.....	4	2,300	2,510	2,510	2,510	3.42	.56
McRoberts.....	Elkhorn.....	B.	21294-97.....	4	2,380	2,670	2,500	2,500	3.42	.56
Do.....	do.....	B.	21299-301, 317.....	4	2,430	2,730	2,540	2,540	3.79	.60
M'LEAN COUNTY.										
Island.....	No. 9.....	B.	19281-84.....	4	1,980	2,170	2,090	2,090	10.62	3.48
MUHLENBERG COUNTY.										
Bevier.....	No. 9.....	B.	19331-32, 34-36.....	5	1,870	2,030	1,950	1,950	9.83	3.98
Central.....	do.....	B.	13257-59.....	3	1,970	2,230	2,090	2,090	8.34	2.87
Cleaton.....	do.....	B.	15339-41.....	3	1,920	1,960	1,940	1,940	10.27	3.60
Graham.....	do.....	B.	16674-75.....	2	1,970	2,030	2,000	2,000	10.20	3.76
OHIO COUNTY.										
McHenry.....	No. 9.....	B.	15103.....	1				2,120	9.51	2.91
Rockport.....	do.....	B.	19338-43.....	6	1,890	2,120	2,040	2,040	11.06	3.77
PERRY COUNTY.										
Domino.....	Hazzard (Haddix or No. 6).....	B.	21334-37.....	4	2,020	3,010	2,460	2,460	8.56	.79
Douglass.....	Fireplay (Dean or No. 4).....	B.	21354-57.....	4	2,620	+3,010	+2,860	+2,860	3.55	.74
Hazzard.....	do.....	B.	21364-66.....	3	2,910	+3,010	+2,940	+2,940	3.64	.63
Do.....	do.....	B.	21368-69.....	2	2,370	2,460	2,420	2,420	4.12	.86
Do.....	do.....	B.	21086.....	1				+3,010	6.16	.68
Lennutt.....	Ross Petrey.....	B.	21359-62.....	1	2,630	+3,010	+2,940	+2,940	4.24	.87
Lothair.....	North Fork.....	B.	21349-50, 52.....	3	2,320	2,610	2,490	2,490	5.39	.67
Do.....	Ashless.....	B.	21344-47.....	4	2,730	2,970	2,880	2,880	7.52	.83
Do.....	Flag (No. 7).....	B.								

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
KENTUCKY—CON.											
PIKE COUNTY.											
Heller.....	Edgewater.....	Upper Elkhorn.....	B.	12004.....	1	.....	.....	.....	2, 260	2.75	0.58
Spring (W. Va.).....	Burnwell No. 2.....	Rawl (Gas or No. 2).....	B.	17459.....	1	.....	.....	.....	2, 940	5.25	.64
Thacker (W. Va.).....	Little Thacker.....	Alum.....	B.	17460.....	1	.....	.....	.....	+ 3, 010	4.37	.61
Do.....	do.....	Thacker.....	B.	17461.....	1	.....	.....	.....	2, 430	4.42	1.39
UNION COUNTY.											
Dekoven.....	Banks.....	No. 10.....	B.	23011.....	1	.....	.....	.....	1, 970	12.56	4.18
Do.....	Curlew.....	No. 9.....	B.	23010.....	1	.....	.....	.....	2, 000	9.69	3.63
Do.....	Ohio Valley.....	do.....	B.	19169-74.....	6	1, 990	2, 070	.....	2, 020	12.32	3.76
Do.....	Syres.....	No. 10.....	B.	23012.....	1	.....	.....	.....	2, 010	11.42	4.17
Morganfield.....	Morganfield.....	No. 11.....	B.	19035-58.....	4	1, 840	2, 230	.....	2, 020	11.96	4.46
Spring Grove.....	Buchanan.....	do.....	B.	23013.....	1	.....	.....	.....	1, 990	9.99	4.02
Sturgis.....	Crittenden.....	No. 6.....	B.	19113-16.....	4	1, 990	2, 260	.....	2, 130	8.81	2.97
Do.....	West Kentucky No. 8.....	No. 9.....	B.	19071-75.....	5	1, 920	2, 050	.....	1, 990	11.62	4.19
Do.....	West Kentucky No. 9.....	do.....	B.	19081-84.....	4	1, 980	2, 000	.....	1, 990	10.62	4.03
Do.....	do.....	do.....	B.	19085-88.....	4	1, 880	2, 050	.....	1, 970	10.33	3.96
Uniontown.....	River Rise.....	No. 11.....	B.	18993-97.....	5	.....	.....	.....	.....	.....	.....
WEBSTER COUNTY.											
Clay.....	West Kentucky No. 7.....	No. 12.....	B.	19148-53, 30748-50.....	9	2, 080	2, 720	.....	2, 410	8.47	1.49
Providence.....	Providence No. 3.....	No. 9.....	B.	19141-46.....	6	1, 870	2, 100	.....	1, 970	10.55	4.17
Do.....	Seamrock.....	No. 3.....	B.	18947-54.....	9	1, 850	2, 110	.....	1, 940	9.77	4.24
Sebree.....	Sebree.....	No. 2.....	B.	18947-68.....	2	1, 810	2, 020	.....	1, 920	11.69	3.86
Whitcroft.....	West Kentucky No. 4.....	No. 11.....	B.	19119-23.....	5	2, 020	2, 390	.....	2, 160	10.45	4.14
WHITLEY COUNTY.											
Barthell.....	No. 1 (North Main).....	No. 2 (Rawl or Gas).....	B.	10062.....	1	.....	.....	.....	2, 340	9.80	3.16

MARYLAND.		ALEGANY COUNTY.		GARRETT COUNTY.	
Allegany.....	Tyson No. 3.....	Upper Sewickley (Tyson).....	26506.....	1	6.16
Barreville.....	Bond.....	Bluebaugh.....	26985.....	1	10.62
Do.....	Emrick No. 1.....	do.....	26504.....	1	13.35
Do.....	Parker.....	Clarion (Parker).....	26539.....	1	5.10
Do.....	Pratt.....	Brush Creek.....	26542.....	1	2.470
Barfon.....	Moscow No. 3.....	Bakerstown.....	26533.....	1	10.17
Do.....	do.....	do.....	26978.....	1	2.27
Do.....	Consolidation No. 12.....	Pittsburgh ("Big Bed").....	26986.....	1	2.99
Borden Shaft.....	Washington No. 2.....	Upper Sewickley (Tyson).....	26528.....	1	7.95
Eckhart.....	Ellerslie Clay.....	Quakertown.....	26987.....	1	3.010
Ellerslie.....	do.....	Clarion (Parker).....	26988.....	1	3.010
Franklin Station.....	Miller & Greene No. 1.....	Upper Sewickley (Tyson).....	26544.....	1	18.13
Frostburg.....	Washington No. 9.....	Lower Kittanning.....	26510.....	1	14.12
Gannons Station.....	Hoffman.....	Pittsburgh (Big Bed).....	26979.....	1	8.43
Hoffman.....	Little Alleghany.....	do.....	26526.....	1	12.42
Lonaconing.....	Do.....	Upper Sewickley (Tyson).....	26528.....	1	7.54
Do.....	Georges Creek No. 3.....	Franklin.....	26509.....	1	8.02
Do.....	Georges Creek (test opening).....	Upper Sewickley (Tyson).....	26540.....	1	5.25
Do.....	Kingsland.....	Waynesburg.....	26332-35.....	4	2.410
Do.....	Consolidation No. 7.....	Pittsburgh (Tyson).....	26984.....	1	2.730
Lord Village.....	Mertens.....	Lower Kittanning.....	26511.....	1	2.580
Luke.....	Consolidation No. 8.....	Pittsburgh (Big Bed).....	17493-97.....	5	2.410
Midland.....	Consolidation No. 8 (tipple samples, run-ol-rune).....	do.....	68192-95.....	2	11.95
Do.....	Montell Tunnel (Merrous).....	Bluebaugh.....	68203-68-11-13.....	4	7.53
Montell.....	Do.....	Lower Kittanning.....	26505.....	1	15.01
Morrison.....	Gin Sang.....	Bakerstown.....	26977.....	1	8.58
Mount Savage.....	Henry Mullaneys.....	do.....	26532.....	1	2.390
Do.....	Union No. 6.....	Upper Freeport.....	26543.....	1	2.150
Ocean.....	Consolidation No. 1.....	Mercer (Mount Savage).....	26527.....	10	20.51
Short Gap.....	Stanton-Georges Creek No. 1.....	Pittsburgh (Big Bed).....	26527, 68176, 181-82.....	10	18.15
Westernport.....	Tacoma.....	Upper Freeport.....	26527, 216-218, 21, 26.....	1	2.880
Do.....	Do.....	Lower Kittanning.....	26529.....	1	9.95
Do.....	Do.....	do.....	26520.....	1	10.16
Do.....	Do.....	do.....	26983.....	1	10.09
Do.....	Do.....	do.....	26982.....	1	9.12
Do.....	Do.....	do.....	26524.....	1	10.30
Do.....	Do.....	do.....	26980.....	1	2.660
Do.....	Do.....	do.....	26981.....	1	2.200
Do.....	Do.....	do.....	26512.....	1	7.88
Do.....	Do.....	do.....	26514.....	1	2.490
Do.....	Do.....	do.....	26511.....	1	12.08
Do.....	Do.....	do.....	26989.....	1	2.510
Do.....	Do.....	do.....	26989.....	1	2.560
Do.....	Do.....	do.....	26989.....	1	11.02
Do.....	Do.....	do.....	26983.....	1	1.64
Do.....	Do.....	do.....	26982.....	1	.62
Do.....	Do.....	do.....	26524.....	1	1.56
Do.....	Do.....	do.....	26980.....	1	2.51
Do.....	Do.....	do.....	26981.....	1	1.83
Do.....	Do.....	do.....	26512.....	1	2.12
Do.....	Do.....	do.....	26514.....	1	2.06
Do.....	Do.....	do.....	26511.....	1	2.12
Do.....	Do.....	do.....	26989.....	1	2.12

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
MARYLAND— Continued.					2					
GARRETT COUNTY continued.										
Dodson.....	Dodson.....	Lower Kittanning.....	S. B.	17647-52.....	6	2, 280	2, 680	2, 540	11.78	2.62
Do.....	do.....	Upper Kittanning.....	S. B.	17654.....	1			3, 010	10.27	1.04
Friendsville.....	McCulloch.....	Lower Kittanning.....	B.	26519.....	1			2, 190	11.84	4.11
German.....	Strathmore.....	Upper Freeport.....	S. B.	26523.....	1			2, 710	16.82	1.42
Gannons Station.....	Washington No. 5.....	Bakerstown.....	S. B.	26531.....	1			2, 660	10.05	1.47
Grantsville.....	Beachey.....	Grantsville.....	S. B.	26541.....	1			2, 490	8.23	1.22
Harrison.....	Dodson No. 3.....	Lower Kittanning.....	S. B.	26543.....	1			2, 530	9.53	1.84
Do.....	Dodson No. 5.....	Upper Kittanning.....	S. B.	26537.....	1			3, 010	8.72	4.68
Hubbard.....	Ajax Hocking No. 1.....	Lower Kittanning.....	S. B.	26515.....	1			2, 260	13.74	2.34
Lonacoring.....	Do.....	Upper Freeport.....	S. B.	26508.....	1			2, 750	5.95	1.18
Do.....	Maryland (new opening).....	Upper Freeport.....	S. B.	26522.....	1			2, 170	22.72	3.20
Oakland.....	Do.....	Lower Kittanning.....	S. B.	26517.....	1			2, 510	8.01	1.49
Do.....	Leighton.....	“Galitzen”.....	B.	26536.....	1			2, 130	15.14	4.91
Do.....	John Sines.....	Mercer (Mount Savage).....	B.	26538.....	1			2, 410	20.13	4.62
Do.....	Taylor Sines.....	Upper Freeport.....	B.	26525.....	1			2, 170	8.63	3.93
Do.....	Tower.....	“Galitzen”.....	S. B.	26534.....	1			2, 150	10.39	2.57
Swallow Falls.....	Beeghly.....	do.....	B.	26535.....	1			2, 130	10.93	2.51
Do.....	Shaeffer.....	Lower Kittanning.....	B.	26518.....	1			2, 190	11.86	3.85
MISSOURI.										
ADAIR COUNTY.										
Connellysville.....	Manufacturers No. 1.....	Bevier.....	B.	10035-87.....	3	1, 870	2, 100	1, 980	14.96	4.10
Kirksville.....	Rocky Ford No. 1.....	do.....	B.	10101-02.....	2	1, 840	2, 020	2, 010	16.11	4.35
Do.....	Star No. 1.....	do.....	B.	10099-800.....	2	1, 940	1, 950	1, 950	13.44	6.13
Do.....	do.....	do.....	B.	7479-800.....	2	1, 990	2, 010	2, 000	11.07	5.91
Do.....	do.....	do.....	B.	10071-76, 84.....	3			2, 000	13.56	3.98
Novinger.....	Electric.....	do.....	B.	76576.....	1	1, 920	1, 980	1, 960	11.97	4.17
Do.....	Great Northern No. 21.....	do.....	B.	10078-82-83.....	3			2, 040	23.08	7.85
Do.....	K. C. Midland No. 4.....	do.....	B.	10078-82-83.....	3	1, 870	1, 950	1, 910	13.96	3.56
Do.....	Rombauer No. 3.....	do.....	B.	10077, 80.....	2	1, 950	1, 960	1, 960	14.62	4.62
Stahl.....	Consolidated Stahl No. 1.....	Lexington.....	B.							

AUDRAIN COUNTY.										
Martinsburg.....								1,940	11.66	5.77
Vandalia.....		Mulky.....	B.	11484.				1,920	13.68	5.41
		do.....	B.	9982-84.						
BAEYON COUNTY.										
Pittsburg (Kans.)..										
Mindenmines.....		Cherokee.....	B.	28241-43.				2,150	7.51	1.97
Do.....		Lower Weir-Pittsburg	B.	11177-79.				1,960	9.51	3.72
		do.....	B.	11185-87.				1,920	12.14	5.17
BATES COUNTY.										
Amsterdam.....		Mulberry.....	B.	11306-08.				1,980	16.19	4.30
Hume.....		do.....	B.	11226-28.				2,010	12.86	2.55
New Home.....		Lower Rich Hill.....	B.	11229-31.				1,900	16.84	5.59
Rich Hill.....		Fleming Pit No. 1.....	B.	11167-69.				1,980	13.70	5.46
Do.....		Ritchie Pit No. 1.....	B.	11168-64.				1,950	16.43	5.24
BOONE COUNTY.										
Columbia.....		Bevier.....	B.	75586.				1,980	9.22	3.73
Do.....		do.....	B.	11475-77.				1,930	11.51	4.57
Do.....		do.....	B.	11479-81.				1,950	14.79	5.55
CALDWELL COUNTY.										
Hamilton.....		Bevier.....	B.	10166.				1,930	16.44	6.65
CALLAWAY COUNTY.										
Fulton.....		Bevier.....	B.	75582.				2,000	14.86	6.24
Do.....		do.....	B.	11501-03.				1,990	11.74	4.42
CLAY COUNTY.										
Missouri City.....		Lexington.....	B.	10219-21.				2,010	14.54	3.40
GRUNDY COUNTY.										
Trenton.....		Tebo.....	B.	10151-53.				2,260	13.64	3.61
HARRISON COUNTY.										
Cainesville.....		Cainesville.....	B.	12679-81.				1,980	12.71	5.78
Melbourne.....		Lexington.....	B.	11374-76.				1,970	7.84	3.52
HENRY COUNTY.										
Calhoun.....		Tebo.....	B.	11314-16.				1,970	13.87	4.01
Clinton.....		do.....	B.	11248-50.				2,000	14.50	4.28
Do.....		Jordan.....	B.	11370-72.				2,090	12.20	2.86
Do.....		do.....	B.	11262-64.				2,160	12.88	5.99
Deepwater.....		do.....	B.	11310-12.				1,990	11.22	4.01
Do.....		do.....	B.	11252-54.				1,950	14.65	4.81

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coalbed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
MISSOURI—Contd.										
HENRY COUNTY—continued.										
Lewis.....	Figg No. 1.....	Tebo.....	B.	11287-69.....	3	1,960	2,010	1,990	14.24	4.54
Windor.....	Bowen No. 1.....	Bituminous.....	B.	75554.....	1	.....	.....	1,970	10.51	5.82
Do.....	Bowen.....	Cannel.....	B.	75555.....	1	.....	.....	2,220	14.80	8.18
Do.....	Bowen No. 4.....	Bowen.....	B.	10349-51.....	3	1,920	1,960	1,940	13.18	4.61
JOHNSON COUNTY.										
Sutherland.....	Sutherland No. 1.....	Bevier.....	B.	10346, 48.....	2	1,890	2,060	1,990	9.07	4.44
LAFAYETTE COUNTY.										
Corder.....	Black Diamond.....	Lexington.....	B.	10343-45.....	3	1,960	1,980	1,970	13.00	5.13
Do.....	Wilson.....	do.....	B.	10242-44.....	3	1,950	1,980	1,970	13.25	3.94
Higginsville.....	Farmers No. 1.....	do.....	B.	10239-41.....	3	2,000	2,120	2,040	19.02	3.76
Lexington.....	Staddy.....	do.....	B.	10238-27.....	3	1,980	2,070	1,990	13.00	3.90
Do.....	do.....	do.....	B.	10232-24.....	1	.....	.....	1,890	18.49	3.71
Napoleon.....	Independence.....	do.....	B.	10222-24.....	3	1,940	1,960	1,950	18.49	3.71
Waverly.....	Buckner.....	Waverly.....	B.	10341-42, 75567.....	3	1,940	2,030	2,010	16.52	7.37
Wellington.....	Labor Exchange, branch 305.....	Lexington.....	B.	10228-30.....	3	1,990	2,070	2,040	11.54	3.51
LINN COUNTY.										
Brookfield.....	Crandall No. 1.....	Tebo.....	B.	11421-23.....	3	1,950	2,160	2,040	9.51	4.97
Do.....	Walker No. 1.....	do.....	B.	11413-15.....	3	1,930	2,200	2,040	8.82	5.12
Marceline.....	Landreth No. 1.....	do.....	B.	11417-19.....	3	1,960	2,040	2,000	8.49	4.86
MACON COUNTY.										
Ardmore.....	Bevier No. 2.....	Bevier.....	B.	75565.....	1	.....	.....	1,940	12.43	5.24
Bevier.....	Central No. 61.....	do.....	B.	10191-93.....	3	1,940	2,090	2,030	11.27	3.83
Do.....	Northwestern No. 9.....	do.....	B.	9989-90.....	3	1,920	1,990	1,960	11.12	4.05
Macon.....	Home No. 1.....	Mulky.....	B.	9985-86, 75559.....	3	1,950	2,100	2,050	10.86	4.74

PUTNAM COUNTY.													
Mendota.....		B.	11398-400.....	3	1,900.....	1,940.....	1,930.....	12.05.....	5.05.....				
Unionville.....	Anderson.....	B.	14880-81.....	2	2,030.....	2,100.....	2,070.....	13.84.....	3.76.....				
RANDOLPH COUNTY.													
Huntsville.....	Carson No. 1.....	B.	11452-54.....	3	1,960.....	1,980.....	1,970.....	11.67.....	6.11.....				
Do.....	Northern Central No. 2.....	B.	11448-50.....	3	1,960.....	1,990.....	1,970.....	9.95.....	4.46.....				
Isacksville.....	Jacksonville.....	B.	7569.....	1	.....	.....	1,940.....	15.87.....	6.96.....		
Mohbey.....	South Marriott.....	B.	11497-99.....	1	.....	.....	1,910.....	14.07.....	5.55.....		
Renick.....	Orris No. 1.....	B.	11497-99.....	1	1,870.....	1,930.....	1,910.....	9.23.....	5.14.....				
Ryder.....	Jones No. 1.....	B.	10180-82.....	3	1,830.....	1,910.....	1,880.....	16.01.....	5.20.....				
RAY COUNTY.													
Richmond.....	Ray County.....	B.	75563.....	1	.....	.....	2,000.....	14.84.....	4.73.....		
Do.....	Ray County No. 2.....	B.	10197-99.....	3	1,930.....	2,140.....	2,040.....	15.84.....	4.40.....				
Do.....	Ray County No. 50.....	B.	10194-96.....	3	1,990.....	2,030.....	2,010.....	13.39.....	4.49.....				
Vibbard.....	Vibbard No. 1.....	B.	11365-67.....	3	1,990.....	2,220.....	2,070.....	9.91.....	3.14.....				
SULLIVAN COUNTY.													
Milan.....	Milan No. 1.....	B.	10125-26.....	2	1,850.....	1,960.....	1,910.....	19.49.....	6.85.....				
VERNON COUNTY.													
Panama.....	Jones No. 1.....	B.	11205-07.....	3	1,930.....	1,990.....	1,970.....	15.47.....	6.12.....				
MONTANA.													
BIG HORN COUNTY.													
Lodgegrass.....	Local prospect.....	Sb. B.	26149.....	1	.....	.....	2,180.....	6.52.....	.39.....		
Sanders.....	Prospect.....	Sb. B.	17711.....	1	.....	.....	2,250.....	7.75.....	.66.....		
BLAINE COUNTY.													
Cleveland.....	Cook.....	Sb. B.	14752.....	1	.....	.....	2,240.....	11.51.....	.90.....		
BROADWATER COUNTY.													
Lombard.....	Western.....	B.	28556-57.....	2	2,350.....	2,470.....	2,410.....	24.38.....	8.22.....				
CARBON COUNTY.													
Bear Creek.....	Internationa.....	Sb. B.	18691-93.....	3	2,010.....	2,090.....	2,040.....	9.44.....	1.99.....				
Do.....	No. 2.....	Sb. B.	15146-49, 51.....	5	2,050.....	2,100.....	2,080.....	10.46.....	1.79.....				
Do.....	No. 3.....	Sb. B.	15143.....	1	.....	.....	1,930.....	9.87.....	1.73.....		
Do.....	North Side.....	Sb. B.	15127-29.....	3	.....	.....	2,080.....	12.50.....	2.47.....		
Do.....	South Side.....	Sb. B.	24466-69.....	3	.....	.....	2,150.....	13.20.....	1.13.....		
Red Lodge.....	Red Lodge No. 4.....	Sb. B.	28622-25.....	4	2,120.....	2,170.....	2,150.....	13.20.....	1.13.....				
Washoe.....	Washoe.....	Sb. B.	28622-25.....	4	2,090.....	2,190.....	2,150.....	12.87.....	1.25.....				

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1						2	3	4	5	6	7
MONTANA—Con.											
CHOUTEAU COUNTY.											
Big Sandy.....	Mackton.....	Mackton.....	Sb. B.	14613, 15.....	2	2, 230	2, 230	2, 230	14.62	0.70	
Virgelle.....	Deda.....	Unnamed.....	Sb. B.	19790.....	1	.....	.....	2, 290	13.84	.99
Do.....	Price Sexton.....	do.....	Sb. B.	19795.....	1	.....	.....	2, 200	13.54	.74
CUSTER COUNTY.											
Terry.....	Cameron.....	Unnamed.....	L.	10577.....	1	.....	.....	2, 460	22.15	.38
Westmore.....	Prospect.....	do.....	L.	10910.....	1	.....	.....	2, 170	15.02	.49
DAWSON COUNTY.											
Glendive.....	Prospect.....	"B".....	L.	10914.....	1	.....	.....	2, 420	9.24	.95
Do.....	Snyder.....	Unnamed.....	L.	11045.....	1	.....	.....	2, 030	11.92	2.00
Jordan.....	Foster prospect.....	do.....	Sb. B.	19923.....	1	.....	.....	2, 240	16.17	.63
FALLON COUNTY.											
Camp Crook.....	Hornet.....	Kerr.....	L.	20370.....	1	.....	.....	2, 180	12.25	1.06
Do.....	Kerr.....	do.....	L.	20372.....	1	.....	.....	2, 000	23.73	2.62
FERGUS COUNTY.											
Hilger.....	Stone.....	Unnamed.....	Sb. B.	14495.....	1	.....	.....	2, 220	16.66	1.40
Whitford.....	Calderwood.....	do.....	Sb. B.	20000.....	1	.....	.....	2, 270	15.25	1.06
Do.....	Millsom.....	do.....	B.	22622.....	1	.....	.....	2, 750	20.15	1.10
Do.....	Prospect.....	do.....	Sb. B.	22548.....	1	.....	.....	2, 530	12.58	1.70
Do.....	do.....	do.....	Sb. B.	22586.....	1	.....	.....	2, 200	19.48	.88
Do.....	do.....	do.....	Sb. B.	22550.....	1	.....	.....	2, 240	19.33	2.47
Do.....	do.....	do.....	Sb. B.	22619.....	1	.....	.....	2, 360	18.83	.69
Do.....	do.....	do.....	Sb. B.	22620.....	1	.....	.....	2, 150	12.58	.87
Do.....	do.....	do.....	Sb. B.	22549.....	1	.....	.....	2, 170	14.91	1.61
Do.....	do.....	do.....	B.	22588.....	1	.....	.....	2, 370	18.09	1.80

FLATHEAD COUNTY.	Unnamed.....	Sb. B.	12786.....	1	2, 210	11.41	2.92
Flathead River.....	Outcrop.....	Sb. B.	12786.....	1	2, 210	11.41	2.92
GRANTEE COUNTY.	Unnamed.....	Sb. B.	10634.....	1	2, 370	20.99	1.70
Drummond.....	Prospect.....	Sb. B.	10634.....	1	2, 370	20.99	1.70
HILL COUNTY.	Unnamed.....	Sb. B.	22793.....	1	2, 250	22.68	.92
Havre.....	Prospect.....	Sb. B.	22793.....	1	2, 250	22.68	.92
Do.....	do.....	Sb. B.	22796.....	1	2, 010	9.46	1.03
Do.....	do.....	Sb. B.	22797.....	1	2, 060	14.25	.79
Do.....	do.....	Sb. B.	22799.....	1	2, 220	26.72	1.64
Do.....	do.....	Sb. B.	22795.....	1	2, 230	20.15	1.00
Do.....	do.....	Sb. B.	22795.....	1	2, 020	12.23	1.52
Do.....	do.....	Sb. B.	17841.....	1	2, 060	20.95	1.97
Rudyard.....	N o. 1.....	Sb. B.	17841.....	1	2, 320	8.97	1.91
Do.....	do.....	Sb. B.	17892.....	1			
Do.....	do.....	B.	17842.....	1			
Shelby.....	Unnamed.....	B.	17842.....	1			
MISSOULA COUNTY.	Unnamed.....	Sb. B.	13541-42.....	2	2, 240	26.28	1.08
Missoula.....	Hell Gate.....	Sb. B.	13541-42.....	2	2, 240	26.28	1.08
MUSSELSHELL COUNTY.	Unnamed.....	Sb. B.	19784.....	1	2, 220	16.79	1.97
Lavina.....	Bennett.....	Sb. B.	19784.....	1	2, 220	16.79	1.97
Do.....	do.....	Sb. B.	19785.....	1	2, 910	17.91	1.93
Do.....	do.....	Sb. B.	15114.....	1	2, 310	18.37	1.13
Do.....	do.....	Sb. B.	15114.....	1	2, 290	7.60	.94
Do.....	do.....	Sb. B.	17587.....	1	2, 420	8.99	.59
Do.....	do.....	Sb. B.	17589.....	1	2, 290	7.60	.45
Do.....	do.....	Sb. B.	17586.....	1	2, 290	7.60	.45
Do.....	do.....	Sb. B.	28999, 29000, 02-03.....	4	2, 230	9.17	.88
Do.....	do.....	Sb. B.	17588.....	1	2, 290	8.15	.67
Do.....	do.....	Sb. B.	17588.....	1	2, 290	8.15	.67
PHILLIPS COUNTY.	Unnamed.....	L.	27221.....	1	2, 450	34.74	.78
Melta.....	Spencer.....	L.	27221.....	1	2, 450	34.74	.78
ROSEBUD COUNTY.	Unnamed.....	Sb. B.	14755.....	1	2, 240	17.89	1.87
Bighorn.....	Prospect.....	Sb. B.	14755.....	1	2, 240	17.89	1.87
SHERIDAN COUNTY.	Unnamed.....	L.	23008.....	1	2, 120	15.61	.38
Daleview.....	Ranous.....	L.	23008.....	1	2, 120	15.61	.38
Do.....	do.....	L.	23007.....	1	2, 240	15.74	.90
Do.....	do.....	L.	23595.....	1	2, 340	11.47	.72
Do.....	do.....	L.	23595.....	1	2, 340	11.47	.72
Do.....	do.....	L.	23595.....	1	2, 340	11.47	.72
TETON COUNTY.	Unnamed.....	B.	12602.....	1	2, 790	13.53	1.09
Browning.....	Stone Prospect.....	B.	12602.....	1	2, 790	13.53	1.09
Do.....	do.....	B.	12694.....	1	2, 590	30.08	1.93
Do.....	do.....	B.	14109.....	1	2, 230	21.84	.71
Do.....	do.....	B.	14109.....	1	2, 230	21.84	.71
Do.....	do.....	B.	12427.....	1	2, 140	14.87	3.30
Do.....	do.....	B.	12427.....	1	2, 140	14.87	3.30

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
MONTANA—Con.										
VALLEY COUNTY.										
Antelope.....	Richardson.....		L.	14614.....	1			2,120	10.43	0.44
Bainville.....	"G".....		L.	10898.....	1			2,470	8.11	.42
Culbertson.....	Brueger.....		L.	10724.....	1			2,170	13.50	1.90
Do.....	"DD".....		L.	10727.....	1			2,290	9.70	.51
Do.....	Dempsy.....		L.	10725.....	1			2,350	10.19	1.23
Do.....	Prospect.....		L.	10726.....	1			2,350	11.95	1.75
East Scooby.....	Fisher.....		L.	23005.....	1			2,210	14.86	.49
Froid.....	"F".....		L.	11005.....	1			2,220	10.51	1.22
Do.....	"F".....		L.	11004.....	1			2,280	8.85	1.20
Medicine Lake.....	Unnamed.....		L.	10899.....	1			2,390	8.23	.61
Do.....	Belgon.....		L.	11002.....	1			2,250	12.60	.65
Do.....	Coal Ridge.....		L.	11006.....	1			2,390	9.54	.69
Do.....	Jones.....		L.	11003.....	1			2,360	9.46	.87
Do.....	Young.....		L.	11003.....	1			2,230	6.99	.63
Mondak.....	Open pit.....		L.	10900.....	1			2,080	13.21	.96
Ophelim.....	Baldwin.....		L.	23006.....	1			2,150	13.11	.54
Do.....	Dawson.....		L.	23025.....	1			2,150	13.11	.54
Plentywood.....	Unnamed.....		L.	14670.....	1			2,340	12.31	1.00
NEVADA.										
ESMERALDA COUNTY.										
Coaldale.....	Darrus.....		B.	13978.....	1			2,480	31.16	7.33
Do.....	Nevada.....		B.	13980,14409.....	2	2,200	2,570	2,380	23.88	7.14
MINERAL COUNTY.										
Yerington (Lyon County).....	Prospect.....		Sb. B.	30792.....	1			2,190	38.81	4.21
NEW MEXICO.										
BEENALILLO COUNTY.										
Albuquerque.....	Holmes.....		B.	12650.....	1			2,330	31.65	3.29

COLFAX COUNTY.	Brilliant.	Dawson No. 2.	Tim Pan. Raton.	B. B.	17703. 18166, 69, 71, 74-75, 12233-34.	2, 910	2, 530	1 7	2, 870 2, 800	16.51 13.67	.57 .72
Do.	Dawson No. 6.	Dawson.	33022.	B.	33022.	.....	.....	1	2, 850	14.95	.58
Gardiner.	Gardiner No. 1.	Raton.	14795.	B.	14795.	.....	.....	1	+3, 000	15.00	.66
Koehler.	Koehler.	.....	33017.	B.	33017.	.....	.....	1	2, 940	11.16	.73
Do.	Do.	.....	12335-37, 14796.	B.	12335-37, 14796.	.....	.....	4	+2, 880	12.45	.65
Do.	Do.	.....	33018.	B.	33018.	.....	2, 710	4	+3, 000	11.77	.72
Sugarite.	Sugarite No. 1.	Sugarite.	14791, 34589-91.	B.	14791, 34589-91.	.....	2, 670	4	2, 980	9.10	.61
Do.	Sugarite No. 2.	.....	14792, 34595-98.	B.	14792, 34595-98.	.....	2, 660	5	3, 000	10.13	.62
Van Houten.	Van Houten No. 1.	Raton.	32592.	B.	32592.	.....	.....	1	3, 000	11.27	.85
Do.	Do.	.....	32593.	B.	32593.	.....	.....	1	+3, 000	12.02	.58
Yankee.	Yankee.	Yankee.	17746.	B.	17746.	.....	2, 800	1	2, 460	13.02	1.16
Do.	Do.	.....	13365-66.	B.	13365-66.	.....	2, 850	2	2, 820	13.89	.58
LINCOLN COUNTY.	Old Abe.	Old Abe.	15053.	B.	15053.	.....	.....	1	2, 380	15.07	.85
White Oaks.	Wild Cat.	Unnamed.	15054.	B.	15054.	.....	.....	1	2, 730	17.30	.78
MCKINLEY COUNTY.	Coal Basin.	Coal Basin No. 1.	32272-73.	Sb. B.	32272-73.	.....	2, 000	2	2, 000	7.19	.54
Do.	Diamond.	Aztec (?)	19217-19.	Sb. B.	19217-19.	.....	2, 180	3	2, 440	9.98	.55
Do.	Do.	Diamond No. 1.	32278.	Sb. B.	32278.	.....	.....	1	2, 530	6.75	.53
Do.	Do.	Diamond No. 2.	15039.	Sb. B.	15039.	.....	.....	1	2, 800	6.77	.52
Black Rock.	Zuni Indian School.	Unamed.	10136.	Sb. B.	10136.	.....	.....	1	2, 800	10.37	.93
Gallup.	Barrett.	Aztec (?)	16922.	Sb. B.	16922.	.....	.....	1	2, 950	11.70	.73
Do.	Corral.	Oreoc (?)	16163.	Sb. B.	16163.	.....	.....	1	2, 420	5.86	.66
Do.	Defiance.	Defiance.	19223.	Sb. B.	19223.	.....	.....	1	2, 460	4.92	.66
Do.	Gallup Southwestern.	Black Diamond.	19166.	Sb. B.	19166.	.....	.....	1	2, 490	7.93	.88
Do.	Heaton.	No. 2.	19286.	Sb. B.	19286.	.....	.....	1	2, 370	6.68	.70
Do.	Do.	No. 3.	19287.	Sb. B.	19287.	.....	.....	1	2, 070	3.93	.62
Do.	Do.	Defiance.	19221.	Sb. B.	19221.	.....	2, 400	1	2, 400	6.04	1.09
Do.	Do.	Myers.	19213.	Sb. B.	19213.	.....	.....	1	2, 490	8.56	.82
Do.	Do.	No. 1.	19131.	Sb. B.	19131.	.....	.....	1	2, 670	10.49	.49
Do.	Do.	No. 2.	19132.	Sb. B.	19132.	.....	2, 350	2	2, 150	4.65	.67
Do.	Do.	Do.	19133-34.	Sb. B.	19133-34.	.....	2, 600	2	2, 480	8.30	.54
Gibson.	Navajo No. 1.	Navajo No. 1.	32330.	Sb. B.	32330.	.....	2, 700	4	2, 350	7.58	.65
Do.	Weaver.	Do.	32338-41.	Sb. B.	32338-41.	.....	.....	4	2, 650	9.02	.54
Do.	Do.	No. 2.	19137.	Sb. B.	19137.	.....	1, 950	2	2, 060	5.64	.57
Do.	Do.	No. 3.	19138, 32332.	Sb. B.	19138, 32332.	.....	.....	2	2, 000	3.92	.58
Do.	Do.	No. 3.	19139.	Sb. B.	19139.	.....	2, 340	2	2, 170	7.21	.42
Do.	Do.	No. 5.	19140, 32335.	Sb. B.	19140, 32335.	.....	.....	2	2, 530	8.43	.64
Do.	Do.	No. 2.	32378.	Sb. B.	32378.	.....	.....	1	2, 150	5.31	.48
HEATON COUNTY.	Prospect.	Unamed.	31076.	B.	31076.	.....	.....	1	2, 420	10.77	2.28
Lumberton.	Old Simms.	Upper.	26279.	B.	26279.	.....	.....	1	2, 340	5.68	.70

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
NEW MEXICO—Continued.										
SAN JUAN COUNTY.										
Durango (Colo.)	New Mexico	"A."	B.	17749	1				14.06	0.71
Farmington	Bill Thomas	Carbonero	B.	26249	1				11.68	.67
Do.	Blake	Unnamed	Sb. B.	25003	1				6.68	1.14
Do.	Government	Hogback	B.	17750	1				2.220	3.46
Do.	Jones	Carbonero	Sb. B.	26250	1				2.870	1.42
Do.	Local	Unnamed	Sb. B.	22685	1				8.34	.82
Do.	Marcellus	Carbonero	Sb. B.	28025	1				9.13	.68
Do.	Prospect	do.	Sb. B.	28026	1				14.02	2.61
Do.	do.	Carbonero (?)	Sb. B.	22807	1				7.68	.53
Do.	Ship Rock Indian School	Unnamed	Sb. B.	28006	1				2.270	4.64
Do.	Black Diamond	Carbonero	Sb. B.	22508	1				10.19	.68
Do.	Hendrixson	do.	Sb. B.	22509	1				10.33	.67
Do.	do.	do.	Sb. B.	2720	1				8.78	1.80
Do.	Pueblo Bonita	Unnamed	Sb. B.	23004	1					
SANTA FE COUNTY.										
Madrid	Anthracite No. 4	White Ash	A.	14888	1				10.08	.82
Do.	Blacksmith	Peacock (?)	B.	14884	1				7.97	1.33
Do.	Peacock prospect	Peacock	B.	14887	1				11.37	1.64
SOCORRO COUNTY.										
Carthage	Government	Carthage	B.	30214-15	2	2,760	2,960		14.35	.85
Magdalena	Prospect	Unnamed	Sb. B.	29007	1				2,250	.53
Do.	do.	do.	Sb. B.	17728	1				2,680	.53
Do.	do.	do.	B.	17602	1				2,220	.53
NORTH DAKOTA.										
ADAMS COUNTY.										
Haynes	Nipper & Monroe	Haynes	L.	14542	1				12.31	2.27
Do.	William Pinkham	do.	L.	14544	1				12.68	2.21

BOWMAN COUNTY.									
Amor.....	Durkin prospect.....	L.	14857.....	1	1	2,060	10.96	1.15	
Bowman.....	Open pit.....	L.	14553.....	1	1	2,130	18.39	.....
Scranton.....	Unnamed.....	L.	14485.....	1	1	2,180	12.47	1.01	
MERCER COUNTY.									
Beulah.....	Beulah.....	L.	33069.....	1	1	2,270	9.51	1.07	
Manhaven.....	Manhaven.....	L.	33068.....	1	1	2,140	9.75	1.66	
Stanton.....	Unnamed.....	L.	33067.....	1	1	2,390	9.02	1.10	
MORTON COUNTY.									
Almont.....	Unnamed.....	L.	19786.....	1	2,030	2,290	9.17	.64	
Hebron.....	do.....	L.	32442-43.....	2	2,060	2,050	13.13	1.56	
Leth.....	Haynes (?).....	L.	17537.....	1	1	2,090	13.07	2.30	
Do.....	do.....	L.	14723.....	1	1	2,150	13.83	1.07	
New Salem.....	Unnamed.....	L.	20653.....	2	2,290	2,000	14.63	2.13	
Do.....	New Salem No. 1.....	L.	34324-25.....	2	2,370	2,530	10.22	1.43	
Do.....	Unnamed.....	L.	19801.....	1	1	2,180	12.83	1.07	
WARD COUNTY.									
Burlington.....	Lignite.....	L.	31702-04.....	3	2,130	2,200	16.63	.40	
WILLIAMS COUNTY.									
Avoca.....	Bruegger.....	L.	12587.....	1	2,240	2,240	7.39	.51	
Ray.....	Pittsley.....	L.	20251-53.....	1	2,310	2,280	8.02	.62	
Trenton.....	Lignite.....	L.	12411.....	1	1	2,270	11.90	2.41	
Wheelock.....	Unnamed.....	L.	20252.....	1	1	2,430	14.63	2.28	
Williston.....	do.....	L.	19370-71, 917, 18.....	4	2,000	2,070	11.75	1.82	
Do.....	Husebye-Ellithorpe.....	L.	12588.....	1	1	2,190	9.28	1.24	
Do.....	Powell.....	L.	12583.....	5	2,190	2,310	10.19	.98	
Do.....	U. S. Reclamation.....	L.	19365-66, 19921-22.....	5	2,310	2,250	10.19	.98	
OHIO.									
BELMONT COUNTY.									
Alliedonia.....	Shipman.....	B.	20237.....	1	1	2,060	18.46	4.20	
Do.....	Moore.....	B.	20238.....	1	1	2,520	21.90	2.98	
Do.....	Washington.....	B.	20239.....	1	1	2,390	15.14	2.71	
Bailey Mills.....	Waynesburg.....	B.	20176.....	2	1,960	1,960	9.35	4.64	
Barnesville.....	Cochran No. 2.....	B.	20187-88.....	1	1,960	2,490	11.72	3.82	
Boston.....	Davy.....	B.	20241.....	1	1	2,370	15.44	3.16	
Burnsville.....	Meigs Creek (Sewickley).....	B.	20174.....	1	1	2,370	15.44	3.16	
Hunter.....	Waynesburg.....	B.	20174.....	1	1	2,370	15.44	3.16	
Do.....	do.....	B.	20174.....	1	1	2,370	15.44	3.16	
Do.....	Uniontown.....	B.	20775.....	1	1	2,160	16.10	2.99	
Martins Ferry.....	Pittsбург (No. 8).....	B.	34092-04.....	3	2,040	2,040	8.82	3.88	
Somerton.....	Waynesburg.....	B.	20254.....	1	1	2,460	16.15	3.03	
Temperanceville.....	Pittsбург (No. 8).....	B.	20230.....	1	1	2,260	9.86	4.75	

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
I										
O HIO—Continued.					2	3	4	5	6	7
COLUMBIANA COUNTY.										
East Liverpool.....	Delaney.....	Middle Kittanning.....	B.	25592.....	1			2,430	4.82	1.53
Do.....	Duck.....	do.....	B.	25589.....	1			2,220	6.31	2.18
Do.....	Gaston.....	Upper Freeport (No. 7).....	B.	25583.....	1			2,050	9.44	4.23
Do.....	Johnson.....	Middle Kittanning.....	B.	25588.....	1			2,600	7.80	1.88
Do.....	Kinsey.....	Lower Freeport.....	B.	25585.....	1			2,300	10.86	4.66
Do.....	Malone.....	Lower Kittanning.....	B.	25590.....	1			2,400	11.94	8.25
Do.....	Moore.....	Lower Freeport.....	B.	25586.....	1			2,470	12.16	3.18
Do.....	Smith.....	Middle Kittanning.....	B.	25584.....	1			2,420	6.51	2.72
New Salisbury.....	McCain.....	Upper Freeport (No. 7).....	B.	25892.....	1			2,030	11.32	4.43
Wellsville.....	Answorth.....	Lower Kittanning.....	B.	25898.....	1			2,060	5.18	3.86
Do.....	Dangelo.....	Mahoning.....	B.	25896.....	1			2,040	6.59	3.67
Do.....	Householder.....	Upper Freeport (No. 7).....	B.	25894.....	1			2,440	8.73	3.98
Do.....	Scheckler.....	Lower Freeport.....	B.	25895.....	1			2,520	12.25	1.58
Do.....	Smith.....	Upper Freeport (No. 7).....	B.	25883.....	1			2,400	7.75	2.96
Do.....	Wooster.....	Lower Kittanning.....	B.	25887.....	1			2,060	8.92	5.87
Do.....	do.....	Middle Kittanning.....	B.	25900.....	1			2,600	11.13	7.72
Do.....	West Point.....	Upper Freeport (No. 7).....	B.	25581.....	1			2,240	8.29	3.79
GUERNEY COUNTY.										
Hartford.....	Andy Slovak.....	Anderson (Bakerstown).....	B.	20243.....	1			2,120	10.86	3.92
Do.....	Walchonding No. 2.....	Upper Freeport (No. 7).....	B.	20245-46.....	2	2,460	2,570	2,520	5.91	2.92
Lore City.....	Black Top.....	do.....	B.	20204-65.....	2	2,280	2,300	2,290	7.92	2.01
Quaker City.....	Sayre.....	Pittsburgh (No. 8).....	B.	20178.....	1			2,180	9.14	5.07
Senecaville.....	Cleveland.....	Upper Freeport (No. 7).....	B.	20261-62.....	2	2,330	2,460	2,400	8.43	2.02
JEFFERSON COUNTY.										
Amsterdam.....	Amsterdam.....	Lower Freeport.....	B.	10593, 15388-90.....	4	2,060	2,190	2,120	7.66	3.03
Do.....	Eastern Ohio.....	do.....	B.	15391-95.....	3	2,060	2,260	2,150	9.12	2.92
Do.....	Elizabeth.....	do.....	B.	15401-43.....	3	2,120	2,210	2,170	7.01	3.13
Do.....	do.....	do.....	B.	15563-64.....	2	2,170	2,190	2,180	8.04	3.94
Brilliant.....	Goucher No. 2.....	Pittsburgh (No. 8).....	B.							

Cream City.....	Middle Kittanning.....	25899.....	1.....	2,410.....	11.45.....	2.13.....
Empire.....	Culp.....	25784.....	1.....	2,150.....	9.67.....	4.15.....
Hopedale.....	Parlett.....	15444-45.....	2.....	2,210.....	8.11.....	2.91.....
Irondele.....	Nicholson.....	25788.....	1.....	2,210.....	8.82.....	2.98.....
Do.....	East Ohio No. 2.....	25901.....	1.....	1,960.....	10.90.....	5.07.....
Piney Fork.....	Lower Kittanning.....	15491.....	1.....	2,710.....	4.86.....	8.89.....
Do.....	Pittsburgh (No. 8).....	15489.....	1.....	2,120.....	7.62.....	2.73.....
Do.....	do.....	15490.....	1.....	2,630.....	5.80.....	8.81.....
Smithfield.....	do.....	15488.....	1.....	2,160.....	7.26.....	2.68.....
Staubenville.....	do.....	{15675.....}	2.....	2,200.....	7.42.....	1.99.....
Yellow Creek.....	Lower Freeport.....	{15676.....}	1.....	2,170.....	10.34.....	4.08.....
Do.....	Pittsburgh (No. 8).....	25786.....	2.....	2,240.....	8.22.....	3.54.....
	Upper Freeport (No. 7).....	25890-91.....	1.....	2,330.....		
MONROE COUNTY.						
Coats Station.....	Uniontown.....	20259.....	1.....	2,290.....	16.10.....	4.16.....
NOBLE COUNTY.						
Belle Valley.....	(No. 7).....	17213-14.....	2.....	2,350.....	8.71.....	3.13.....
Mount Ephraim.....	Melgs Creek (Sewickley).....	20235.....	1.....	2,320.....	10.81.....	4.32.....
Quaker City.....	do.....	20185.....	1.....	2,400.....	13.17.....	2.77.....
Steamtown.....	do.....	20240.....	1.....	2,310.....	10.92.....	3.05.....
OKLAHOMA.						
COAL COUNTY.						
Lehigh.....	Folsom Morris No. 5.....	30707-11.....	5.....	2,120.....	12.89.....	4.56.....
Do.....	Folsom Morris No. 8.....	30713-17.....	5.....	2,150.....	12.20.....	4.19.....
Do.....	do.....	10054.....	1.....	2,160.....	11.66.....	3.92.....
Phillips.....	do.....	30719-23.....	5.....	2,190.....	9.30.....	3.76.....
CRAIG COUNTY.						
Bluejacket.....	Unnamed.....	20716.....	1.....	2,060.....	10.61.....	6.34.....
Estella.....	do.....	20718.....	1.....	2,050.....	10.68.....	6.39.....
Vinita.....	do.....	20717.....	1.....	2,110.....	10.51.....	6.83.....
Welch.....	do.....	20715.....	1.....	2,040.....	12.33.....	6.06.....
HASKELL COUNTY.						
McCurtain.....	Panama.....	29840-41.....	2.....	2,190.....	6.13.....	1.01.....
Do.....	do.....	29839-42.....	2.....	2,120.....	7.49.....	.91.....
Do.....	Blue Ridge No. 5.....	10057, 13688-92.....	6.....	2,110.....	6.92.....	.84.....
Stigler.....	San Bois No. 2.....	17646.....	1.....	1,940.....	4.00.....	.64.....
Do.....	Turner strip pit.....	do.....	1.....	2,090.....	2.62.....	.65.....
Do.....	do.....	26323.....	1.....	2,050.....	4.69.....	.71.....
Do.....	Strip pit.....	30344.....	1.....	1,920.....	8.09.....	3.60.....
Tamaha.....	Old Slope.....	30706.....	1.....	2,250.....	3.95.....	1.44.....
Do.....	Nunnally strip pit.....	26324.....	1.....	2,000.....	2.62.....	
Whitefield.....	Ligon strip pit.....	26325.....	1.....			

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
I										
OKLAHOMA—Continued.										
LATIMER COUNTY.										
Adamson.....	Adamson No. 6.....	Lower Hartshorne.....	B.	19852-53.....	2	1,920	1,990	1,960	3.21	1.38
Gowen.....	Rock Island No. 40.....	do.....	B.	30270-76.....	7	1,910	2,070	2,030	6.86	1.46
Wilburton.....	Degnan-McConnell No. 5.....	Upper Hartshorne.....	B.	27531-34.....	4	2,020	2,340	2,190	5.16	.98
LE FLORE COUNTY.										
Bokoshe.....	Slope No. 3.....	Hartshorne.....	S. B.	26801-02.....	2	2,230	2,300	2,270	5.12	.78
Hughes.....	Turkey Creek No. 2.....	do.....	B.	10065.....	1	.....	.....	2,050	6.46	.89
Williams.....	Williams No. 1.....	do.....	S. B.	19673-77.....	5	1,870	2,020	1,970	8.85	1.02
OKMULGEE COUNTY.										
Henryetta.....	Victoria No. 1.....	Henryetta.....	B.	10177-78.....	2	1,960	2,000	1,990	8.03	1.59
PITTSBURG COUNTY.										
Adamson.....	Eclipse No. 1.....	Lower Hartshorne.....	B.	16142-44.....	2	2,030	2,060	2,050	4.16	1.42
Aderson.....	Rock Island No. 5.....	McAlester.....	B.	30415-17, 30660-66.....	10	2,030	2,290	2,180	4.92	.74
Do.....	Rock Island No. 38.....	do.....	B.	11572-64, 1670, 18188-89, 30636-59.....	8	1,930	2,100	2,060	5.28	.56
Buck.....	Buck No. 22.....	Upper Hartshorne.....	B.	26130.....	1	.....	.....	2,200	4.78	1.68
Craig.....	Bolen-Darnell No. 4.....	McAlester.....	B.	15104-05.....	2	2,200	2,290	2,250	5.39	.87
Halleville.....	Blue Creek No. 7.....	Lower Hartshorne.....	B.	30401-02.....	2	2,060	2,030	2,040	6.02	2.31
Do.....	Hailey-Ola No. 2.....	Upper Hartshorne.....	B.	30398-99.....	2	2,000	2,130	2,110	8.50	1.86
Hartshorne.....	Rock Island No. 8.....	Lower Hartshorne.....	B.	11569, 19703.....	2	1,990	2,030	2,010	5.79	1.84
McAlester.....	Busby No. 5.....	McAlester.....	B.	11569, 86-90.....	6	2,190	2,270	2,230	5.40	1.58
Pittsburg.....	McAlester Edwards No. 1.....	do.....	B.	10060.....	6	.....	.....	2,180	8.97	3.38
Pocahontas.....	Pocahontas No. 1.....	Lower Hartshorne.....	B.	19728.....	1	.....	.....	2,030	5.12	.81
Ridgeway.....	Rock Island No. 10.....	do.....	B.	30222-26.....	5	1,980	2,120	2,050	7.77	1.70

ROGERS COUNTY.									
Catale.....	20780.	B.	Unamed.	1	10.25	5.40			
McNitt.....	20781.	B.	.do.	1	5.10	.89			
Collinsville.....	20714.	B.	Dawson.	1	8.73	4.09			
SEQUOYAH COUNTY.									
Hanson.....	26900.	S. B.	Unamed.	1	5.76	1.82			
TULSA COUNTY.									
Dawson.....	20712.	B.	Dawson.	1	9.36	3.62			
Tulsa.....	20713.	B.	.do.	1	8.75	4.01			
WAGONER COUNTY.									
Broken Arrow.....	20832.	B.	Unamed.	1	7.25	2.75			
Red Bird.....	26348.	B.	.do.	1	14.21	6.78			
OREGON.									
CLACKAMAS COUNTY.									
Willait.....	22492.	B.(?)	Unamed.	1	23.04	.53			
COOS COUNTY.									
Beaver Hill.....	27951.	Sb. B.	Newport.	1	11.59	.94			
Henryville.....	27956.	Sb. B.	.do.	1	9.79	.86			
West Fork.....	17707.	B.	Unamed.	1	16.86	1.46			
Do.....	17706.	B.	.do.	1	23.71	1.14			
Do.....	17708.	B.	Donnell prospect.	1	23.93	1.52			
Do.....	14927.	B.	Everett Association prospect.	1	16.92	1.70			
Do.....	17705.	B.	Hillis prospect.	1	24.69	1.85			
Do.....	19877-78.	B.	Meyers prospect.	2	32.26	.93			
Do.....	17704.	B.	Pulford prospect.	2	40.70	.62			
Do.....		B.	Reeves prospect.	1					
GRANT COUNTY.									
Dayville.....	18125.	L.	Unamed.	1	47.65	2.16			
MALHEUR COUNTY.									
Nyssa.....	12585.	L.	Unamed.	1	45.63	3.82			
WHEELER COUNTY.									
Fossil.....	18126-27.	Sb. B.	Unamed.	2	2,480	2,670			
					2,550	.54			

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						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
PENNSYLVANIA.										
ALLEGHENY COUNTY.										
Bruceston.....	U. S. experimental.....	Pittsburgh.....	B.	11985, 12282, 12557, 22618.	4	2,280	2,510	2,400	6.82	1.23
Campbell.....	New Field No. 1.....	Lower Freeport.....	B.	32235.	1	.....	.....	2,440	6.16	.52
Do.....	Do.....	Upper Freeport.....	B.	32236.	1	.....	.....	2,180	9.04	1.72
Do.....	Do.....	Upper and Lower Freeport.....	B.	32258-59.	2	2,010	2,150	2,080	7.77	2.76
Creighton.....	Do.....	do.....	B.	26932-34, 90-91.	2	2,360	2,960	2,560	10.66	1.25
Do.....	Creighton.....	do.....	B.	11130, 32.	2	2,410	2,520	2,470	6.73	1.01
Do.....	Hite.....	do.....	B.	20032, 34.	2	2,300	2,580	2,440	6.04	.80
Elizabeth.....	Paterson No. 2.....	Pittsburgh.....	B.	10845.	1	.....	.....	2,430	6.13	1.22
Oak Station.....	Oak.....	do.....	B.	.....	.....	.....	.....	.....	.....	.....
ARMSTRONG COUNTY.										
Appledold.....	Snyder.....	Lower Kittanning.....	B.	28684-65.	2	2,080	2,220	2,160	10.38	4.22
Ford City.....	Campbell.....	Upper Kittanning.....	B.	30290-91.	2	2,000	2,060	2,020	17.75	5.04
Logansport.....	Rardian.....	Upper Freeport.....	B.	28667-68.	2	2,140	2,170	2,160	10.80	3.29
Adrian F. O. (Mont- gomerystown Station). West Kittanning. Yatesboro.....	Montgomeryville.....	Middle Kittanning.....	B.	28774-75.	2	2,300	2,360	2,330	28.80	3.72
Do.....	Neals.....	Lower Freeport.....	B.	28731-22.	2	2,070	2,070	2,070	10.06	3.28
Do.....	Cowanshannock No. 2.....	do.....	B.	28672-73.	2	2,080	2,100	2,080	10.88	3.20
BEAVER COUNTY.										
Cannelton.....	Beaver Cannel.....	No. 4 (Brookville).....	B.	34650-51.	2	1,960	2,090	2,030	7.12	3.10
Do.....	Cannelton.....	No. 7 (Upper Freeport).....	B.	34656-57.	2	1,980	2,160	2,070	6.57	2.10
Do.....	Robin Hood.....	No. 6 (Middle Kittanning).....	B.	34637-38.	2	2,130	2,230	2,180	5.12	1.03
Do.....	Saratoga.....	No. 3 (Lower Mercer).....	B.	34653-54.	2	1,960	2,090	2,030	15.06	4.51
Smiths Ferry.....	Island Run.....	Upper Freeport.....	B.	25587.	1	.....	.....	2,290	5.09	1.45
BEDFORD COUNTY.										
Hopewell.....	Cambria No. 3.....	Upper Freeport.....	S. B.	15055-59.	5	2,460	3,010	2,670	12.45	2.01

County	Location	Sample No.	Depth	3	2, 120	2, 460	2, 240	2, 120	6, 87	1, 96
BLAIR COUNTY.	Glen White	Glen White No. 2	Upper Freeport	3	2, 120	2, 460	2, 240	2, 120	6, 87	1, 96
	Do	Glen White No. 2 (car sample)	do	1			2, 120		9, 61	1, 96
BRADFORD COUNTY.	Long Valley	Long Valley	Clarion	2	3, 000	+3, 000	+3, 000		11, 99	1, 10
BUTLER COUNTY.	Bruin	Bruin	Brookville	2	2, 220	2, 480	2, 350		11, 51	2, 47
	Budler	Muntz	Upper Freeport	1			2, 030		7, 75	3, 07
	Do	Thompson	Upper Kittanning	1			2, 230		7, 33	2, 09
	Do	Do	Upper Freeport	1			2, 050		9, 90	3, 73
	Do	Zenith No. 1	Upper Kittanning	2	3, 010	+3, 010			4, 54	1, 90
	Chacora	Cunningham	Upper Freeport	1			3, 000		8, 67	1, 26
	Claytonia	Stage	Middle Kittanning	1			2, 130		13, 97	3, 89
	Evans City	Young Shaft	Upper Freeport	1			2, 110		5, 55	3, 71
	Goff	Annadae No. 2	Brookville and Clarion	4	2, 480	2, 580	2, 500		14, 33	3, 65
	Harmony Junction	North Pittsburgh Realty	Upper Freeport	1			2, 050		11, 37	4, 54
	Jamisonville	Victoria	Upper Freeport	2	2, 020	2, 360	2, 190		11, 56	2, 98
	Jefferson Center	Reamer	do	1			2, 150		8, 41	1, 32
	Nealy	Nealy	Middle Kittanning	1			1, 990		10, 77	3, 92
	Unionville	Eagle	Upper Freeport	1			2, 220		6, 50	2, 67
CAMBERIA COUNTY.	Barnesboro	Cymbria No. 1	Lower Freeport	5	2, 340	2, 570	2, 470		6, 57	1, 50
	Do	Camdena No. 2	Upper Freeport	4	2, 410	2, 460	2, 450		8, 48	1, 54
	Do	Bella	Lower Freeport	5	2, 410	2, 340	2, 380		6, 70	1, 52
	Beardsale	Beard Run	Upper Freeport	0	2, 070	2, 380	2, 350		8, 49	1, 81
	Do	Leas No. 6	Lower Freeport	0	2, 280		2, 340		7, 83	2, 73
	Do	Pennsylvania No. 15	Lower Kittanning	2					7, 26	2, 92
	Bens Creek	Wilmore No. 1	Upper Freeport	5	1, 140	2, 470	2, 250		6, 26	3, 94
	Do	Wilmore No. 3	do	2	1, 990	2, 490	2, 270		7, 97	2, 92
	Colver	Colver	Lower Kittanning	0	2, 450	+3, 010	2, 500		5, 75	1, 14
	Dunlo	Henrietta	do	0	3, 010		2, 010		4, 82	1, 64
	El Mora	Peerless No. 1	do	5	2, 380	+3, 010	2, 610		6, 81	1, 57
	Fallen Timber	Peerless No. 4	Upper Freeport	2	2, 270	2, 330	2, 300		10, 05	1, 78
	Gallitzin	Gallitzin	do	4	2, 280	2, 390	2, 330		6, 27	1, 43
	Do	Gallitzin (car sample)	do	2			2, 490		8, 79	1, 47
	Hastings	Pennsylvania No. 11	Lower Freeport	5	2, 430	2, 640	2, 540		7, 14	1, 46
	Do	Pennsylvania No. 12	do	5	2, 200	2, 580	2, 380		7, 63	1, 86
	Johnstown	Smokeless No. 1	Upper Kittanning	3	2, 160	2, 260	2, 210		9, 71	2, 19
	Do	Sunnyside	do	2	2, 240	2, 450	2, 340		10, 40	2, 47
	Lilly	Sonman No. 2	Lower Kittanning	3	3, 010	+3, 010	3, 010		6, 36	0, 67
	Llanfair	Scalp Level No. 2	do	3	2, 960	3, 010	3, 000		4, 93	1, 72
	Nanty Glo	Lincoln No. 1	do	11	2, 160	2, 480	2, 370		6, 47	1, 84
	Do	Lincoln No. 1 (car sample)	do	1			2, 150		7, 75	2, 18
	Do	Springfield No. 1	do	5	2, 080	2, 280	2, 110		6, 68	2, 54
	Portage	Miller No. 1	do	10	2, 260	+3, 010	2, 730		6, 22	1, 15
	Do	Puritan No. 1	do	4	2, 230	2, 580	2, 380		7, 65	2, 07

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.				Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
PENNSYLVANIA											
—Continued.											
CAMBERIA COUNTY											
St. Michael.....	Maryland.....	do.....	S. B.	25717-22, 30118-19, 27, 29, 68185, 87, 93, 68219-20.....	2	2, 630	+3, 010	+2, 880	6.13	.93	
Sonman.....	Sonman Slope.....	Upper Freeport.....	S. B.	26398-403.....	6	2, 050	2, 280	2, 170	6.44	1.78	
Spangler.....	Pennsylvania No. 21.....	Lower Freeport.....	B.	12144-47.....	4	2, 240	+3, 010	+2, 550	6.49	1.32	
Do.....	Pennsylvania No. 22.....	do.....	B.	12128-27, 40-42.....	5	2, 530	2, 880	2, 620	6.57	1.27	
Van Ormer.....	Peerless No. 1.....	Upper Freeport.....	B.	10275-77.....	3	2, 420	3, 010	2, 760	8.94	.86	
Do.....	Peerless No. 2.....	Lower Freeport.....	B.	10272-74.....	3	2, 330	2, 500	2, 410	10.38	2.12	
Vintondale.....	Vinton No. 6.....	Lower Kittanning.....	S. B.	10254, 56, 57.....	3	2, 100	2, 410	2, 310	6.95	2.08	
W/indber.....	Eureka No. 40.....	do.....	S. B.	68179, 90-91, 204, 206-08, 222.....	8	2, 520	+3, 010	+2, 650	7.38	1.22	
CAMERON COUNTY.											
Sterling Run.....	Berry.....	Freeport.....	B.	75467-68.....	2	2, 850	2, 940	2, 900	6.45	.76	
CENTER COUNTY.											
Clarence.....	Lehigh Valley No. 22.....	Brookville.....	B.	17447.....	1	.....	.....	+3, 010	14.85	1.01
Do.....	Poormansite.....	Lower Freeport.....	S. B.	17445.....	1	.....	.....	2, 220	8.08	1.86
Do.....	do.....	Lower Kittanning.....	B.	17444.....	1	.....	.....	+3, 010	12.83	.91
Gillingtown.....	Lehigh Valley No. 15.....	Lower Freeport.....	B.	17446.....	1	.....	.....	2, 300	11.64	2.75
Osceola Mills.....	Electric.....	Lower Kittanning.....	S. B.	12087-70.....	4	2, 370	+3, 010	+2, 680	7.96	2.07	
Do.....	Moshannon No. 10.....	do.....	S. B.	12037-61.....	5	2, 380	2, 550	2, 470	7.52	2.11	
Do.....	Weston.....	do.....	S. B.	12063-65.....	3	2, 450	2, 690	2, 580	7.93	2.11	
CLARION COUNTY.											
Church Hill.....	Church Hill.....	Lower Kittanning.....	B.	34825-26.....	2	2, 340	2, 320	2, 330	10.24	2.59	
Hillville.....	Blue Goose.....	do.....	B.	34837-38.....	2	2, 210	2, 270	2, 240	8.64	3.56	
Monterey.....	Monterey.....	Clarion.....	B.	34828-29.....	2	2, 120	2, 190	2, 160	7.63	3.58	
Parker.....	Clarion River.....	Upper Kittanning (?).....	B.	34822-23.....	2	2, 060	2, 170	2, 170	8.31	4.69	
Phillipston.....	James.....	Lower Kittanning.....	B.	34831-32.....	2	2, 300	2, 310	2, 310	7.38	3.10	
Sarah Furnace.....	Sarah Furnace.....	do.....	B.	34834-35.....	2	2, 140	2, 180	2, 160	8.45	3.37	

CLEARFIELD COUNTY.	Name	Address	Occupation	Sex	Age	1900			Total
						Male	Female	Total	
	Read.	Lower Freeport.	B.	5	2,100	2,420	9,36	2,200	3.47
	Berwindale.	Lower Kittanning.	S. B.	1	2,580	+3,010	8.95	+2,850	1.44
	Boardman.	Upper Freeport.	B.	1	2,450	2,540	8.04	2,640	1.81
	Brisban.	do.	B.	1	2,480	3,010	8.49	2,620	1.02
	Do.	do.	B.	5	2,390	2,410	6.74	2,800	1.14
	Carnwath.	Lower Freeport.	B.	2	2,140	2,850	7.77	2,800	2.23
	Do.	do.	B.	4	2,740	2,860	5.53	2,850	0.95
	Clearfield.	Cassidy No. 1.	S. B.	3	2,170	2,280	10.36	2,240	2.96
	Do.	Eagle.	B.	3	76926	4.76	8.57	2,240	2.47
	Do.	McFavish & Bailey	B.	1	1	1	4.76	2,380	1.10
	Do.	Prospect drift.	B.	1	1	1	0.92	2,350	0.75
	Do.	Schickling	B.	1	1	1	0.89	2,350	0.71
	Do.	Addeman.	B.	1	1	1	0.86	2,350	1.02
	Curwensville.	do.	B.	1	1	1	0.89	2,350	1.02
	Do.	Catwell.	S. B.	1	2,740	2,840	8.89	2,350	2.05
	Do.	Prospect drift.	B.	1	1	1	8.89	2,350	2.05
	Dubois.	Lower Kittanning.	B.	1	1	1	8.89	2,350	2.05
	Irons.	Lower Freeport.	B.	1	1	1	8.89	2,350	2.05
	Karlauas.	Lower Kittanning.	B.	2	2,740	2,840	14.41	2,700	1.56
	McGees Mills.	Brookville.	S. B.	1	2,440	8.97	8.97	2,440	3.23
	Do.	Butter Ball	B.	2	300	13.48	13.48	2,300	3.13
	Do.	Sherwood	B.	1	150	12.75	12.75	2,150	5.20
	Mahahey.	Upper Kittanning.	B.	1	630	8.61	8.61	2,630	1.42
	Morrisdale.	Moshannon	B.	1	5734	5734	8.50	2,510	1.63
	Do.	do.	B.	3	2,280	8.53	3.54	2,280	3.54
	Do.	Morrisdale No. 1.	S. B.	1	2,250	2,320	8.94	2,280	1.12
	Do.	do.	S. B.	2	2,850	+3,010	8.94	+2,850	1.41
	Do.	Morrisdale No. 2.	S. B.	2	2,620	2,980	10.26	2,930	1.41
	Do.	do.	S. B.	2	2,500	2,660	7.12	2,550	1.98
	Munson.	Lower Kittanning.	S. B.	5	2,300	3,010	7.87	2,600	2.08
	Do.	Colorado No. 5.	S. B.	4	2,300	2,470	9.72	2,350	3.10
	Do.	Ghem.	B.	4	2,300	2,470	7.58	2,430	2.61
	Phillipsburg.	Acme No. 2.	S. B.	1	1	1	5.48	2,620	0.95
	Do.	Conquest.	B.	1	1	1	5.48	2,620	2.44
	Do.	do.	S. B.	1	1	1	6.25	2,370	2.44
	Do.	do.	B.	1	1	1	8.85	2,540	0.99
	Do.	Roden.	B.	1	1	1	14.11	2,360	4.05
	Do.	Viola.	S. B.	3	2,580	2,600	7.75	+2,750	1.10
	Smoke Run.	Upper Freeport.	B.	2	2,580	2,600	8.20	2,570	1.03
	Suryvor.	Goshen No. 2.	B.	1	1	1	6.82	2,210	1.99
	Do.	do.	B.	1	1	1	9.43	2,130	2.91
	CLINTON COUNTY.								
	Lock Haven.	Scotiac.	S. B.	2	+3,000	+3,000	16.69	+3,000	.70
	ELK COUNTY.								
	Averyville.	Unnamed.	B.	2	2,480	2,500	19.42	2,490	4.84
	Benezett.	Lower Kittanning.	B.	2	2,250	2,310	6.77	2,280	3.04
	Benizinger.	Middle Kittanning.	B.	2	2,680	2,720	17.53	2,700	2.09
	Brandy Camp.	Lower Kittanning.	B.	2	2,140	8.90	8.90	2,140	2.97
	Byrnedale.	do.	B.	1	1	1	6.49	2,550	2.59
	Dagus.	do.	B.	1	1	1	9.95	2,440	4.04
	Force.	Proctor No. 1.	B.	3	2,310	2,440	6.12	2,370	2.1
	Whitmere.	do.	B.	1	1	1	9.66	2,650	3.56

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
I										
PENNSYLVANIA—Contd.										
FAYETTE COUNTY.										
East Millsboro.....	Hustead.....	Pittsburgh.....	B.	22083-96.....	4	2,110	2,440	2,290	8.40	1.79
HUNTINGDON COUNTY.										
Jacobs.....	Barnet.....	Lower Kittanning.....	S.B.	10319.....	1	.....	.....	+3,010	6.38	.83
Do.....	Jacobs.....	Fulton.....	S.B.	10315-17.....	3	2,770	+3,010	+2,880	8.64	1.63
Do.....	Starr.....	.....	S.B.	10318.....	1	.....	.....	+2,010	8.34	1.08
Robertsdale.....	Robertsdale.....	do.....	S.B.	12115-19.....	5	2,370	+3,010	+2,880	6.56	1.06
Woodvale.....	Woodvale.....	do.....	S.B.	12121-23.....	3	+3,010	+3,010	+3,010	5.92	.95
INDIANA COUNTY.										
Ernest.....	Ernest No. 2.....	Upper Freeport.....	B.	24191-92.....	2	2,190	2,240	2,220	10.70	2.94
Glen Campbell.....	Electric No. 8.....	Upper Kittanning.....	B.	75812-13.....	2	2,510	2,630	2,570	10.13	1.58
Do.....	Falcon No. 9.....	Lower Freeport.....	B.	75821.....	1	.....	.....	2,390	12.76	2.81
Do.....	Falcon No. 8.....	Middle Kittanning.....	B.	75820.....	1	.....	.....	2,890	9.52	1.83
Do.....	Hillsdale No. 6.....	Upper Freeport.....	B.	75819.....	1	.....	.....	2,450	10.78	1.75
Do.....	Indiana No. 6.....	do.....	B.	12102-04,06.....	4	2,410	2,550	2,490	8.58	1.28
Gypsey.....	Trojan.....	Lower Freeport.....	B.	75818.....	1	.....	.....	2,250	5.79	2.24
Homer City.....	Lucerne No. 1.....	Upper Freeport.....	B.	10306,08-12.....	6	2,080	2,590	2,290	7.97	2.12
Do.....	Lucerne No. 3.....	do.....	B.	10303-05.....	3	2,190	2,350	2,240	8.28	1.98
Locust.....	Lucerne No. 2.....	do.....	B.	45750-51.....	2	2,140	2,280	2,210	9.27	3.35
Robindale.....	Robindale.....	Lower Kittanning.....	S.B.	25135-38.....	2	2,440	2,490	2,470	7.86	2.20
Scott Glen.....	Brush Valley.....	do.....	S.B.	22501-05.....	5	2,200	2,380	2,260	8.09	2.99
Do.....	Brush Valley (car sample).....	do.....	S.B.	22507.....	1	.....	.....	2,150	8.16	3.00
JEFFERSON COUNTY.										
Brookwayville.....	West Clarion.....	Lower Freeport.....	B.	17448.....	1	.....	.....	2,140	10.48	2.97
Do.....	do.....	Lower Kittanning.....	B.	17450.....	1	.....	.....	2,120	10.60	3.45
Do.....	do.....	Upper Freeport.....	B.	17449.....	1	.....	.....	2,300	9.98	1.74

Conifer.....	Conifer.....	34910-11.....	2	2, 160	2, 220	2, 190	10.21	4.59
Fuller.....	Black Prince.....	75736-37.....	2	2, 130	2, 180	2, 160	12.48	5.18
Hillman.....	Arthur.....	75815-16.....	2	2, 400	2, 510	2, 460	8.76	1.91
McDarey.....	Upper Freeport.....	34904-05.....	2	2, 910	2, 970	2, 940	10.27	1.59
Pancoast.....	Middle Kittanning.....	75728-29.....	2	2, 240	2, 360	2, 300	9.50	2.86
Punxsutawney.....	Upper Kittanning.....	26927-31.....	5	2, 120	2, 490	2, 490	7.98	2.04
Do.....	Eleanora.....	75754, 53, 55.....	3	2, 440	2, 540	2, 480	5.07	1.22
Ramsaytown.....	Williams Run No. 1.....	34956-57.....	2	2, 190	2, 190	2, 190	11.49	3.46
Sykesville.....	No. 4.....	12455, 57-58, 71.....	4	2, 330	2, 720	2, 510	12.68	2.28
LACKAWANNA COUNTY.	Sykesville.....							
Dunmore.....	Sloan.....	11440.....	1			+3, 010	11.94	.43
LAWRENCE COUNTY.	Dunmore No. 2.....							
Wampum.....	Country bank.....	34736-37.....	2	2, 130	2, 190	2, 160	5.86	2.62
Do.....	Crescent.....	34738-41.....	3	2, 410	2, 540	2, 450	9.63	3.28
LUZERNE COUNTY.								
Pittston.....	Colliery No. 14.....	11441.....	1			+3, 010	6.03	.58
LYCOMING COUNTY.								
Ralston.....	Red Run.....	75520.....	1			2, 960	15.31	.53
Do.....	Do.....	75521.....	1			+3, 000	17.11	.57
M'KEAN COUNTY.								
Clermont.....	Clermont.....	34982-84.....	3	2, 160	2, 440	2, 270	16.76	4.69
Do.....	Coal Blossom.....	34992-93.....	2	2, 600	2, 620	2, 610	6.13	1.62
MERCER COUNTY.								
Drake.....	Sharon No. 5.....	34807-08.....	2	2, 460	2, 610	2, 540	3.80	.95
Grove City.....	Diamond No. 3.....	34816-17.....	2	2, 100	2, 430	2, 270	9.08	4.51
Oakes Station.....	Pennsy.....	34904-05.....	2	2, 130	2, 220	2, 180	5.91	1.20
Pardoe.....	Do.....	34813-14.....	2	2, 040	2, 290	2, 170	7.30	3.95
Stoneboro.....	Stoneboro No. 7.....	34810-11.....	2	2, 060	2, 150	2, 100	7.27	3.26
SOMERSET COUNTY.								
Bakersville.....	Wyand.....	17689.....	1			+3, 010	12.65	.70
Cainbrook.....	Hitehew or Fleegle.....	19851.....	2	3, 010	+3, 010	+3, 010	10.60	1.43
Do.....	Loyal Hanna No. 6.....	19848-49.....	2			+3, 010	6.75	.86
Confluence.....	Linmer.....	13631.....	1			2, 190	8.44	2.42
Edie.....	Levi Berkey.....	17691.....	1			2, 680	11.22	1.57
Elk Lick.....	Engle.....	13983.....	1			2, 460	8.94	1.59
Do.....	Grassy Run No. 1.....	13664.....	1			2, 420	13.01	2.36

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
PENNSYLVANIA—Contd.											
SOMERSET COUNTY—continued.											
Gillette.	Jake Miller	Unnamed.	B. (?)	17692	1				2,510	11.25	1.19
Holsopple.	Haws No. 3.	Lower Kittanning.	S. B.	22541-45.	5				2,370	8.00	2.43
Do.	Haws No. 3 (run-of-mine, car sample).	do.	S. B.	22547	1	2,180	2,440		2,370	9.07	2.71
Do.	Lenore.	do.	S. B.	15078-81.	4	2,210	2,600		2,360	8.00	2.38
Do.	Oneta.	Upper Kittanning.	S. B.	15073-76.	4	2,120	2,460		2,280	11.06	2.81
Pinehill.	Consolidation No. 112.	"Little Pittsburgh"	S. B.	13981-82.	2	2,350	2,420		2,390	8.13	1.70
Do.	Consolidation No. 113.	"Stoner"	S. B.	13984	1				2,470	11.20	1.96
Seanor.	Eureka No. 39.	Upper Kittanning.	S. B.	68200, 05, 14.	3	1,980	2,390		2,190	9.20	2.24
Somerset.	Neva.	Upper Freeport.	S. B.	17683	1				2,270	12.07	2.49
Do.	Sanner & Shaffer.	do.	S. B.	17694	1				2,630	9.62	1.69
Do.	Stauffer No. 3.	Lower Freeport.	S. B.	17695	1				+3,010	5.34	1.65
Windber.	Loehrie Arrow.	Lower Kittanning.	S. B.	20292-95, 98.	5	2,320	+3,010		+2,520	6.79	1.44
Do.	Loehrie Arrow (run-of-mine, car sample).	do.	S. B.	22534	1				2,460	10.25	2.16
Zimmerman.	Ralphton No. 6.	Upper Freeport.	S. B.	17690	1				2,600	15.61	1.52
SULLIVAN COUNTY.											
Bernice.	Randall & Shadd.	Lower Kittanning.	S. A.	9652.	1				+3,010	12.09	.84
TOGA COUNTY.											
Antrim.	Anna S.	Bloss.	S. B.	17453	1				2,500	12.78	2.92
Landrus.	Bear Run.	do.	S. B.	17452	1				2,600	12.99	2.53
Morris Run.	New.	do.	S. B.	17454	1				2,900	10.11	1.51
Do.	do.	Morgan.	S. B.	17451	1				2,620	9.39	1.76

WASHINGTON COUNTY.

Avella.....	B.	15673-74.....	2	2,040	2,110	2,090	6.36	2.12
Baird.....	B.	11164-69.....	6	2,310	2,520	2,440	5.98	1.08
Schoenberger.....	B.	17082-84.....	3	2,350	2,550	2,420	6.98	1.20
Finleyville.....	B.	27901-05.....	5	2,010	2,220	2,120	8.12	2.26
Greer Station.....	B.	11157-62.....	6	2,140	2,610	2,420	6.58	1.17
Monongahela City.....	B.							

WESTMORELAND COUNTY.

Greensburg.....	B.	12853.....	1			2,550	10.66	1.41
Ligonier.....	B.	17901.....	1			2,450	11.90	1.99
Lucesco.....	B.	12393-96.....	4	2,000	2,140	2,090	10.79	3.27

SOUTH DAKOTA.

Hilton.....	L.	13221.....	1			2,400	18.40	1.59
Mendenhall.....	L.	13220.....	1			2,140	17.36	.94
Newcomb.....	L.	15062.....	1			2,140	13.95	1.46

PEEKINS COUNTY.

Lodgepole.....	L.	14354.....	1			2,180	15.73	1.14
Strool.....	L.	12488.....	1			2,130	15.64	2.02
Do.....	L.	12453.....	1			2,290	13.72	3.65
Do.....	L.	12454.....	1			2,120	17.23	1.65

TENNESSEE.

ANDERSON COUNTY.

Coal Creek.....	B.	21645-48.....	4	2,150	2,400	2,310	5.14	1.30
Do.....	B.	13237-38, 64-65, 90, 32671-73.	8	2,120	3,010	2,550	8.18	1.00
Do.....	B.	21636-38.....	3	2,300	2,600	2,440	5.90	1.04
Do.....	B.	21640-43.....	4	2,330	2,460	2,400	5.81	.84
Do.....	B.	21680.....	1			2,390	4.33	.91
Do.....	B.	21627.....	1			2,320	2.99	.87
Do.....	B.	21632-34.....	3	2,350	2,460	2,410	8.63	1.67
Do.....	B.	21628, 30.....	3	2,210	2,320	2,250	6.20	1.60
Do.....	B.	77185-86.....	2	2,240	2,250	2,250	8.29	3.14
Do.....	B.	21427.....	1			2,150	4.11	1.63
Do.....	B.	21451-54.....	4	2,000	2,310	2,100	5.62	1.68
Do.....	B.	32688-91.....	4	2,280	2,310	2,290	5.10	.88
Do.....	B.	32701.....	1			2,440	5.10	2.72
Do.....	B.	32700.....	1			2,350	8.75	2.09
Do.....	B.	32703.....	1			2,370	9.15	2.43
Do.....	B.	32697.....	1			2,320	8.18	2.32

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
TENNESSEE—Continued.										
BLEDSOE COUNTY.										
Apontley No. 6.....	Apontley No. 6.....	Sewanee.....	B.	22259-60.....	2	2,370	2,440	2,410	8.47	1.06
Prospect.....	Prospect.....	do. (?).....	B.	10915.....	1			2,600	8.10	.58
Do.....	do.....	do. (?).....	B.	10916.....	1			2,600	6.60	.84
Litton.....	do.....	Angel.....	B.	12584.....	1			2,180	5.80	1.84
Do.....	do.....	Richard.....	B.	10869.....	1			2,790	8.87	.88
Do.....	do.....	New Opening.....	B.	10863.....	1			2,810	7.95	.82
Do.....	do.....	Prospect.....	B.	10863.....	1			2,910	7.95	.82
Do.....	do.....	Thomson.....	B.	10731.....	1			2,910	10.87	3.63
Pikeville.....	McFarland.....	Morgan Springs.....	B.	11071.....	1			2,910	10.87	3.63
Do.....	do.....	Sewanee(?).....	B.	11049.....	1			2,750	8.88	.97
Do.....	do.....	do.....	B.	11050.....	1			2,540	6.89	.84
CAMPBELL COUNTY.										
Anthras.....	Anthras.....	Jellico.....	B.	21853-55.....	?	2,400	2,430	2,420	3.15	.85
Block.....	Monarch.....	Monarch.....	B.	22028-31.....	4	2,060	2,470	2,320	11.29	2.77
Do.....	Fee Wee.....	Red Ash.....	B.	21673-75.....	3	2,940	2,970	2,960	5.72	1.07
Do.....	Bear Wallow.....	Coal Creek.....	B.	21673-75.....	2	2,530	2,610	2,570	4.39	.94
Do.....	Bear Wallow No. 2.....	do.....	B.	32660-62.....	3	2,300	2,690	2,450	7.13	1.28
Do.....	Caryville.....	do.....	B.	21659-62.....	4	2,220	2,480	2,370	6.08	1.24
Do.....	Fee Wee.....	Red Ash.....	B.	21677-78.....	2	2,400	2,450	2,340	3.69	1.72
Do.....	Fee Wee.....	Lower Dean.....	B.	21669-71.....	3	2,400	2,450	2,420	6.48	1.02
Do.....	Red Ash.....	Red Ash.....	B.	21654-57.....	4	2,400	2,590	2,510	6.24	1.18
Do.....	Sun.....	do.....	B.	21813.....	1	2,350	2,500	2,220	1.53	.90
Chasaca.....	Chaska.....	Rich Mountain.....	B.	21680-82.....	3	2,400	2,400	2,400	3.95	1.83
Coal Creek.....	Coal Creek.....	Coal Creek.....	B.	21687-88.....	1	2,080	2,340	2,380	3.07	1.41
Cotula.....	Cotula.....	Jellico.....	B.	32885.....	3	2,440	2,460	2,210	3.98	1.22
Do.....	Southern.....	Jordan.....	B.	21694-92.....	3	2,440	2,460	2,460	2.10	1.36
Do.....	do.....	Rich Mountain.....	B.	22018-19.....	2	2,050	2,080	2,090	2.59	1.07
Do.....	Elk Valley.....	Blue Gem.....	B.	22012-13.....	2	2,950	2,930	2,040	2.94	1.03
Do.....	Elk Valley.....	do.....	B.	32641-42.....	2	2,270	2,360	2,330	8.83	1.58
Do.....	Peckas Branch.....	do.....	B.	21896.....	1	2,270	2,360	2,330	6.83	1.50
Do.....	Spirit.....	Jellico.....	B.	21896.....	1	2,270	2,360	2,330	6.83	1.50
Do.....	Old Davis Creek.....	do.....	B.	21896.....	1	2,270	2,360	2,330	6.83	1.50
Do.....	Remy.....	Rich Mountain.....	B.	21892,04.....	2	2,440	2,740	2,590	2.13	.72

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
I										
TENNESSEE—										
Continued.										
CUMBERLAND COUNTY.										
Crab Orchard	Haley Mountain No. 1.	Sewanee	B.	33471-72.	2	2,500	2,610	2,560	7.50	0.70
Litton	Hale Prospect.	Morgan Springs	B.	10802.	1	.....	.....	2,310	11.23	3.31
Do.	do.	Sewanee (?)	B.	10800.	1	.....	.....	2,850	7.81	.59
Ozone	Fox Den.	Sewanee	B.	33474.	1	.....	.....	2,570	9.35	.62
Do.	Nelson.	Nelson	B.	33475.	1	.....	.....	2,640	6.77	.66
FENTRESS COUNTY.										
Davidson	Davidson	Bon Air No. 2.	B.	20987-88.	2	2,050	2,080	2,070	10.54	3.14
Do.	Highland No. 2.	do.	B.	20982-84, 86.	4	2,030	2,190	2,120	9.91	3.25
Gerrit	East Laurel.	White Oak.	B.	32789.	1	.....	.....	2,360	6.53	1.25
Wildor	Big Laurel No. 2.	Wildor	B.	33476.	1	.....	.....	2,260	11.18	3.24
Do.	Wildor No. 3.	Bon Air No. 2.	B.	24845-49.	5	2,210	2,350	2,240	10.28	2.69
Zenith	White Oak.	White Oak.	B.	32798-800.	3	2,460	2,550	2,500	5.60	.42
GEUNDEY COUNTY.										
Coalmont	Coalmont E.	Sewanee	B.	22384.	1	.....	.....	2,530	9.55	1.20
Do.	Coalmont I.	do.	B.	22383.	1	.....	.....	2,630	12.61	1.90
Do.	Coalmont New A.	do.	B.	22385.	1	.....	.....	2,460	13.19	1.21
Do.	Coalmont Old A.	do.	B.	22386.	1	.....	.....	2,580	10.06	1.95
Do.	Coalmont S. Old Hill.	do.	B.	22374.	1	.....	.....	2,750	8.40	.62
Do.	Trade No. 4.	do.	B.	22354.	1	.....	.....	2,420	9.75	.74
Do.	Mill Creek prospects.	do.	B.	22373.	1	.....	.....	2,450	9.53	1.84
Fremont	Tracy City No. 3.	do.	B.	22370, 81.	2	2,210	2,690	2,640	9.06	.62
Do.	Tracy City No. 4.	do.	B.	32587.	1	.....	.....	2,400	8.33	.62
Palmer	Tennessee No. 8.	do.	B.	32586.	1	.....	.....	2,610	8.63	.71
Do.	do.	do.	B.	32585.	1	.....	.....	2,690	9.45	.60
Tracy City	Tennessee No. 16.	do.	B.	32587.	1	.....	.....	2,300	10.29	2.05
Do.	East Fork.	do.	B.	22361.	1	.....	.....	2,300	10.29	2.05

Do.	do.	22663.	1	1	2,500	11.22	.62
Do.	do.	22672	1	1	2,500	9.03	.80
Do.	do.	22671	1	1	2,380	9.18	.57
Do.	do.	22604	1	1	2,630	8.30	.58
Do.	do.	22600	1	1	1,970	11.97	3.81
Do.	do.	22603.	1	1	2,690	8.07	.66
HAMILTON COUNTY.							
Daisy	Unnamed.	22249	1	1	2,100	8.95	1.53
Montlake	No. 10.	22243-45.	3	3	2,500	11.56	3.14
Do.	Unnamed.	22247	1	1	2,630	11.57	3.69
Rathoun.	Soddy	22248.	1	1	2,750	5.33	1.67
Do.	do.	22211-12.	2	2	2,470	4.33	.71
Do.	do.	22197.	1	1	2,610	4.18	.71
Do.	do.	22197-88.	2	2	2,840	10.48	1.43
Do.	do.	22160, 62-63.	3	3	2,220	7.79	1.28
MARION COUNTY.							
Orms.	Battle Creek No. 3	22231	1	1	2,620	8.77	1.09
Do.	Battle Creek No. 4	22270, 33.	2	2	2,410	10.59	1.94
Tracy City	Sewagee.	22370	1	1	2,580	8.95	1.19
Do.	do.	22398-401	4	4	2,330	10.64	2.30
Whiteside.	Castle Rock	22254	1	1	2,300	10.31	2.41
Do.	do.	22257	1	1	2,210	11.24	2.95
Do.	Clements prospect	22255	1	1	2,650	9.70	1.29
Do.	New Etna No. 1	22251	1	1	2,400	5.56	1.36
Do.	do.	22251	1	1	2,140	2.63	.76
Do.	Old Etna.	22267	1	1	2,560	8.53	.60
Whitwell	Sewagee.	22268-70.	3	3	2,480	8.68	.93
Do.	do.						
MORGAN COUNTY.							
Blue Gem Siding.	Blue Gem.	21150.	1	1	2,110	4.18	1.66
Do.	do.	21145.	2	2	2,480	4.35	1.37
Catoosa.	Unnamed.	32743-44.	2	2	2,280	8.36	3.37
Do.	do.	32756	1	1	2,540	7.21	1.48
Do.	do.	32757	1	1	2,560	32757	5.03
Do.	Catoosa.	29556-58.	3	3	2,250	7.11	1.17
Do.	Flatrock No. 3.	32746-47.	2	2	2,830	6.45	2.51
Do.	Panther No. 2.	32758.	2	2	2,260	9.06	2.99
Do.	Red Eye.	32758.	2	2	2,470	3.75	1.87
Christmas Siding.	Grassy Ridge.	21151.	1	1	2,330	2.58	.69
Do.	do.	21152.	1	1	2,590	2.54	.80
Do.	Hooper.	21153.	1	1	2,130	5.54	4.14
Do.	Hooper (?).	21104-05.	2	2	2,180	8.28	4.13
Coalfield.	Coal Creek.	21100-02.	3	3	2,390	4.65	1.47
Do.	do.	21147	1	1	2,200	4.89	3.40
Do.	Davis.	21147	1	1	2,140	11.62	4.96
Do.	Coal Creek (?).	21146	1	1	2,280	2.44	.82
Do.	Slope.	21099	1	1	2,440	4.58	1.52
Do.	Coal Creek.	21099	1	1	2,440	4.58	1.52
Do.	Blue Gem.	21146	1	1	2,280	2.44	.82
Do.	Three Rock	32698	1	1	2,360	4.58	1.52
Do.	Hooper.	21146	1	1	2,280	2.44	.82
Do.	Unnamed.	21148	1	1	2,360	4.58	1.52

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
I										
TENNESSEE—										
Continued.										
MORGAN COUNTY—										
continued.										
Nemo.....	Lower Seam.....	do.....	B.	32760.....	1			3,000	15.64	0.86
Do.....	Upper Seam.....	do.....	B.	32759.....	1			2,540	9.92	1.89
Do.....	Catoosa.....	Walden Ridge.....	B.	21428.....	1			2,430	7.49	1.33
Oakdale.....	Babatchie.....	do.....	B.	32755.....	1			2,620	15.50	1.85
Do.....	Unnamed.....	Coal Creek.....	B.	21424.....	1			2,040	6.75	4.24
Do.....	Big Mountain.....	Coal Creek (?). ..	B.	21426.....	1			2,270	2.77	1.01
Do.....	Jackson.....	do.....	B.	21420.....	1			2,290	3.57	1.39
Do.....	Levan.....	Old Eagle.....	B.	32699.....	1			2,380	6.20	3.54
Do.....	New Eagle No. 1.....	Poplar Creek.....	B.	21421.....	1			2,200	3.23	1.21
Do.....	Old Mount Carbon.....	Coal Creek.....	B.	21423.....	1			2,040	7.16	3.97
Do.....	Prudential.....	do.....	B.	21412-14.....	3	1,990	2,010	2,000	9.51	4.61
Do.....	Reed.....	do.....	B.	21425.....	1			2,300	4.25	7.72
Do.....	Richards.....	Unnamed.....	B.	21425.....	2	2,050	2,060	2,080	9.63	5.50
Do.....	Signal Mountain.....	Coal Creek.....	B.	21422.....	1			2,230	9.08	5.31
Do.....	Union.....	do.....	B.	32702.....	1			2,580	1.74	1.19
Do.....	Williams.....	Poplar Creek.....	B.	21419.....	1			2,520	5.41	3.73
Petros.....	Big Brushy.....	Coal Creek.....	B.	52685-86.....	3	2,520	2,520	2,520	6.92	3.75
Do.....	Frozen Head.....	Jellico.....	B.	1088-90.....	3	2,330	2,430	2,370	7.36	2.72
Do.....	Petros No. 3.....	Jellico.....	B.	21092-96.....	3	2,180	2,430	2,300	8.30	2.80
Do.....	State No. 8.....	do.....	B.	21149.....	1			2,070	7.26	2.80
Stephens.....	Jaymanee.....	Unnamed.....	B.	21084-86.....	3	2,130	2,350	2,210	5.14	2.68
Do.....	Little Brushy.....	Jellico.....	B.	21084-86.....	3	2,130	2,350	2,210	5.14	2.68
OVERTON COUNTY.										
Davidson.....	Briar Hill No. 1.....	Wilder.....	B.	33468-69.....	2	2,270	2,390	2,330	8.78	2.54
Do.....	Briar Hill No. 2.....	do.....	B.	33465-66.....	2	2,270	2,370	2,270	9.19	2.79
Do.....	Buckeye.....	do.....	B.	33441-43.....	3	2,210	2,370	2,270	10.01	3.09
Do.....	Goch.....	do.....	B.	33445-47.....	3	2,220	2,310	2,260	11.20	3.00
Do.....	Tunnel.....	do.....	B.	33437-39.....	3	2,300	2,330	2,310	9.81	2.63

Highland Junction.	Overton.....	Bon Air No. 2.....	20978-80.....	3	2, 120	2, 300	2, 190	10.57	3.15
Lovejoy.....	Bill's Branch.....	Wildor.....	33454-55.....	2	2, 010	2, 060	2, 040	13.89	6.63
Obey City.....	Bon Air No. 2.....	Bon Air No. 2.....	20991.....	1	.....	.....	2, 180	12.90	3.90
Do.....	do.....	do.....	33449-52.....	1	.....	2, 230	2, 160	10.29	3.40
Wildor.....	Wildor.....	Wildor.....	.....	4	2, 060	.....	2, 180	10.52	3.50
PUTNAM COUNTY.									
Monterey.....	Monterey.....	Bon Air No. 2.....	20990.....	1	.....	.....	2, 100	10.07	3.55
RHEA COUNTY.									
Dayton.....	New Prospect.....	Nelson.....	10696-99.....	4	2, 460	2, 060	2, 600	18.46	1.49
Do.....	North Pole.....	Richland.....	10699-90, 92-93.....	4	2, 250	2, 460	2, 350	14.21	1.40
Graysville.....	Montague No. 1.....	Nelson.....	22199 65.....	2	2, 010	2, 290	2, 190	11.79	2.24
Do.....	Do.....	Sewanee.....	22180-83.....	4	2, 070	2, 710	2, 400	12.55	2.74
Do.....	Montague No. 6.....	Nelson.....	22188.....	1	.....	.....	2, 280	12.85	1.59
ROANE COUNTY.									
De Armond.....	Wilcox.....	Rockwood.....	32754.....	1	.....	.....	2, 140	8.55	6.7
Emory Gap.....	Emory Gap.....	do.....	32753.....	1	.....	.....	2, 090	8.83	8.55
Harriman.....	Blizard.....	do.....	32752.....	1	.....	.....	2, 440	6.80	5.81
Do.....	Walden Ridge.....	Walden Ridge.....	21082.....	1	.....	.....	2, 730	8.85	5.50
McLean Siding.....	McLean.....	Sewanee.....	21024.....	1	.....	.....	2, 400	8.81	8.81
Rockwood.....	Rockwood.....	do.....	18695-97, 21016-18.....	6	2, 250	2, 460	2, 340	9.50	5.54
SCOTT COUNTY.									
Bear Creek Junction.....	Phillips.....	No. 4.....	21154-55.....	2	2, 190	2, 590	2, 390	6.84	2.02
Do.....	Wilson.....	do.....	21218-20.....	1	2, 050	2, 060	2, 050	11.32	5.22
Helenwood.....	Flat Creek.....	Glen Mary.....	32750.....	3	.....	.....	2, 220	8.45	3.54
Do.....	Helenwood.....	do.....	32740-41.....	2	2, 200	2, 330	2, 270	8.61	4.65
Do.....	Wagon.....	do.....	.....	1	.....	.....	2, 300	13.61	4.10
Huntsville.....	Cross.....	Paint Rock.....	21222.....	1	.....	.....	2, 050	9.05	3.78
Jake's Tank.....	Jake's Branch.....	do.....	21226.....	1	.....	.....	2, 680	4.83	8.82
Do.....	Opossum Jaw.....	do.....	21272.....	1	.....	.....	2, 050	8.33	3.47
Newland.....	Arch Mountain.....	Jellico.....	21273.....	1	.....	.....	2, 430	5.57	1.93
Do.....	Arch Mountain No. 2.....	Big Mary.....	32795-96.....	2	2, 460	2, 520	2, 490	9.35	2.73
Do.....	Pemberton No. 1.....	Jellico.....	21228.....	1	.....	.....	2, 410	7.65	2.76
Robbins.....	Clay No. 1.....	Blue Gem (?).....	32788.....	1	.....	.....	1, 990	9.49	3.85
Do.....	Do.....	Mud Slip.....	21314.....	1	.....	.....	2, 640	4.21	1.92
Do.....	Hughett.....	Blue Gem (?).....	21229.....	1	.....	.....	2, 580	4.21	1.08
Do.....	do.....	do.....	21316.....	1	.....	.....	2, 210	4.26	1.25
Do.....	Long prospect.....	do.....	32751.....	1	.....	.....	2, 500	5.71	1.08
Do.....	Newman prospect.....	Glen Mary.....	21227.....	1	.....	.....	2, 060	10.44	5.35
Do.....	Southern No. 5.....	Paint Rock.....	32791.....	1	.....	.....	2, 580	4.53	4.80
Stanley Junction.....	Keaton.....	Paint Rock.....	21225.....	1	.....	.....	2, 320	4.98	7.3
Do.....	Morning Glory.....	do.....	32790.....	1	.....	.....	2, 360	3.44	6.94
Do.....	Paint Rock.....	do.....	21224, 32792-93.....	1	.....	.....	2, 600	3.09	6.6
Do.....	Pumpkin Hollow.....	do.....	.....	1	.....	.....	2, 420	4.18	6.65
Do.....	Sexton.....	do.....	32787.....	3	2, 330	2, 560	2, 610	6.94	7.72

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
TENNESSEE—Continued.										
SEQUATCHIE COUNTY.										
Dunlap.....	Douglas No. 2.....	Sewanee.....	B.	22239-41.....	3	2,330	2,460	2,380	10.12	1.35
WHITE COUNTY.										
Bon Air.....	Bon Air.....	Bon Air (lower bench).....	B.	22365-68.....	4	2,300	2,420	2,350	7.87	2.87
Clifty No. 1.....	Sewanee (?).....	Sewanee (?).....	B.	12623-26, 22388-91.....	8	1,990	2,090	2,040	13.15	4.24
Ravenscroft.....	Bon Air (?).....	Bon Air (?).....	B.	22393-96.....	4	2,050	2,210	2,140	10.78	4.19
TEXAS.										
WEBB COUNTY.										
Dolores.....	Dolores.....	San Pedro.....	L.	29022.....	1			2,330	12.75	2.04
Do.....	do.....	Santo Tomas.....	L.	29021.....	1			2,590	19.89	2.17
Santo Tomas.....	do.....	do.....	L.	29024.....	1			2,570	18.52	1.78
UTAH.										
CARBON COUNTY.										
Carbon.....	Panther.....	Castlegate.....	B.	19881.....	1			2,110	5.59	.60
Castlegate.....	Cameron No. 1.....	"No. 2".....	B.	19880.....	1			2,230	6.40	.41
Do.....	do.....	"A".....	B.	19879.....	1			2,170	6.78	.48
Do.....	Castlegate No. 1.....	"C".....	B.	19847.....	1			2,080	6.46	.51
Do.....	do.....	"D".....	B.	19846.....	1			2,090	5.92	.49
Do.....	do.....	"D".....	B.	19844.....	1			2,130	7.37	.63
Do.....	Castlegate No. 2.....	"D".....	B.	19845.....	1			2,210	9.44	.68
Do.....	do.....	"D".....	B.	19843.....	1			2,150	5.51	.84
Do.....	Prospect.....	Spring Canyon No. 1.....	B.	19837.....	1			2,360	7.85	.30
Do.....	do.....	do.....	B.	19838.....	1			2,260	9.09	.72
Hiawatha.....	Hiawatha No. 1.....	Hiawatha.....	B.	10904-05.....	2	2,140	2,430	2,280	6.16	.74
Do.....	do.....	do.....	B.	10907-08.....	2	2,220	2,220	2,220	6.16	.58

Kenilworth.....	Book Cliffs (T).....	10044, 46.....	2	2, 150	2, 150	4.64	.35
Do.....	Aberdeen.....	19702.....	1	.....	2, 130	6.68	.43
Do.....	do.....	19690, 711.....	2	2, 120	2, 140	5.65	.46
Do.....	Kenilworth.....	19681, 712.....	1	2, 150	2, 150	5.52	.50
Do.....	do.....	19682, 710.....	2	2, 150	2, 160	4.90	.70
Do.....	do.....	19706.....	2	.....	2, 130	5.86	.56
Do.....	Milburn prospect.....	10045.....	1	.....	2, 150	4.57	.65
Do.....	Royal Blue.....	14678.....	1	.....	2, 220	5.06	.61
Do.....	Jesse Knight prospect.....	19988-89.....	2	2, 150	2, 150	6.26	.40
Do.....	Standard.....	19986.....	1	.....	2, 150	8.52	.58
Do.....	Spring Canyon No. 1.....	19987.....	1	.....	2, 110	5.25	.90
Do.....	Spring Canyon No. 2.....	19980.....	1	.....	2, 210	4.20	.41
Do.....	Spring Canyon No. 3.....	14901.....	1	.....	2, 620	5.58	.52
Do.....	Prospect.....	12792.....	1	.....	2, 390	7.01	1.11
Do.....	do.....	12632.....	1	.....	2, 760	8.04	1.84
Do.....	Utah No. 1.....	12631, 17604.....	1	2, 550	2, 980	7.01	1.32
Do.....	Utah No. 3.....	12546, 630, 17605.....	3	2, 620	+ 3, 010	7.69	.67
Do.....	Upper.....	.....	.....	.....	.....	.....	.....
EMERY COUNTY.							
Black Hawk.....	Hiawatha.....	22355-53, 55, 414.....	6	2, 040	2, 430	6.34	.78
Emery.....	Browning.....	12627.....	1	.....	2, 100	6.17	.41
Do.....	"C".....	12652.....	1	.....	2, 430	14.90	.85
Do.....	Casper.....	14903.....	1	.....	2, 100	8.52	1.34
Do.....	Surface prospect.....	.....	.....	.....	2, 000	12.10	4.85
Do.....	Williams.....	12613.....	1	.....	.....	.....	.....
GRAND COUNTY.							
Thompson.....	No. 1-A.....	17577.....	1	.....	2, 960	11.24	.71
Do.....	Prospect.....	17578.....	1	.....	2, 670	11.28	.65
MORGAN COUNTY.							
Devil's Slide.....	Heber Robinson.....	19799.....	1	.....	2, 500	23.47	.77
Do.....	Lucas & Smith.....	19900.....	1	.....	2, 560	21.59	.56
SANPETE COUNTY.							
Wales.....	Coal Creek.....	17715.....	1	.....	2, 040	23.36	7.05
Do.....	North Tunnel.....	17717.....	1	.....	2, 210	19.06	3.80
Do.....	Thomas.....	17718.....	1	.....	2, 130	16.17	4.76
SEVIER COUNTY.							
Emery.....	Surface prospect.....	15061.....	1	.....	2, 470	6.83	.50
Fremont.....	Hogan prospect.....	15090.....	1	.....	2, 390	13.83	3.77
Salina.....	Kearns & Duggins.....	15045.....	1	.....	2, 320	13.07	.47
SUMMIT COUNTY.							
Carter.....	Prospect.....	20895.....	1	.....	2, 710	15.96	.57
Do.....	do.....	20894.....	1	.....	2, 150	10.55	5.28
Coalville.....	Rees-Grass Creek.....	13216.....	1	.....	2, 420	3.96	2.16
Do.....	Superior.....	13217.....	1	.....	2, 130	5.72	1.85
Do.....	Wasatch.....	13218.....	1	.....	2, 350	4.72	1.59

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
UTAH—Contd.										
UINTA COUNTY.										
	Vernal.	Blue Bell.	B.	10712.	1				10.56	1.65
	Do.	Green.	B.	10713.	1			2,520	9.03	2.59
	Do.	Reynolds.	B.	10812.	1			2,740	7.56	1.07
WASATCH COUNTY.										
	Hanna.	Prospect.	Sb. B.	10998.	1			2,130	8.95	.96
	Do.	Winchester prospect.	B.	10997.	1			2,040	3.57	.83
	Heber.	Cummings.	Sb. B.	11058.	1			2,040	7.68	.85
VIRGINIA.										
BUCHANAN COUNTY.										
	Big Rock.	Oliver Elswick.	B.	19735.	1			+3,010	7.23	.69
	Bischoy.	Blackey.	B.	19832-34.	2			2,160	3.49	1.82
	Whitewood.	Whitewood.	S. B.	19924.	1		2,060	2,260	13.74	.73
DICKENSON COUNTY.										
	Clintwood.	Yeates.	B.	14766.	1			2,670	3.26	.87
	Mart.	Owen's.	B.	17751-52.	2		2,690	2,750	5.77	.65
	Nora.	Nora Mills.	B.	17559-60.	2		2,130	2,260	9.79	.74
	Frater.	Yellow Poplar.	B.	17743-44.	2		2,430	2,630	7.02	1.08
HENRICO COUNTY.										
	Gayton.	Carbon Hill.	S. B.	15051.	1			2,420	17.73	2.21
	Do.	Do.	S. B.	15050.	1			2,160	9.28	1.47
	Do.	Do.	N. C.	15052.	1			2,250	11.23	1.34

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
VIRGINIA—Contd.										
RUSSELL COUNTY—continued.										
Della.....	Flat Rock.....	Kennedy.....	B.	25367-68.....	2	2,090	2,160	2,130	9.58	0.84
Do.....	Jackson.....	Unnamed.....	B.	22346.....	1			2,070	12.96	0.96
Drill.....	Do.....	Kennedy.....	B.	19484.....	1			2,230	6.94	1.03
Do.....	Sandy Ridge.....	Do.....	B.	19528, 22345.....	2	2,070	2,220	2,150	5.81	1.00
St. Paul.....	Russell Fork.....	Unnamed.....	B.	32513.....	1			2,130	3.96	0.49
Slomp.....	Clinchfield No. 201.....	No. 4.....	B.	18239-41.....	3	2,160	2,200	2,180	6.58	0.49
Wilder.....	Clinchfield No. 6.....	Upper Banner.....	B.	18235-37.....	3	2,260	2,360	2,300	5.86	0.57
Do.....	Clinchfield No. 55.....	Lower Banner.....	B.	18243-45.....	3	2,200	2,450	2,320	5.92	0.82
SCOTT COUNTY.										
Adamar.....	Hagan.....	Unnamed.....	B.	10359.....	1			2,530	29.01	1.01
Dunganon.....	J. S. T.....	Do.....	B.	75749-44.....	2	2,740	2,780	2,760	7.12	1.91
Ka.....	Miner prospect.....	Miner.....	B.	10358.....	1			2,120	5.89	1.69
Do.....	Hagan prospect.....	Duncan.....	B.	10361.....	1			2,160	6.65	0.88
TAEWELL COUNTY.										
Bandy.....	Christian.....	Middle Seaboard.....	B.	25913.....	1			2,360	4.15	1.03
Do.....	Patrol.....	Lower Seaboard.....	B.	25912.....	1			2,290	3.87	1.14
Bolesvain.....	Big Vein No. 2.....	Pocahontas No. 3.....	S. B.	67927, 67964.....	2	2,410	2,500	2,460	4.40	0.66
Do.....	Bolesvain.....	Do.....	S. B.	67887-88, 92, 99, 901 03-04, 67922, 23, 25, 57, 60, 71, 26101.....	13	2,030	2,560	2,270	4.05	0.51
Feraday.....	Altizer.....	Pocahontas No. 5.....	S. B.	26101.....	1			2,090	5.19	0.82
Jewell.....	Jewell Ridge No. 1.....	Baven (Red Ash).....	S. B.	25651-52.....	2	2,500	2,640	2,570	5.94	0.78
Pocahontas.....	Baby.....	Pocahontas No. 3.....	S. B.	67921, 24, 26.....	3	2,490	2,580	2,530	4.33	0.53
Do.....	Big Vein No. 1.....	Do.....	S. B.	67886, 89, 902, 984, 951.....	5	2,380	2,640	2,520	3.98	0.62
Do.....	West Pocahontas.....	Do.....	S. B.	67910, 53-54, 58.....	4	2,190	2,500	2,320	4.52	0.46

Do.	West Pocahontas (run-of-mine, 4 cars).	Do.	30294.	1	2, 230	2, 240	5, 60	.67
Red Ash.....	Raven (Red Ash).....	B.	25630-31.....	2	2, 240	2, 240	5, 96	.64
Richlands.....	East.....	B.	25763-64.....	2	2, 300	2, 300	5, 40	.66
Do.	Meadow.....	B.	31414-15.....	2	2, 660	2, 660	12, 82	.62
Do.	Richlands No. 2.....	B.	31418.....	1	2, 190	2, 300	11, 83	.48
Do.	Do.....	B.	25757-58.....	2	2, 310	2, 320	11, 84	.48
Do.	West.....	B.	25760-61.....	2	2, 310	2, 320	6, 34	.60
Do.	Empire No. 6½.....	B.						
Seaboard.....	Upper Seaboard.....	B.						
WISE COUNTY.								
Arno.....	Rock Heading No. 2.....	B.	75984-66.....	3	2, 690	2, 700	4, 19	.65
Banner.....	Lower Banner No. 1.....	B.	32549-10.....	2	2, 410	2, 420	7, 65	.72
Do.	No. 1.....	B.	32512.....	1	2, 270	2, 270	4, 66	.91
Dooley.....	Lee.....	B.	75946.....	1	2, 200	2, 240	43, 59	.62
Dorchester.....	Upper Banner (Haskell No. 3).....	B.	32963-41.....	1	2, 200	2, 240	5, 63	1.45
Durbar.....	Rhoda Marker.....	B.	32963.....	1	2, 200	2, 240	2, 78	.77
Do.	Taggart.....	B.	32963.....	1	2, 200	2, 240	3, 70	.63
Do.	do.....	B.	75359-61.....	3	2, 500	2, 620	3, 06	1.00
Esserville.....	Upper Banner (?).....	B.	15174.....	1	2, 500	2, 620	5, 31	1.12
Fiat Gap.....	Lower Bolling.....	B.	10386.....	1	2, 190	2, 190	5, 86	1.22
Georgel.....	Upper Banner.....	B.	15100-01.....	2	2, 220	2, 370	5, 40	1.17
Glamorgan.....	Glamorgan.....	B.	32842-43.....	2	2, 450	2, 680	5, 11	.84
Do.	Stone Gap No. 3.....	B.	75973-74.....	2	2, 390	2, 390	7, 13	.80
Imboden.....	Imboden.....	B.	75969-70.....	2	2, 540	2, 640	10, 25	.90
Inman.....	Imboden No. 2.....	B.	32167-68.....	3	2, 140	2, 190	6, 84	2.29
Josephine.....	do.....	B.	75363-65.....	1	2, 140	2, 190	3, 89	.93
Norton.....	Intermittent No. 6.....	B.	10390.....	1	2, 950	2, 980	5, 49	.72
Do.	Norton No. 2.....	B.	33182-84.....	3	2, 890	2, 950	9, 52	1.23
Do.	Norton No. 4.....	B.	33140-41.....	2	2, 420	2, 500	8, 04	1.59
Osaka.....	Unnamed.....	B.	15099, 22279.....	2	2, 370	2, 890	6, 53	.94
Pardee.....	Pardee (Parsons).....	B.	33143-44.....	4	2, 190	2, 370	2, 28	.53
Do.	do.....	B.	33203-06.....	4	2, 190	2, 370	12, 69	2.22
Rearing Fork.....	Kelly.....	B.	32275.....	1	2, 240	2, 240	19, 86	1.03
Roda.....	Taggart.....	B.	32275.....	1	2, 240	2, 240	4, 96	.77
St. Paul.....	Imboden.....	B.	33188.....	1	2, 960	2, 960	8, 03	2.37
Do.	Jawbone.....	B.	33188-87.....	1	2, 100	2, 180	10, 70	.98
Do.	do.....	B.	75436-38.....	3	2, 910	2, 910	10, 70	.64
Stonesga.....	Stonesga No. 2.....	B.	75446-47.....	2	2, 560	2, 560	6, 31	.57
Do.	Clark No. 3.....	B.	32407-08.....	3	2, 370	2, 640	5, 28	.55
Do.	Beaver.....	B.	18228-28.....	3	2, 310	2, 560	5, 25	.51
Do.	Bolling.....	B.	32410-11.....	2	2, 370	2, 560	14, 84	.62
Do.	Carney.....	B.	32410-11.....	2	2, 370	2, 560	8, 90	.55
Do.	Lee No. 6.....	B.	32413.....	2	2, 430	2, 430	17, 42	1.28
Do.	Lee No. 2.....	B.	32404-05.....	2	2, 220	2, 470	6, 45	.78
Do.	Sexton No. 1.....	B.	32503-06.....	1	2, 220	2, 470	6, 45	.78
Do.	Thelma No. 1.....	B.	75746.....	3	2, 470	2, 460	7, 76	1.47
Do.	Virginia Iron.....	B.	75746.....	3	2, 470	2, 460	7, 76	1.47
Do.	Dean Brothers.....	B.	75867-69.....	3	2, 470	2, 460	7, 76	1.47
Do.	Gladeville No. 3.....	B.						
WYTHE COUNTY.								
Max Meadows.....	Ellison & Johnson prospect.....	B.	20721.....	1	2, 460	2, 460	35, 20	.34

+3, 010

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1						2	3	4	5	6	7
WASHINGTON.											
CLALLAM COUNTY.											
Challam.....	Fuca.....	Unnamed.....	B.	10030.....	1	.....	.....	.....	1, 870	14.16	5.75
KING COUNTY.											
Cumberland.....	Rose-Marshall.....	Unnamed.....	B.	10512.....	1	.....	.....	.....	2, 860	17.24	.63
Durham.....	Prospect.....	No. 1.....	B.	32964.....	1	.....	.....	.....	3, 000	17.51	.54
Do.....	do.....	No. 2.....	B.	32965.....	1	.....	.....	.....	2, 730	21.42	.58
Grand Ridge.....	do.....	No. 3.....	Sb. B.	11736.....	1	.....	.....	.....	2, 610	11.38	2.69
Do.....	do.....	No. 4.....	Sb. B.	11737.....	1	.....	.....	.....	2, 400	24.44	.45
Do.....	do.....	No. 7.....	Sb. B.	11738.....	1	.....	.....	.....	2, 640	15.01	.37
Ravensdale.....	Ravensdale No. 1.....	No. 3.....	B.	23495.....	1	.....	.....	.....	2, 380	6.91	.51
Snoqualmie.....	Niblock.....	do.....	B.	10031.....	1	.....	.....	.....	2, 950	11.65	.94
Do.....	do.....	No. 4.....	B.	10032.....	1	.....	.....	.....	2, 830	13.21	1.56
Do.....	do.....	No. 5.....	B.	10033.....	1	.....	.....	.....	2, 910	23.58	.....
KITTITAS COUNTY.											
Ellensburg.....	Prospect.....	No. 7.....	B.	13286.....	1	.....	.....	.....	2, 760	25.47	1.26
Do.....	do.....	No. 9C.....	B.	13288.....	1	.....	.....	.....	2, 550	7.73	1.69
Do.....	do.....	No. 10D.....	B.	13287.....	1	.....	.....	.....	2, 530	23.53	1.29
Do.....	do.....	Unnamed.....	B.	28273.....	1	.....	.....	.....	2, 580	17.73	1.50
Roslyn.....	do. No. 1.....	Roslyn.....	B.	11522-24.....	3	.....	.....	2, 590	2, 440	12.99	.40
Do.....	do. No. 2.....	Roslyn.....	B.	11526.....	1	.....	.....	2, 420	2, 420	11.94	.49
Thorp.....	Wilson (run-of-mine).....	Unnamed.....	B.	13269.....	1	.....	.....	.....	2, 250	17.52	.47
LEWIS COUNTY.											
Centralia.....	Fords Prairie.....	Unnamed.....	Sb. B.	23554.....	1	.....	.....	.....	2, 200	11.14	.87
Do.....	Monarch.....	do.....	Sb. B.	23570.....	1	.....	.....	.....	1, 990	12.16	.....

Chehalis.....	do.....	9944	1	2,340	2,380	2,290	10.83	2.50
Do.	Sheldon.....	9943, 29569.	2			2,360	8.30	1.75
Do.	Superior.....	29568.	1			2,150	12.18	1.08
Do.	Superior No. 1.....	9942	1			2,340	14.99	1.45
Do.	Superior No. 2.....	9941	1			2,170	7.12	1.80
Do.	Twin City.....	9945	1			2,270	14.04	1.39
Ladd.....	East Creek Ladd.....	9982	1			2,240	18.05	1.31
Do.	do.....	9980-81	2	2,570	2,670	2,620	22.54	.73
Do.	do.....	9979	1			2,910	26.78	.93
Do.	Prospect.....	33073	1			2,710	28.73	1.17
Do.	do.....	33072	1			2,530	30.34	1.73
Littell.....	do.....	9940	1			2,130	12.97	4.36
Mendota.....	Crescent.....	10323-24, 29565.	3	2,230	2,350	2,280	15.87	1.91
Morrison.....	Edlund.....	12563	1			2,760	21.06	.94
Do.	do.....	12564	1			2,970	25.40	.73
Do.	do.....	12565.	1			2,660	25.48	.90
PIERCE COUNTY.								
Ashford.....	Mashel.....	9884-85.	2	2,710	2,860	2,780	33.77	.59
Do.	Prospect.....	12581	1			2,650	25.72	.44
Burdett.....	Miscuually Chief.....	9881	1			2,320	8.44	.79
Do.	do.....	9880-90	2	2,350	2,420	2,380	13.74	.39
Carbado.....	Carbon Hill.....	9572	1			2,720	15.40	.47
Do.	do.....	9569	1			2,210	18.86	.31
Do.	do.....	9577	1			2,640	15.98	.36
Do.	do.....	9555, 65.	2			2,740	17.54	.33
Do.	do.....	9582	1	2,640	2,840	2,350	10.77	.58
Do.	do.....	9584	1			2,890	16.99	.54
Do.	do.....	9556	1			2,840	16.10	.54
Do.	do.....	9570	1			2,740	20.42	.82
Do.	do.....	9580, 9601.	2	2,150	2,190	2,190	9.66	.41
Do.	Wingate.....	9558.	1			2,260	6.68	.54
Do.	do.....	10573-74.	2	2,610	2,730	2,670	15.04	.34
Do.	Carbon Hill No. 6.....	9609	1			2,240	13.16	.70
Do.	Carbonado No. 4N.....	9607	1			2,740	10.51	.54
Fairfax.....	Blacksmith.....	9608.	1			2,910	34.22	1.03
Do.	do.....	9602	1			2,570	13.50	.48
Do.	do.....	9603.	1			2,890	23.44	.73
Do.	do.....	9605.	1			2,430	20.21	.73
Do.	do.....	9606.	1			2,290	11.07	.57
Do.	do.....	12478.	1			2,980	35.15	.57
Do.	Prospect.....	12496	1			2,370	8.46	1.19
Do.	Prospect No. 1.....	9577	1			3,000	20.36	.70
Do.	Prospect No. 2.....	9576, 80	1			2,890	19.49	.73
Melmont.....	Melmont.....	9578-79	1			2,850	18.28	.43
Do.	do.....	9892	2	2,850	2,910	2,890	14.70	.34
Do.	do.....	9895	2	2,410	2,750	2,560	24.19	.57
Pittsburg.....	Black Carbon.....	9894	1			3,000	19.79	.44
Do.	Pittsburg.....	9906.	1			2,960	21.38	.58
Do.	do.....		1			2,300	21.87	.82
Do.	do.....		1					
South Willis.....	South Willis.....		1					

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1						2	3	4	5	6	7
WASHINGTON—Continued.											
PIERCE COUNTY—continued.											
Wilkeson.....	Briar Hill.....	Unnamed.....	B.	9897.....	1				2,700	29.91	1.21
Do.....	Gale Creek.....	No. 1.....	B.	9908.....	1				2,300	8.53	.85
Do.....	do.....	No. 2.....	B.	9909.....	1				2,390	6.22	1.00
Do.....	do.....	Queen.....	B.	9910.....	1				2,220	9.83	1.04
Do.....	do.....	Snell.....	B.	9896.....	1				2,900	18.72	.84
Do.....	Wilkeson.....	No. 3.....	B.	9903-05.....	3	2,720	2,850		2,780	17.99	.47
Do.....	do.....	No. 2.....	B.	9900-02.....	3	2,240	2,970		2,570	14.27	.47
Do.....	do.....	No. 7.....	B.	9899.....	1				2,380	10.38	.44
STEVENS COUNTY.											
Valley.....	Valley.....	Unnamed.....	Sb. B.	34156-57.....	2	2,040	2,070		2,060	22.73	2.82
THURSTON COUNTY.											
Hurr.....	Hannaford No. 1.....	Unnamed.....	Sb. B.	9573.....	1				2,150	7.69	.55
Tenino.....	Black Bear.....	do.....	Sb. B.	9839.....	1				2,570	27.01	1.79
Do.....	King.....	do.....	Sb. B.	9987.....	1				2,210	14.24	3.09
Tono.....	Hannaford.....	do.....	Sb. B.	23566-67.....	2	2,380	2,340		2,340	12.28	1.19
WHATCOM COUNTY.											
Bellingham.....	Bellingham.....	No. 1.....	B.	32034.....	1				2,450	18.01	.28
Glacier.....	Discovery tunnel.....	Unnamed.....	A.	19722-23.....	2	2,430	2,510		2,470	11.65	1.04
Do.....	Prospect.....	do.....	S. A.	19726.....	1				2,440	8.35	1.05
Do.....	do.....	do.....	S. A.	19725.....	1				2,590	9.95	1.11
Do.....	do.....	do.....	A.	19724.....	1				3,000	9.56	.97

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—		
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
WEST VIRGINIA— Continued.					2		3	4	5	6	7
FAYETTE COUNTY— continued.											
Do.	Minden No. 2	Sewell	B.	68113, 127, 133	3	2, 280	2, 640	2, 450	3.23	0.65	
Do.	Minden No. 3	do.	B.	68117	1			2, 600	2.86	.56	
Do.	Minden No. 4	do.	B.	68124-25, 131	3	2, 270	2, 710	2, 550	2.57	.43	
Do.	Minden No. 5	do.	B.	68116, 119, 121	4	2, 080	2, 620	2, 340	3.13	.88	
Do.	Rock Lick No. 4	do.	B.	68114, 126, 132	3	2, 370	2, 920	2, 520	2.43	.45	
Mount Hope	Catherine (run-of-mine, 25 tons).	do.	S. B.	76393	1			2, 450	7.13	1.03	
Do.	Catherine	do.	S. B.	77169-70	2	2, 350	2, 620	2, 490	4.38	1.12	
Do.	Hi-Top (run-of-mine, 1 car)	do.	S. B.	76390	1			2, 430	4.35	.83	
Do.	Mill Creek No. 1	do.	S. B.	76928-29	2	2, 250	2, 370	2, 310	3.60	1.56	
Do.	Minnie Bell	do.	S. B.	77173-74	2	2, 450	2, 660	2, 560	3.66	.91	
Do.	Minnie Bell (run-of-mine, $\frac{1}{2}$ car).	do.	S. B.	76377	1			2, 450	4.74	1.32	
Do.	Pack's Branch	Eagle	B.	77203-04	2	2, 900	3, 000	3, 000	6.96	.76	
Do.	Sugar Creek (run-of-mine, 5 cars).	Sewell	S. B.	76805	1			2, 410	5.25	1.04	
Do.	Warner (run-of-mine, 30 tons).	do.	S. B.	76392	1			2, 970	9.56	1.86	
Do.	Warner (run-of-mine, 10 cars)	do.	S. B.	77171-72	2	2, 230	2, 800	2, 590	4.60	1.62	
Oakwood.	Ansted (car sample, run-of-mine).	do.	S. B.	77360	1			2, 450	5.83	1.01	
Page	Ansted (car sample, run-of-mine).	No. 2.	B.	9678	1			2, 430	6.61	1.81	
Do.	Page (run-of-mine, 12 cars)	Eagle and Ansted	B.	76451	1			2, 680	9.81	1.41	
Do.	Page No. 1 Gas	do.	B.	76965-66	2	2, 850	2, 940	2, 910	5.83	.88	
Do.	Page No. 2 Gas	do.	B.	77200-02	3	2, 340	2, 400	2, 360	6.94	2.25	
Do.	Wagwood	Sewell	S. B.	32598-99	2	2, 400	2, 400	2, 400	6.31	.95	
Do.	Pax Branch (run-of-mine, approximately 100 tons).	Upper Eagle	S. B.	76487	1			2, 740	12.51	1.15	
Do.	Scarbro (run-of-mine, 8 cars)	Sewell	S. B.	76992	1			2, 450	5.05	.95	
South Nitral.	Brown	do.	S. B.	10620-22	3	2, 580	2, 850	2, 730	2.55		

Summerlee.....	Summerlee (run-of-mine, 7 cars).....	B.	77091.....	1	.....	2, 310	4. 22	.70
Do.....	Summerlee.....	B.	77179-82.....	4	.....	2, 370	2. 60	.81
Sun.....	New River (run-of-mine, 13 cars).....	S. B.	76817.....	1	.....	2, 440	6. 16	1.03
Do.....	Sun No. 1.....	S. B.	9741, 44, 47, 50, 53.....	5	.....	2, 250	6. 14	1.69
Do.....	Sunset.....	S. B.	77175-76.....	2	.....	2, 340	3. 97	.92
Do.....	Sunset (run-of-mine, 1 car).....	S. B.	76807.....	3	.....	2, 420	2. 50	.74
Thayer.....	Buffalo.....	S. B.	10629, 10664, 730.....	1	.....	2, 370	7. 46	.78
Thurmond.....	Rock Lick No. 2.....	S. B.	68128-30.....	3	.....	2, 390	4. 90	.98
Whipple.....	Whipple (run-of-mine, 7 cars).....	S. B.	76891.....	1	.....	2, 310	4. 52	.74
Willis Branch.....	Willis Branch (run-of-mine, 1 car).....	B.	77165.....	1	.....	2, 850	10. 90	.71
Do.....	Willis Branch.....	B.	76931-33.....	3	.....	2, 900	5. 55	.76
GRANT COUNTY.									
Henry.....	Henry or No. 22.....	S. B.	26579.....	1	.....	2, 190	6. 17	1. 97
GREENBERG COUNTY.									
Richwood.....	Spruce Knob.....	B.	13547.....	1	.....	2, 960	6. 04	.65
HANCOCK COUNTY.									
Chester.....	Allison coal bank.....	B.	25633.....	1	.....	2, 130	6. 94	1. 88
Do.....	Jones coal bank.....	B.	25635.....	1	.....	2, 150	6. 15	4. 64
Do.....	Lime Island coal bank.....	B.	25591.....	1	.....	2, 110	10. 93	4. 06
Do.....	Sprouts coal bank.....	B.	25634.....	1	.....	2, 070	12. 55	9. 20
New Cumberland.....	Crescent.....	B.	25716.....	1	.....	2, 280	13. 65	9. 20
Do.....	Martin coal bank.....	B.	25714.....	1	.....	2, 300	4. 13	1. 46
Do.....	McNal-Herron coal bank.....	B.	25715.....	1	.....	2, 140	6. 13	2. 15
Do.....	Wern coal bank.....	B.	25713.....	1	.....	2, 080	5. 28	2. 05
HARRISON COUNTY.									
Lost Creek.....	Calif.....	B.	22321-23, 25.....	4	.....	2, 060	8. 08	2. 24
Do.....	Righter No. 1.....	B.	22332-36.....	5	.....	2, 180	6. 07	1. 66
KANAWHA COUNTY.									
Putney.....	Putney No. 1.....	B.	23892-96.....	5	.....	+2, 760	9. 87	1. 11
Ward.....	Kelly's Creek No. 3.....	B.	23919-24.....	6	.....	+2, 850	8. 51	.74
LOGAN COUNTY.									
Accoville.....	Big Eagle.....	B.	23407-12.....	6	.....	2, 960	6. 08	.65
Do.....	Island Creek.....	B.	23414-18.....	5	.....	+2, 520	5. 82	1. 28
Craneco.....	Lorado No. 1.....	B.	23500-12.....	3	.....	+2, 810	5. 65	.75
Earling.....	Earling No. 1.....	B.	23339, 41-42.....	3	.....	2, 860	5. 07	.70
Omar.....	Main Island Creek No. 5.....	B.	23514-18.....	5	.....	2, 900	5. 62	.88

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, per centage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
WEST VIRGINIA—Continued.										
M'DOWELL COUNTY.										
Alagma.	Piney.	Pocahontas No. 3.	S. B.	14154-55, 58-61.	7	2, 180	2, 300	2, 240	4. 79	0. 56
Arlington.	do.	do.	S. B.	68026, 31-32.	3	2, 450	2, 630	2, 520	3. 77	. 40
Bear Wallow.	Roanoke.	do.	S. B.	30232, 67887-88, 963.	4	2, 190	2, 330	2, 270	6. 98	. 44
Berwind.	Berwind No. 1.	do.	S. B.	68085, 91-92.	3	2, 280	2, 350	2, 360	7. 17	. 80
Do.	do.	do.	S. B.	68081-82, 87.	3	2, 370	2, 440	2, 420	7. 54	. 80
Do.	Berwind No. 2.	do.	S. B.	68070, 73, 77.	3	2, 360	2, 370	2, 340	5. 90	. 86
Do.	Berwind No. 3.	do.	S. B.	68078, 76, 74.	3	2, 310	2, 340	2, 340	5. 19	1. 06
Do.	Berwind No. 4.	do.	S. B.	68076, 78, 74.	3	2, 310	2, 340	2, 340	4. 56	. 63
Do.	Cirrus No. 2.	do.	S. B.	14233.	1	2, 200	2, 340	2, 270	3. 85	. 57
Do.	do.	Pocahontas No. 4.	S. B.	14232.	1	2, 200	2, 340	2, 270	3. 85	. 57
Do.	Big Sandy.	Sewell.	S. B.	68018, 21.	2	2, 200	2, 370	2, 330	3. 60	. 53
Big Sandy.	No. 1.	Pocahontas No. 4.	S. B.	20300-01, 506-98.	2	2, 100	2, 220	2, 170	5. 29	. 67
Coalwood.	do.	do.	S. B.	68004, 97-98.	3	2, 030	2, 140	2, 080	6. 43	. 77
Do.	Olea.	do.	S. B.	20307, 10.	2	2, 350	2, 490	2, 420	2. 95	. 74
Do.	Nera or No. 3.	Sewell.	S. B.	20317-23.	4	2, 300	2, 650	2, 440	4. 32	1. 03
Do.	Thera or No. 6.	Pocahontas No. 3.	S. B.	67898, 896, 933.	3	2, 370	2, 690	2, 530	3. 0	. 47
Cooper.	Tug River.	Pocahontas No. 3.	S. B.	20389.	1	2, 430	2, 430	2, 430	2. 67	. 51
Dar.	Elkstone.	Sewell.	S. B.	20388.	1	2, 430	2, 430	2, 460	3. 18	. 58
Do.	do.	do.	S. B.	20382.	1	2, 430	2, 430	2, 460	3. 18	. 58
Do.	Helena.	do.	S. B.	20386.	1	2, 430	2, 430	2, 460	3. 18	. 58
Do.	do.	do.	S. B.	20386.	1	2, 430	2, 430	2, 460	3. 18	. 58
Do.	Fulaski No. 2.	Pocahontas No. 3.	S. B.	26615-16, 18-22.	10	2, 250	2, 500	2, 330	4. 52	. 56
Eckman.	do.	do.	S. B.	67923, 56, 68011.	10	2, 250	2, 500	2, 330	4. 52	. 56
Do.	Fulaski No. 3.	do.	S. B.	26610-13.	4	2, 170	2, 270	2, 210	4. 31	. 63
Do.	Shawnee.	do.	S. B.	67935, 37-38.	3	2, 300	2, 380	2, 330	5. 67	. 63
Elkhorn.	Houston No. 1.	do.	S. B.	67935, 59.	2	2, 190	2, 240	2, 220	4. 60	. 48
Do.	Houston No. 2.	do.	S. B.	67932, 69-70.	2	2, 120	2, 730	2, 330	5. 00	. 45
Do.	do.	do.	S. B.	67932, 69-70.	2	2, 120	2, 730	2, 330	5. 00	. 45
Elk Ridge.	Elk Ridge.	do.	S. B.	10035.	1	2, 410	2, 410	2, 410	3. 85	. 59
Faraday.	Presley.	Pocahontas No. 5.	S. B.	26159.	1	2, 350	2, 350	2, 350	3. 09	. 55
Gilliam.	Gilliam.	Pocahontas No. 3.	S. B.	68000, 022-23.	1	2, 180	2, 300	2, 250	5. 4	. 45
Do.	Gilliam (run-of-mine, 4 cars).	do.	S. B.	30238.	1	2, 180	2, 300	2, 250	5. 4	. 45
Do.	Berwind No. 5.	do.	S. B.	68069, 72, 76.	1	2, 190	2, 410	2, 260	8. 05	. 44
Hartwell.	Berwind No. 5 (run-of-mine, 4 cars).	do.	S. B.	68069, 72, 76.	1	2, 190	2, 410	2, 260	4. 17	. 83
Do.	do.	do.	S. B.	30283.	1	2, 190	2, 410	2, 310	9. 55	. 96
Do.	do.	do.	S. B.	30283.	1	2, 190	2, 410	2, 310	9. 55	. 96
Havaco.	Havaco.	do.	S. B.	10034, 13775, 67996, 68019-020.	5	2, 190	2, 640	2, 350	5. 66	. 74

Do.....	Havaco (run-of-mine, 4 cars)	S. B.	30237	2,440	8.19
Hempfill	Welch.....	S. B.	26582-85, 87	2,840	7.41
Huger	Lake Superior No. 1.....	S. B.	20346-58	2,310	4.66
Do.....	Pocahontas No. 3.....	S. B.	14421	2,430	8.78
Do.....	Pocahontas No. 4.....	S. B.	14416-19, 22-23	2,390	6.04
Do.....	do.....	S. B.	14185-87, 89-90,	2,250	5.03
Jenkinjones	Pocahontas No. 3.....	S. B.	20518-25, 69083,		
	90, 96,		30256		
Do.....	do.....	S. B.	30256	2,280	5.9
Do.....	Jenkinjones No. 6 (car sample,	S. B.	20507-11, 67985,	2,270	3.92
Do.....	8 cars).	S. B.	87, 68429, 99		
Do.....	Jenkinjones No. 7.....	S. B.	20531-35, 69088-	2,320	5.16
Do.....	Jenkinjones No. 8.....	S. B.	89, 95, 95,		
Do.....	Jenkinjones No. 8 (run-of-	S. B.	30289	2,280	6.88
	mine) ² / ₃ cars).				
Kimball	Pocahontas Nos. 3 and 4.....	S. B.	69033, 34-35	2,270	6.4
Leckie	Pocahontas No. 3.....	S. B.	14271-76	2,510	3.92
Do.....	do.....	S. B.	14277-80	2,790	5.77
Do.....	do.....	S. B.	17469-70	2,640	3.39
Lex	Pocahontas No. 5.....	S. B.	67891, 94, 967	2,870	7.80
Lick Branch	Pocahontas No. 3.....	S. B.	30280	+ 2,210	6.65
Do.....	do.....	S. B.	30280	2,230	4.45
Do.....	Delta (car sample, 11 cars)	S. B.	2,420	2,370	7.71
McDowell	do.....	S. B.	68046-07, 10	2,450	3.93
Marytown	do.....	S. B.	68042-03	2,670	4.43
Newhall	Sewell.....	S. B.	68046-75	2,600	8.95
Do.....	Pocahontas No. 3.....	S. B.	2,540	2,810	4.90
Do.....	do.....	S. B.	30235	3,070	6.63
Do.....	do.....	S. B.		2,660	9.83
Do.....	Berwind No. 7.....	S. B.	68146, 48, 64	2,610	4.27
Do.....	Berwind No. 8.....	S. B.	68071, 78-79	2,690	4.43
Do.....	do.....	S. B.	30282	2,970	6.65
Do.....	Berwind No. 8 (run-of-mine,	S. B.		2,700	7.59
	8 cars).				
Roderfield	Davy Pocahontas No. 1.....	S. B.	14236-68	2,720	11.31
Do.....	Davy Pocahontas No. 2.....	S. B.	14282-64	2,770	6.43
Rolle	Rolle.....	S. B.	14394-98, 400	2,400	4.42
Susana	Yukon-Pocahontas.....	S. B.	14426-29	2,620	8.50
Twin Branch	Beckley (War Creek)	S. B.	69001	2,370	5.57
Do.....	do.....	S. B.	69004	2,440	3.1
Do.....	J. B. No. 1.....	S. B.	28601	3,010	4.4
Do.....	J. B. No. 2.....	S. B.	28604	2,540	5.27
Do.....	J. B. No. 3.....	S. B.	28631	2,550	5.2
Do.....	J. B. No. 4.....	S. B.	67999	2,500	3.0
Do.....	J. B. No. 5.....	S. B.	67997-98	2,550	5.55
Do.....	J. B. No. 6.....	S. B.	22490-85, 89	2,930	4.51
Do.....	J. B. B. (or Maher) No. 4.....	S. B.	22497-88	2,680	4.22
Do.....	do.....	S. B.		2,690	6.68
Do.....	sample, run-of-mine).	S. B.			
Vivian	Pocahontas No. 4.....	S. B.	25314-16	+ 2,920	6.81
Do.....	Pocahontas No. 3.....	S. B.	69024-25, 27, 30	+ 2,420	4.85
Do.....	do.....	S. B.	30251	2,300	5.46
Do.....	King (car sample, 11 cars)	S. B.	21800	2,280	8.05
Do.....	King No. 98.....	S. B.	11287, 780	2,240	4.83
Do.....	Norfolk (car sample)	S. B.		2,730	10.33
Do.....	do.....	S. B.		2,300	6.55
Do.....	Tidewater.....	S. B.	69035, 08-09	2,270	8.63
Do.....	Tidewater (run-of-mine, 15	S. B.	30236	2,350	8.35
	cars).				

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.				Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.	
I											
WEST VIRGINIA—											
Continued.											
M'DOWELL COUNTY—											
continued.											
War.	John's Branch	Beckley (War Creek)	S. B.	14468-71	4	2,650	+3,010	+2,860	8.99	0.63	
Do.	War Creek	do.	S. B.	14405-07	3	2,730	2,750	2,740	8.62	0.72	
Welch.	Oregon No. 2	Pocahontas No. 4	S. B.	14215-16	2	3,010	3,010	3,010	7.52	0.53	
Do.	Oregon No. 3	do.	S. B.	14212-14	3	2,960	+3,010	+2,980	7.92	0.63	
Do.	Standard Pocahontas	Pocahontas No. 3	S. B.	12512-13	2	2,430	2,470	2,450	7.36	0.97	
MARION COUNTY.											
Chiefton.	Consolidation No. 47	Pittsburgh	B.	28570-75	6	2,040	2,170	2,090	7.41	2.97	
Farmington.	Consolidation No. 38	do.	B.	28106-07, 11	3	2,110	2,150	2,130	6.97	2.29	
Farmington.	Consolidation No. 37	do.	B.	28505-08	3	2,010	2,330	2,230	6.61	1.23	
Hutchinson.	Consolidation No. 84	do.	B.	28432-35, 69-70	6	2,110	2,310	2,230	7.12	1.98	
Monongah.	Consolidation No. 43	do.	B.	28209-11, 25-27	6	2,170	2,270	2,270	6.27	1.07	
Do.	Consolidation No. 63	do.	B.	11431-32, 28323-26	6	2,200	2,330	2,270	5.64	1.07	
Montana Station.	Parker Run	Sewickley	B.	15087-71	5	2,050	2,120	2,080	9.61	3.99	
Watson.	Consolidation No. 26	Pittsburgh	B.	28139-42, 44	1	2,000	2,260	2,110	6.65	1.87	
Worthington.	Annabelle	do.	B.	32839	5	2,240	2,410	2,200	6.04	0.82	
Do.	Consolidation No. 86	do.	B.	28535-38	4	2,070	2,340	2,170	6.15	1.80	
Do.	Hutchinson	do.	B.	11153-55	3	2,070	2,170	2,130	8.70	2.25	
MARSHALL COUNTY.											
Benwood	Hitchman	Pittsburgh	B.	25606-10	5	1,940	1,990	1,970	8.36	4.64	
Moundsville.	Mound	do.	B.	18422-23	2	2,020	2,130	2,080	17.44	6.09	
Do.	Panama	do.	B.	14486-87	2	2,070	2,090	2,080	7.29	3.33	
MERCER COUNTY.											
Algonquin.	Algonquin	Pocahontas No. 3	S. B.	77296-08	3	2,730	2,840	2,770	4.60	0.56	
Coaldale.	Coaldale	do.	S. B.	67890, 97, 905	3	2,300	2,540	2,410	4.07	0.70	
Crystal.	Crystal No. 1	do.	S. B.	29653, 67985, 88	3	2,560	2,610	2,590	6.37	0.55	
Do.	Crystal No. 2	do.	S. B.	67984, 68014-15, 17	4	2,410	2,520	2,480	4.50	0.64	
Do.	Godfrey	do.	S. B.	14253-59, 61	3	2,370	2,580	2,490	3.88	0.73	

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

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						Lowest.	Highest.	Average.	Ash.	Sulphur.	
1											
WEST VIRGINIA—											
Continued.											
PRESTON COUNTY.											
Corinth.	Wills No. 3.	Lower Kittanning.	B.	26516.	1				2,080	9.55	3.15
Crellin (Md.).	Arnold Run No. 2.	do.	B.	33875, 34124.	2	2,440	2,440		2,440	12.00	2.18
Do.	Banner.	do.	B.	34123, 25-26.	3	2,440	2,610		2,500	11.66	2.02
Do.	Freeport.	do.	S. B.	33871-73.	3	2,380	2,490		2,440	13.91	2.40
Do.	Guthrie.	do.	B.	33888.	1				2,440	15.79	3.13
Do.	Kildow.	do.	B.	33890-91.	2	2,440	2,500		2,470	16.39	3.02
Do.	Prendergast.	do.	B.	33889.	1				2,760	19.02	2.18
Do.	Kempion or No. 42.	Middle Kittanning.	S. B.	26578.	1				2,430	5.55	.82
PULASKI COUNTY.											
Pulaski.	Virginia Anthracite No. 1.	Little Bed.	S. A.	75888-89.	2	2,530	2,930		2,730	14.93	.60
PUTNAM COUNTY.											
Black Betsey.	Black Betsey No. 3.	Pittsburgh.	B.	23641-46.	6	1,930	2,370		2,150	7.40	1.92
BALEIGH COUNTY.											
Abney.	Boone No. 1.	Beckley.	S. B.	76881-82.	2	2,540	2,900		2,720	2.73	.88
Do.	Boone Smokeless (run-of-mine, 1 car).	Fire Creek.	S. B.	76196.	1				2,370	11.03	1.64
Affinity.	Affinity.	Beckley.	S. B.	26691-93, 95, 68115, 122-123.	7	2,690	+3,090		+3,000	4.19	.56
Do.	Affinity (run-of-mine, 2 cars).	do.	S. B.	79004.	1				2,900	7.45	.75
Amigo.	Amigo (run-of-mine, 2 cars).	Pocahontas No. 3.	S. B.	76110.	2				2,730	8.69	.71
Do.	Kirby No. 1.	do.	S. B.	76215-16.	2	2,570	2,760		2,670	5.20	.95
Do.	Kirby No. 1 (run-of-mine, 75 tons).	Beckley, 75 per cent; Pocahontas No. 3, 25 per cent.	S. B.	79254.	1				2,850	8.10	.64
Bacontown.	Bacontown (run-of-mine, 4 cars).	Fire Creek.	S. B.	77721.	1				2,510	5.27	.92
Do.	Battleship.	do.	S. B.	76922.	1				2,510	5.25	1.26

Do.	Battleship (run-of-mine, 3 cars).	76197.	1	2, 460	2, 510	6. 71	.88
Do.	Wilton No. 1.	76917-19.	3	2, 860	2, 710	4. 79	.94
Beckley	Beckley (run-of-mine, 11 cars).	77414.	1	2, 450	2, 390	4. 40	1.04
Do.	City No. 1.	77185-86.	2	2, 450	2, 450	2. 23	.70
Do.	City No. 1 (run-of-mine, 15 tons).	76389.	1			5. 70	.85
Do.	City No. 2 (run-of-mine, 1 car).	77415.	1		2, 530	5. 10	.85
Besoco.	Beckley Smokeless.	77187-89.	3	2, 520	2, 520	2. 79	.63
Do.	Clyde Pocahontas.	76235-66.	2	2, 860	2, 690	4. 79	.63
Do.	Clyde Pocahontas (run-of-mine, 2 cars).	76322.	1		2, 850	4. 89	.66
Do.	Clyde Pocahontas (run-of-mine, 2 cars).	76322.	1		2, 850	10. 21	.65
Big Stick.	Beckley.	26684-86.	8	2, 700	+2, 950	4. 20	.55
Do.	Beckley.	68115, 34-35.	1		2, 870	7. 61	.57
Do.	Beckley.	78669.	1		2, 870	8. 28	.99
Capece.	Callaway (run-of-mine, 2 cars).	76378.	1	2, 460	2, 470	2. 68	.55
Cranberry.	do.	26274-75.	2	2, 250	2, 620	6. 62	1.03
East Gulf.	Beckley.	76369-71.	3		2, 790	6. 44	.79
Eccles.	Eccles No. 3 (run-of-mine, 6 cars).	76821.	1		2, 900	4. 61	1.10
Do.	Eccles No. 5.	19774-78.	5	2, 550	+2, 920	6. 44	.78
Do.	Eccles No. 5 (run-of-mine, 8 cars).	78922.	1		2, 350	4. 08	.84
Do.	Eccles No. 6 (run-of-mine, 9 cars).	77316.	1		2, 570	5. 88	.95
Fireco.	Douglas No. 2.	76887-90.	4	2, 750	2, 660	4. 08	.84
Do.	Douglas No. 2 (run-of-mine, 10 cars).	77723.	1		2, 570	5. 01	.76
Do.	Leckie No. 1.	76914-15.	2	2, 750	2, 750	4. 60	.80
Do.	Leckie No. 2.	76907-09.	3	2, 730	2, 800	7. 15	.92
Do.	Leckie No. 2 (run-of-mine, 6 cars).	77595.	1		2, 570	4. 11	.91
Do.	Lillybrook No. 2.	76481-83.	3	2, 540	2, 720	5. 67	1.09
Do.	Lillybrook No. 2 (run-of-mine, 6 cars).	77722.	1		2, 600	7. 73	.97
Glen White.	Glen White (run-of-mine, 27 cars).	76289.	1		2, 710	3. 39	.60
Helen.	East Gulf No. 3.	76278-80.	3	2, 660	2, 790	4. 02	.58
Do.	East Gulf No. 4.	76283-85.	3	2, 850	2, 890	7. 02	.62
Do.	East Gulf No. 5.	76301-03.	1		2, 790	4. 11	.91
Do.	Helen Nos. 3 and 4 (run-of-mine, 32 cars).	76229.	1		2, 790	7. 37	.73
Do.	Helen No. 5 (run-of-mine, 3 cars).	76240.	1		2, 990	4. 95	.69
Hotocoal.	Big Stick.	14375-77.	3	2, 960	+2, 810	4. 05	.72
Do.	Gulf (Hotocoal).	76924-27, 68.	5	2, 660	+2, 960	6. 50	.62
Do.	Gulf (Hotocoal, run-of-mine, 10 cars).	78598.	1		2, 830	5. 46	.92
Lego.	Fire Creek.	77191-93.	3	2, 680	2, 780	4. 99	.82
Do.	Laurel Smokeless.	76542-43.	2	2, 730	2, 830	8. 94	.74
Do.	Laurel Smokeless (run-of-mine, 1 car).	78663.	1		2, 820	8. 94	.74

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal. Percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
WEST VIRGINIA—Continued.										
RALEIGH COUNTY—continued.										
Lester.....	Lester Smokeless (run-of-mine, 13 tons).	Sewell.....	S. B.	77286.....	1			2,440	10.46	1.63
Do.....	Neal (run-of-mine, 2 cars).	do.....	S. B.	76951-52.....	2	2,390	2,730	2,570	4.88	1.00
Do.....	Lilybrook No. 1.....	do.....	S. B.	76501.....	1			2,510	12.43	1.37
Lilybrook.....	Lilybrook No. 1 (run-of-mine, 81 cars).	Fire Creek.....	S. B.	76398-401.....	4	2,410	2,800	2,680	4.79	.97
Do.....	Lily and Hombrook No. 3.....	do.....	S. B.	76241.....	1			2,770	6.22	.88
Do.....	Lily and Hombrook No. 3 (run-of-mine, 2 cars).	Pocahontas No. 6.....	S. B.	76551-52.....	2	2,740	2,740	2,740	5.13	.83
Do.....	Lily and Hombrook No. 3 (run-of-mine, 2 cars).	do.....	S. B.	76183.....	1			2,670	9.95	.90
McAlpin.....	McAlpin (run-of-mine, 21 cars).	Beckley.....	S. B.	68259-60.....	2	2,730	+3,010	+2,870	2.65	.65
Do.....	Blue Jay No. 4.....	do.....	S. B.	77720.....	2			2,790	7.62	.64
McQuade Station.....	Malscott (run-of-mine, 9 cars).	do.....	S. B.	14288-90.....	3	2,730	+3,020	+2,830	4.38	.75
Malscott.....	Malscott (run-of-mine, 6 cars).	Sewell.....	S. B.	77413.....	1			2,390	5.70	1.23
Mexalon.....	Summit (run-of-mine, 6 cars).	do.....	S. B.	79313.....	1			2,560	6.91	.89
Mistlee.....	Lynnwin.....	Beckley.....	S. B.	14319-23, 68136-37, 76896-98.....	10	2,620	+3,010	+2,900	3.99	.74
Do.....	Lynnwin (run-of-mine, 6 cars).	do.....	S. B.	79034.....	1			2,740	8.33	.67
Morco.....	Morco (run-of-mine, 1 car).	Pocahontas No. 3.....	S. B.	75768.....	1			2,730	15.06	.50
Mount Hope.....	Cepece No. 1.....	Sewell.....	S. B.	76948-49.....	2	2,090	2,200	2,150	4.92	2.37
Oswald.....	Oswald (run-of-mine, 4 cars).	do.....	S. B.	77134.....	1			2,450	4.59	.83
Do.....	Oswald No. 3.....	do.....	S. B.	68165, 69-70.....	3	2,190	2,590	2,380	4.07	.80
Pemberton.....	Pemberton (run-of-mine, 4 cars).	Beckley.....	S. B.	76892-94.....	3	2,810	+3,000	+2,920	5.43	.67
Do.....	Pemberton (run-of-mine, 4 cars).	do.....	S. B.	78587.....	1			2,820	7.34	.75
Do.....	Ragland.....	do.....	S. B.	77223-25.....	3	2,800	+3,000	+2,930	6.20	.59
Do.....	Ragland (run-of-mine, 5 cars).	do.....	S. B.	77531.....	1			2,900	7.46	.68
Price Hill.....	Price Hill (run-of-mine, 7 cars).	Sewell.....	S. B.	76379.....	1			2,280	5.37	1.37
Prince Wick.....	Prince Wick.....	Beckley.....	S. B.	76317-20.....	4	2,150	2,890	2,590	3.83	.6
Prosperity.....	Cranberry No. 1 (run-of-mine, 16 cars).	Sewell.....	S. B.	77412.....	1			2,520	4.83	.59

Raleigh	Raleigh No. 1	Beckley	10630	1	+3,010	3.70
Do.	Raleigh Nos. 1 and 4 (run-of-mine, 3 cars)	do.	77499		2,730	4.45
Do.	Raleigh No. 3	do.	10624-27	2,620	2,750	3.67
Do.	Raleigh No. 3 (run-of-mine, 8 cars)	do.	77593		2,720	4.32
Do.	Raleigh No. 6 (run-of-mine, 14 cars)	do.	77500		2,730	5.36
Rhodell	Rhodell No. 1	Pocahontas No. 3	76236-37	2,910	2,910	4.05
Do.	Rhodell Nos. 1 and 2 (run-of-mine, 3 cars)	Beckley, 80 per cent; and Pocahontas No. 3, 20 per cent.	78586	1	2,910	9.43
Do.	Rhodell No. 2	Beckley	76229-30	2,800	2,850	5.68
Skelton	Cranberry No. 2	Sewell	76672-75	2,490	2,850	2.99
Do.	Cranberry No. 2 (run-of-mine, 9 cars)	do.	78974		2,740	3.48
Slab Fork	Slab Fork No. 1	Beckley	14337	1	2,580	2.87
Do.	Slab Fork No. 1 (run-of-mine, 16 cars)	do.	77323		2,800	5.53
Do.	Slab Fork No. 2	do.	14325-26, 28-30, 68194, 54, 61	8	+2,740	3.69
Do.	Slab Fork No. 2 (run-of-mine, 34 cars)	do.	77329	1	2,800	5.69
Do.	Slab Fork No. 3	do.	14322-24, 68155, 57, 60, 64	7	+2,740	4.03
Do.	Slab Fork No. 4	do.	14336	1	2,960	2.39
Do.	Slab Fork No. 5	do.	14313-16, 18,	8	+2,760	3.49
Sprague	Cranberry No. 3 (run-of-mine, 12 cars)	Sewell	68150-52		2,520	4.48
Stanford	Elk Run Piney No. 6	do.	77411	1		
Statesbury	White No. 3	Beckley	77226-28	3	2,130	2.92
Do.	Statesbury (run-of-mine, 21 cars)	do.	76942-46	5	2,800	4.70
Sullivan	Piney Creek No. 1	do.	77785	1	2,760	5.99
Do.	Sullivan (run-of-mine, 4 cars)	do.	76900-01	2	2,510	2.580
Tamroy	Tamroy (run-of-mine, 4 cars)	Sewell	79343	2	2,570	6.44
Do.	Tams (run-of-mine, 4 cars)	do.	68166-68	3	2,540	1.97
Tams	Tams (run-of-mine, 18 cars)	Beckley	77132		+3,010	1.97
Do.	Tams No. 1	do.	78559	1	2,440	4.93
Do.	Tams No. 2	do.	68086	1	2,790	4.99
Do.	Tams No. 3	do.	68086	1	+3,010	6.2
Do.	Tams No. 4	do.	68084	1	+3,010	3.5
Talbert	Crabb Orchard (run-of-mine, 185 tons)	Sewell	68084	1	3,010	3.5
Tommy Creek	Tommy Creek (run-of-mine, 1 car)	do.	78793	1	2,520	7.60
Vanwood	Beckley No. 1	Pocahontas No. 3	76108	1	2,730	7.43
Do.	Wood-Sullivan (run-of-mine, 14 cars)	Beckley and Pocahontas No. 3	76538-40	3	2,510	2.830
Do.	Wood-Sullivan No. 3	Sewell	76109	1	2,700	7.24
Viacova	Viacova (run-of-mine, 2 cars)	do.	76534-35	2	2,590	2.890
Do.	Viacova	do.	76390	1	2,800	16.09
Do.	Do.	do.	77183-84	2	2,910	2,910
						12.95

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
WEST VIRGINIA—Continued.										
RALEIGH COUNTY—continued.										
Whitby.	Bowyer No. 1.	Fire Creek No. 1.	S. B.	76884-85.	2	2,700	2,800	2,750	6.92	0.83
Do.	Bowyer No. 2.	Beckley.	S. B.	76954.	1	1.	1.	2,820	10.46	.75
Do.	Bowyer (run-of-mine, 3 cars).	Fire Creek, 80 per cent; Beckley, 20 per cent.	S. B.	79616.	1	1.	1.	2,580	6.91	.89
Wiley.	Piney Creek (run-of-mine, 2 cars).	Beckley.	S. B.	76376.	1	1.	1.	2,460	10.76	1.42
Winding Gulf.	Winding Gulf No. 1.	do.	S. B.	14398-70, 76935-37.	6	2,670	+3,020	+2,860	3.14	.54
Do.	do.	do.	S. B.	77637.	1	1.	1.	2,640	5.92	.50
Do.	Winding Gulf No. 2.	do.	S. B.	14372-73.	2	2,960	2,990	2,980	2.78	.51
Do.	Winding Gulf No. 3.	do.	S. B.	76839-40.	2	2,730	2,960	2,850	3.83	.79
Woodbay.	McAlpin No. 1.	do.	S. B.	14301-08.	3	2,560	+3,010	+2,850	3.66	.60
Do.	Woodbay (run-of-mine, 12 cars).	do.	S. B.	77724.	1	1.	1.	2,910	6.91	.60
RANDOLPH COUNTY.										
Mill Creek.	Tolbert & Spiker.	Sewell.	B.	13561.	1	1.	1.	+3,010	11.43	.52
Spruce.	Hopkins.	do.	B.	13601.	1	1.	1.	+3,010	13.85	.99
WYOMING COUNTY.										
Alpoca.	Alpha.	Beckley.	S. B.	68147 49 62-63.	4	2,120	2,540	2,360	4.45	1.05
Amigo.	Amigo.	Pocahontas No. 3.	S. B.	76219-21.	3	2,760	2,960	2,850	5.47	.78
Bud.	Thermo Pocahontas.	Beckley.	S. B.	76900-62.	3	2,450	2,770	2,600	5.09	1.25
Do.	Thermo Pocahontas (run-of-mine, 8 cars).	do.	S. B.	75801.	1	1.	1.	2,440	8.23	1.57
Caloric.	Smith Pocahontas.	Pocahontas No. 3.	S. B.	75366-68.	3	2,550	3,000	2,800	7.06	.95
Do.	Smith Pocahontas (run-of-mine, 7 cars).	do.	S. B.	78486.	1	1.	1.	2,910	13.43	.75
Do.	Miller Pocahontas (run-of-mine, 7 cars).	do.	S. B.	78449.	1	1.	1.	2,790	10.43	.63

Do.	Miller Pochontas.	do.	76157-59.	S. B.	2,810	2,860	2,840	5.44	
Do.	Virginia Smokeless.	do.	76151-54.	S. B.	2,820	2,910	2,850	6.21	
Do.	Virginia Smokeless (run-of-mine, tippie sample).	do.	75917.	S. B.			2,960	11.85	
Crabb Orchard.	Crabb Orchard.	Sewall.	76911-12.	S. B.	2,440	2,620	2,530	4.67	
Devil's Fork.	Devil's Fork (run-of-mine, 4 cars).	Pochontas No. 3.	76012.	S. B.			2,910	6.33	
Do.	Devil's Fork.	do.	76298-90.	S. B.	2,820	2,910	2,910	6.41	
Hendon.	Hendon.	Pochontas No. 6.	76087-88.	S. B.	2,450	2,700	2,580	5.38	
Do.	Magnum (run-of-mine, 2 cars).	Pochontas Nos. 3 and 6.	78949.	S. B.	2,740	2,800	2,740	10.86	
Do.	Flat Top (run-of-mine, 5 cars).	Pochontas No. 3.	76985-97.	S. B.	2,800	2,960	2,780	8.01	
Iroquois.	Iroquois (run-of-mine, 5 cars).	do.	76984.	S. B.	2,800	2,960	2,900	8.12	
Do.	Iroquois (run-of-mine, 5 cars).	do.	76224-26.	S. B.	2,800	2,960	2,860	6.43	
Morco.	Morris Smokeless No. 1.	do.	76162-63.	S. B.	2,800	2,800	2,800	6.36	
Mullens.	Mullens (run-of-mine, 1 tippie sample car).	do.	76013.	S. B.			2,850	11.84	
Do.	Mullens Smokeless.	do.	75876-77.	S. B.	2,850	3,000	2,930	6.43	
Do.	Otsego.	do.	75960-62.	S. B.	2,680	2,940	2,830	6.22	
Do.	Sabine.	Beckley.	75900-02.	S. B.	2,260	2,460	3,350	8.88	
Do.	Sabine (run-of-mine tippie sample).	do.	75918.	S. B.			2,590	10.17	
Tracool.	Trace Fork.	Pochontas No. 3.	75861-63.	S. B.	2,910	3,010	2,940	6.67	
Do.	Trace Fork (run-of-mine, 6 cars).	do.	76338.	S. B.			2,840	12.27	
Do.	Barker's Creek No. 1.	do.	75993-95.	S. B.	2,570	2,620	2,600	4.81	
Do.	Barker's Creek No. 2.	Pochontas No. 6.	76014-15.	S. B.	2,390	2,570	2,480	5.63	
Do.	Barker's Creek No. 2 (run-of-mine, 1 car).	do.	76075.	S. B.			2,510	6.38	
Do.	Barker's Creek No. 3.	Beckley.	75988-90.	S. B.	2,570	2,620	2,600	5.37	
Do.	Barker's Creek No. 3 (run-of-mine, 1 car).	Pochontas No. 6.	75691.	S. B.			2,830	10.01	
Do.	Cooper No. 1 (run-of-mine, 8 cars).	Beckley, 27 per cent, and Pochontas, No. 3, 73 per cent.	75758.	S. B.			2,620	9.88	
Do.	Mead-Pochontas.	do.	76871-873.	S. B.	2,620	2,980	2,770	6.18	
Do.	Mead - Pochontas (run-of-mine, 5 cars).	do.	75982.	S. B.			2,800	6.60	
Do.	Trace No. 2.	Pochontas No. 3.	76017-19.	S. B.	2,740	2,860	2,800	5.63	
Do.	Trace No. 2 (run-of-mine, 9 cars).	do.	75690.	S. B.			2,620	7.83	
Wyco.	Wyco.	do.	76298-97.	S. B.	2,850	3,000	2,940	7.41	
Do.	Wyco (run-of-mine, tippie sample).	do.	75920.	S. B.			2,910	8.89	
WYOMING.									
CAMPBELL COUNTY.									
Gillette.	Country bank	Unnamed.	23973.	Sb. B.			2,090	14.66	
Do.	Local.	"B".	22885.	Sb. B.			2,350	11.03	
Do.	Prospect.	"A" (?)	22904.	Sb. B.			2,230	9.31	
CARBON COUNTY.									
Hanna.	Local.	Unnamed.	22972.	Sb. B.			2,110	5.18	
Medicine Bow.	Johnson.	do.	22900.	Sb. B.			2,150	7.91	
Rock River.	King.	do.	22792.	Sb. B.			2,430	9.59	

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature ° F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
WYOMING—Con.										
CONVERSE COUNTY.										
Big Muddy.....	Big Muddy.....	Lower Big Muddy.....	Sb. B.	17723.....	1			2,100	9.15	0.77
Do.....	do.....	Upper Big Muddy.....	Sb. B.	17722.....	1			2,240	6.37	.97
Douglas.....	Country bank.....	Lower Burned.....	Sb. B.	11442.....	1			2,090	11.65	.50
Gienrock.....	Do.....	Unnamed.....	Sb. B.	11048.....	1			2,360	6.42	.63
Do.....	Fairview.....	do.....	Sb. B.	17657.....	1			2,210	7.15	.92
Do.....	Gienrock.....	do.....	Sb. B.	17658.....	1			2,110	7.79	.92
Do.....	Prospect.....	do.....	Sb. B.	17902.....	1			2,110	9.61	.55
Do.....	Inez.....	do.....	Sb. B.	14781.....	1			2,110	15.30	1.68
Do.....	Diamond.....	do.....	Sb. B.	14754.....	1			2,180	11.54	.98
Lost Spring.....	Harney Creek.....	do.....	L.	10911.....	1			1,990	10.49	1.13
Do.....	Do.....	do.....	Sb. B.	10711.....	1			2,310	7.77	1.57
Do.....	Raynes.....	do.....	Sb. B.	10740.....	1			2,010	11.50	1.23
Do.....	Do.....	do.....	Sb. B.	11447.....	1			2,260	5.83	.37
Do.....	Prospect.....	do.....	Sb. B.	10775.....	1			2,170	13.81	1.42
Do.....	Eosau.....	do.....	Sb. B.	10855.....	1			2,320	10.65	.80
Do.....	Sunset.....	do.....	Sb. B.	10855.....	1			2,320	10.65	.80
CROOK COUNTY.										
Sundance.....	Belsic.....	Unnamed.....	B.	15713-15.....	3	2,150	2,490	2,260	14.99	6.09
FREMONT COUNTY.										
Dubois.....	Prospect.....	Unnamed.....	Sb. B.	17584.....	1			2,180	15.84	4.00
Hudson.....	Hickey.....	do.....	Sb. B.	17247.....	7			2,150	5.46	.90
Do.....	Indian.....	do.....	Sb. B.	10838-41, 43, 13178-79.....	7	2,000	2,260	2,130	7.26	.64
Do.....	McKinley.....	Mesa Verde.....	Sb. B.	21408-10.....	3	2,080	2,250	2,140	9.45	1.46
Do.....	Mitchell.....	Unnamed.....	Sb. B.	9773, 17248.....	2	2,280	2,310	2,300	9.55	.98
Do.....	Proposia.....	Lander.....	L.	17244-45.....	2	2,270	2,280	2,280	5.61	.79
Riverton.....	Shipton.....	Unnamed.....	Sb. B.	9772.....	1			2,320	9.42	.90

TABLE I.—Softening temperatures of coal ash from coals of the United States—Continued.

Locality.	Mine.	Coal bed.	Rank of coal.	Laboratory No.	Number of samples from mine.	Softening temperature °F.			Average analysis of dry coal, percentage of—	
						Lowest.	Highest.	Average.	Ash.	Sulphur.
1										
WYOMING—Con.					2	3	4	5	6	7
SHERIDAN COUNTY—continued.										
Kooli.....	Hughey prospect.....	Monarch (?).....	Sb. B.	12642.....	1	1,970.....	2,240.....	2,150.....	6.48.....	0.41.....
Do.....	Kooli.....	Monarch.....	Sb. B.	10818-21, 16060-66, 25263-73.....	22	1,970.....	2,240.....	2,080.....	6.36.....	.83.....
Monarch.....	Monarch.....	do.....	Sb. B.	12005-06, 08, 19006-08, 54, 25190-91, 25244-50, 52, 53, 25311-13.....	21	1,970.....	2,200.....	2,190.....	4.85.....	.56.....
Do.....	New Monarch.....	do.....	Sb. B.	12685, 15830-36.....	8	2,000.....	2,490.....	2,180.....	4.92.....	.59.....
New Acme.....	New Acme.....	do.....	Sb. B.	16055-58.....	4	2,150.....	2,450.....	2,320.....	4.32.....	.67.....
SWEETWATER COUNTY.										
Gunn.....	Gunn-Quealy B. Prospect.....	No. 11.....	Sb. B.	11507-09.....	3	1,900.....	2,030.....	1,970.....	2.44.....	1.06.....
Rock Springs.....	Prospect.....	Tipton.....	Sb. B.	22552.....	1	1,980.....	2,040.....	1,980.....	15.33.....	7.52.....
Supitor.....	do.....	No. 1 upper.....	B.	10067.....	1	2,190.....	2,410.....	2,040.....	2.91.....	1.03.....
Do.....	do.....	No. 7.....	B.	11461-64.....	4	2,100.....	2,390.....	2,330.....	3.92.....	1.05.....
Do.....	do.....	No. 1.....	Sb. B.	11456-59.....	4	2,100.....	2,390.....	2,280.....	3.76.....	1.12.....
UINTA COUNTY.										
Elkol.....	Elkol.....	No. 1.....	B.	11720-31.....	2	2,380.....	2,400.....	2,390.....	4.61.....	.75.....
Frontier.....	Kemmerer No. 1.....	do.....	Sb. B.	11565-68.....	4	2,060.....	2,190.....	2,120.....	7.13.....	1.35.....
Kemmerer.....	Prospect.....	Unnamed.....	Sb. B.	11740.....	1	2,040.....	2,270.....	1,920.....	3.05.....	2.38.....
Susie.....	Kemmerer No. 4.....	Kemmerer No. 1.....	B.	13517-18.....	2	2,040.....	2,270.....	2,160.....	6.82.....	1.42.....
WESTON COUNTY.										
Cambria.....	Antelope No. 3.....	Unnamed.....	Sb. B.	16428-30.....	3	2,600.....	2,860.....	2,790.....	18.88.....	5.40.....
Do.....	Antelope No. 4.....	do.....	Sb. B.	16412-14.....	3	2,750.....	2,870.....	2,810.....	16.53.....	5.56.....
Moocroft.....	Prospect.....	do.....	Sb. B.	12446.....	1	2,400.....	2,400.....	2,400.....	8.53.....	3.70.....
Do.....	do.....	do.....	Sb. B.	12392.....	1	2,310.....	2,310.....	2,310.....	9.62.....	1.91.....

TABLE II.—Comparison of softening temperatures of coal ash from mine and car samples.

State.	County.	Town.	Mine.	Coal bed.	Type of coal.	Laboratory No.	Number of samples.	Average softening temperature, F.	Average analysis of dry coal, percentage of—	
									Ash.	Sulphur.
1	2	3	4	5	6	7	8	9	10	11
Illinois	Franklin	Orient	Orient (mine samples)	No. 6 (Herrin)	B.	23442-43	2	2,410	8.99	0.93
Do.	do.	do.	Orient (egg and lump, 32 cars)	do.	B.	30266-67	2	2,190	9.73	1.29
Do.	do.	do.	Sesser No. 1 (mine samples)	do.	B.	26492-96	5	2,210	9.30	1.21
Do.	do.	do.	Sesser No. 1 (egg and nut, 14 cars)	do.	B.	30290-98, 30485-86	4	2,360	9.84	1.22
Do.	Macoupin	Gillespie	Superior No. 1 (mine samples)	do.	B.	18545-46	2	2,150	11.36	4.59
Do.	do.	do.	Superior No. 1 (run-of-mine 1 car)	do.	B.	18910	1	2,040	15.11	5.76
Maryland	Alleghany	Midland	Consolidation No. 8 (mine samples)	Pittsburgh (Big Bed)	S. B.	68192-95	2	+3,010	7.35	.72
Do.	do.	do.	Consolidation No. 8 (tippie samples, run-of-mine)	do.	S. B.	68203-09-11-13	4	+3,010	7.33	.88
Pennsylvania	Blair	Glen White	Glen White No. 2 (mine samples)	Upper Freeport	B.	30830-32	3	2,240	6.87	1.96
Do.	do.	do.	Glen White No. 2 (tippie sample)	do.	B.	30834	1	2,120	9.61	1.96
Do.	Cambria	Gallatin	Gallatin (mine samples)	do.	B.	30824-27	4	2,330	6.27	1.43
Do.	do.	do.	Gallatin (car sample)	do.	B.	30829	1	2,490	8.79	1.47
Do.	do.	Nanty Glow	Lincoln No. 1 (mine sample)	Lower Kittanning	S. B.	22180-84, 22514-19	11	2,370	7.75	2.84
Do.	do.	do.	Lincoln No. 1 (car sample)	do.	S. B.	22521	1	2,360	7.75	2.84
Do.	Indiana	Scott Glen	Brush Valley (car samples)	do.	S. B.	22521-05	5	2,360	8.16	3.00
Do.	do.	do.	Brush Valley (mine samples)	do.	S. B.	22507	1	2,150	8.16	3.00
Do.	Somerset	Holopie	Haws No. 3 (mine sample)	do.	S. B.	22541-45	5	2,370	8.00	2.43
Do.	do.	do.	Haws No. 3 (run-of-mine, car sample)	do.	S. B.	22547	1	2,370	9.07	2.71
Do.	do.	Windber	Loehrie Arrow (mine samples)	do.	S. B.	20292-95, 98	5	+2,520	6.79	1.44
Do.	do.	do.	Loehrie Arrow (run-of-mine, car sample)	do.	S. B.	22534	1	2,460	10.25	2.16
Virginia	Tazewell	Pocahontas	West Pocahontas (mine samples)	Pocahontas No. 3	S. B.	67910, 53-54, 58	4	2,320	4.52	.46
Do.	do.	do.	West Pocahontas (run-of-mine, 4 cars)	do.	S. B.	30264	1	2,190	5.60	.67
West Virginia	Fayette	Glen Jean	Nichol (mine samples)	Sewell	S. B.	76961-64	4	2,550	5.30	.78
Do.	do.	do.	Nichol (run-of-mine, 5 cars)	do.	S. B.	76890	1	2,500	5.25	.76
Do.	do.	Ingram Branch	Ingram Branch No. 2 (mine samples)	Big Eagle	B.	77233-36	4	2,650	5.05	1.08
Do.	do.	do.	Ingram Branch No. 2 (run-of-mine, 14 cars)	do.	B.	76504	1	2,780	8.36	.99
Do.	do.	Lochegally	Lochegally (mine samples)	Sewell	B.	77229-32	4	2,490	2.51	.51
Do.	do.	do.	Lochegally (run-of-mine, 6 cars)	do.	B.	77090	1	2,680	4.95	.56
Do.	do.	Long Branch	Long Branch No. 1 (mine samples)	Eagle	B.	77215-17	3	2,780	3.56	.69

TABLE II.—Comparison of softening temperatures of coal ash from mine and car samples—Continued.

State.	County.	Town.	Mine.	Coal bed.	Type of coal.	Laboratory No.	Number of samples.	Average softening temperature, °F.	Average analysis of dry coal, percentage of—			
									Ash.	Sulphur.		
1	2	8	4	5	6	7	8	9	10	11		
West Virginia.	Fayette	Long Branch	Long Branch No. 2 (mine samples).	No. 2 Gas.	B.	77218-22	5	2,810	4.63	0.81		
Do.	do.	do.	Long Branch Nos. 1 and 2 (run-of-mine, 16 cars).	Eagle, 23 per cent; and No. 2 Gas, 77 per cent.	B.	76488	1	2,890	8.46	.86		
Do.	do.	Mount Hope	Catherine (mine samples).	Sewell.	S. B.	77169-70	2	2,490	4.38	1.12		
Do.	do.	do.	do. (run-of-mine, 25 tons).	do.	S. B.	76398	1	2,450	7.13	1.03		
Do.	do.	do.	Minnie Bell (mine samples).	do.	S. B.	77173-74	2	2,560	3.66	.91		
Do.	do.	do.	do. (run-of-mine, 4 car).	do.	S. B.	76377	1	2,450	4.74	1.32		
Do.	do.	do.	Warner (mine sample).	do.	S. B.	77171-72	2	2,520	4.60	1.62		
Do.	do.	do.	Warner (run-of-mine, 30 tons).	do.	S. B.	76392	1	2,270	9.56	1.86		
Do.	do.	Summerlee	Summerlee (mine sample).	do.	B.	77179-82	4	2,370	2.60	.81		
Do.	do.	do.	Summerlee (run-of-mine, 7 cars).	do.	B.	77091	1	2,310	4.22	.70		
Do.	do.	Sun.	Sunset (mine sample).	do.	S. B.	77175-76	2	2,340	3.97	.92		
Do.	do.	do.	Sunset (run-of-mine 1 car).	do.	S. B.	76807	1	2,390	5.91	.74		
Do.	do.	Willis Branch.	Willis Branch (mine sample).	Alma.	B.	76931-33	3	2,900	5.55	.76		
Do.	do.	do.	do. (run-of-mine, 1 car).	do.	B.	77165	1	2,850	10.60	.71		
Do.	McDowell.	Gilliam	Gilliam (mine sample).	Pocahontas No. 3.	S. B.	68000, 022-23	3	2,250	5.40	.45		
Do.	do.	do.	do. (run-of-mine, 4 cars).	do.	S. B.	30238	1	2,260	8.05	.44		
Do.	do.	Hartwell	Berwind No. 5 (minesample).	do.	S. B.	68069, 72, 76	3	2,290	4.17	.83		
Do.	do.	do.	Berwind No. 5 (run-of-mine, 4 cars).	do.	S. B.	30263	1	2,310	9.55	.96		
Do.	do.	Havaco	Havaco (mine sample).	do.	S. B.	10034, 13775, 67996, 68019-20.	5	2,350	5.66	.74		
Do.	do.	do.	Havaco (run-of-mine, 4 cars).	do.	S. B.	30237	1	2,240	8.19	.81		
Do.	do.	Jenkinjones No. 6	Pocahontas No. 3 (minesample).	do.	S. B.	14185 - 87, 89 - 90, 20519-23, 68068, 90, 96.	14	2,250	5.03	.51		
Do.	do.	do.	Pocahontas No. 3 (car sample, 8 cars).	do.	S. B.	30256	1	2,280	5.9	.50		
Do.	do.	Jenkinjones No. 8	Pocahontas No. 3 (minesamples).	do.	S. B.	20331-36, 68088-89, 83, 95.	9	2,320	5.16	.59		
Do.	do.	do.	Pocahontas No. 3 (run-of-mine, 34 cars).	do.	S. B.	30239	1	2,280	6.88	.54		
Do.	do.	Lick Branch	Delta (minesample).	do.	S. B.	67891, 94, 967	3	2,210	4.30	.45		

Do.	do.	Delta (carsample, 11 cars)	S. B.	30260.	7.71	2,370	.50
Do.	Newhall.	Berwind No. 6 (mine sample)	S. B.	68066, 75.	4.90	2,810	.63
Do.	do.	Berwind No. 6 (run-of-mine, 9 cars)	S. B.	30235.	9.53	2,660	.80
Do.	do.	Berwind No. 8 (mine sample)	S. B.	68071, 78-79.	4.43	2,690	.65
Do.	do.	Berwind No. 8 (run-of-mine, 8 cars)	S. B.	30262.	7.59	2,700	.70
Do.	Twin Branch.	Maher or No. 4 (mine samples)	S. B.	22480-85, 89.	4.46	2,660	.71
Do.	do.	Maher or No. 4 (carsamples, run-of-mine)	S. B.	22487-88.	4.31	2,680	.71
Do.	Vivian	Pocahontas No. 3.	S. B.	68024, 25, 27, 30.	4.85	+ 2,420	.44
Do.	do.	King (mine samples)	S. B.	30201.	8.05	2,280	.56
Do.	do.	King (carsamples, 11 cars)	S. B.	68003, 9-9.	5.63	2,270	.55
Do.	do.	Tidewater (mine samples)	S. B.	30236.	8.55	2,530	.55
Do.	do.	Tidewater (run-of-mine, 15 cars)	S. B.	14224-26, 28, 67986.	4.00	2,660	.58
Do.	Mercer	Weyanoke No. 1 (mine sample)	S. B.	683-66.			
Do.	do.	Weyanoke No. 1 (car sample, 9 cars)	S. B.	30253.	8.33	2,600	.58
Do.	Raleigh	Affinity (mine samples)	S. B.	26691-93, 95, 68115, 122, 123.	4.19	+ 3,000	.56
Do.	do.	Affinity (run-of-mine, 5 cars)	S. B.	79004.	7.45	2,800	.75
Do.	do.	Battleship (mine sample)	S. B.	76922.	5.25	2,510	1.26
Do.	do.	Battleship (run-of-mine, 3 cars)	S. B.	76197.	6.71	2,510	.88
Do.	do.	City No. 1 (mine sample)	S. B.	77185-86.	2.23	2,450	.70
Do.	do.	City No. 1 (run-of-mine, 15 tons)	S. B.	76389.	5.70	2,430	.83
Do.	do.	Clyde Pocahontas (mine samples)	S. B.	76265-66.	4.10	2,920	.66
Do.	do.	Clyde Pocahontas (run-of-mine, 24 cars)	S. B.	78522.	10.21	2,850	.65
Do.	do.	Big Stick (mine samples)	S. B.	26684 - 86, 88 - 89, 68118, 34-35.	4.20	+ 2,950	.55
Do.	do.	Big Stick (run-of-mine, 84 cars)	S. B.	78669.	7.61	2,870	.78
Do.	do.	Eccles No. 5 (mine samples)	S. B.	19774-78.	6.44	2,920	.57
Do.	do.	Eccles No. 5 (run-of-mine, 8 cars)	S. B.	78922.	6.44	2,800	.79
Do.	do.	Douglas No. 2 (mine sample)	S. B.	76887-90.	4.08	2,660	.84
Do.	do.	Douglas No. 2 (run-of-mine, 10 cars)	S. B.	77723.	5.88	2,570	.95
Do.	do.	Leckie No. 2 (mine samples)	S. B.	76907-09.	4.60	2,760	.80
Do.	do.	Leckie No. 2 (run-of-mine, 6 cars)	S. B.	77595.	7.15	2,570	.92
Do.	do.	Lillybrook No. 2 (mine samples)	S. B.	76481-83.	4.11	2,720	.91
Do.	do.	Lillybrook No. 2 (run-of-mine, 6 cars)	S. B.	77722.	5.67	2,600	1.09
Do.	Hotcoai.	Gulf (Hotcoai) (mine samples)	S. B.	76924-27, 68.	4.05	+ 2,810	.72
Do.	do.	Gulf (Hotcoai) (run-of-mine, 10 cars)	S. B.	78568.	6.50	2,960	.62
Do.	Lego.	Laurel Smokeless (mine samples)	S. B.	76542-43.	4.49	2,780	.82
Do.	do.	Laurel Smokeless (run-of-mine, 2 cars)	S. B.	78653.	8.94	2,820	.74
Do.	Lester.	Neal (mine samples)	S. B.	76951-52.	4.88	2,570	1.00
Do.	do.	Neal (run-of-mine, 2 cars)	S. B.	76501.	12.43	2,510	1.37
Do.	Lillybrook	Lillybrook No. 1 (mine samples)	S. B.	76398-401.	4.79	2,660	.97
Do.	do.	Lillybrook No. 1 (run-of-mine, 84 cars)	S. B.	76241.	6.22	2,770	.88

TABLE II.—Comparison of softening temperatures of coal ash from mine and car samples—Continued.

State.	County.	Town.	Mine.	Coal bed.	Type of coal.	Laboratory No.	Number of samples.	Average softening temperature, F.	Average analysis of dry coal, percentage of—		
									Ash.	Sulphur.	
1	2	3	4	5	6	7	8	9	10	11	
West Virginia...	Raleigh.....	Lillybrook.....	Lilly and Hornbrook No. 3 (mine samples).	Pocahontas No. 6.	S. B.	76551-52.....	2	2,740	5.13	0.83	
Do.....	do.....	do.....	Lilly and Hornbrook No. 3 (run-of-mine, 2 cars).	do.....	S. B.	76183.....	1	2,670	9.95	.90	
Do.....	do.....	McAlpin.....	McAlpin (mine samples).	Beckley.....	S. B.	68259-60.....	2	+2,870	2.65	.65	
Do.....	do.....	do.....	McAlpin (run-of-mine, 21 cars).	do.....	S. B.	77720.....	1	2,790	7.62	.64	
Do.....	do.....	Pemberton.....	Pemberton (mine samples).	do.....	S. B.	76892-94.....	3	+2,920	5.43	.67	
Do.....	do.....	do.....	Pemberton, (run-of-mine, 4½ cars).	do.....	S. B.	78387.....	1	2,820	7.34	.75	
Do.....	do.....	do.....	Regland (mine samples).	do.....	S. B.	77225-25.....	3	+2,930	6.20	.59	
Do.....	do.....	do.....	Regland (run-of-mine, 5 cars).	do.....	S. B.	77531.....	1	2,900	7.46	.68	
Do.....	do.....	Raleigh.....	Raleigh No. 3 (mine samples).	do.....	S. B.	10624-27.....	2	2,670	3.67	.75	
Do.....	do.....	do.....	Raleigh No. 3 (run-of-mine, 8 cars).	do.....	S. B.	77593.....	1	2,720	4.32	.71	
Do.....	do.....	Skelton.....	Cranberry No. 2 (mine samples).	Sewell.....	S. B.	76672-75.....	4	2,660	2.99	.73	
Do.....	do.....	do.....	Cranberry No. 2 (run-of-mine, 9 cars).	do.....	S. B.	78874.....	1	2,740	5.48	.81	
Do.....	do.....	Slab Fork.....	Slab Fork No. 1 (mine samples).	Beckley.....	S. B.	14337.....	1	2,580	2.87	.61	
Do.....	do.....	do.....	Slab Fork No. 1 (run-of-mine, 16 cars).	do.....	S. B.	77328.....	1	2,900	5.53	.71	
Do.....	do.....	do.....	Slab Fork No. 2 (mine samples).	do.....	S. B.	14325-26, 28-30, 68154, 96, 61.	8	+2,740	3.69	.50	
Do.....	do.....	do.....	Slab Fork No. 2 (run-of-mine, 3½ cars).	do.....	S. B.	77329.....	1	2,800	5.87	.69	
Do.....	do.....	Tamroy.....	Tamroy (mine samples).	Sewell.....	S. B.	68166-68.....	3	+2,850	1.97	.50	
Do.....	do.....	do.....	Tamroy (run-of-mine, 4 cars).	do.....	S. B.	77192.....	1	2,640	4.93	.85	
Do.....	do.....	Viacova.....	Viacova (mine samples).	do.....	S. B.	77182-84.....	2	2,910	12.95	.54	
Do.....	do.....	do.....	Viacova (run-of-mine, 2 cars).	do.....	S. B.	76380.....	1	2,800	16.99	.63	
Do.....	do.....	Winding Gulf.....	Winding Gulf No. 1 (mine samples).	Beckley.....	S. B.	14368-70, 76935-37.	6	+2,860	3.14	.54	
Do.....	do.....	do.....	Winding Gulf No. 1 (run-of-mine, 11 cars).	do.....	S. B.	77637.....	1	2,640	5.92	.50	
Do.....	Wyoming.....	Bud.....	Thermo Pocahontas (mine samples).	do.....	S. B.	76990-92.....	3	2,600	5.09	1.25	
Do.....	do.....	do.....	Thermo Pocahontas (run-of-mine, 8 cars).	do.....	S. B.	75801.....	1	2,440	8.23	1.57	
Do.....	do.....	Caloric.....	Smith Pocahontas (mine samples).	Pocahontas No. 3.	S. B.	75896-98.....	3	2,900	7.06	.95	

Do.	do.	do.	do.	Smith Pocahontas (run-of-mine, 7 cars).	do.	S. B.	78486.	1	2,910	13.43	.75
Do.	do.	do.	do.	Virginia Smokeless (mine samples).	do.	S. B.	76151-54.	4	2,850	6.21	.72
Do.	do.	do.	do.	Virginia Smokeless (run-of-mine, tippie sample).	do.	S. B.	75917.	1	2,960	11.85	.65
Do.	do.	do.	do.	Devil's Fork (mine samples).	do.	S. B.	76988-90.	3	2,910	6.41	.65
Do.	do.	do.	do.	Devil's Fork (run-of-mine, 4 cars).	do.	S. B.	76012.	1	2,910	6.33	.70
Do.	do.	do.	do.	Iroquois (mine samples).	do.	S. B.	76924-26.	3	2,800	8.43	.69
Do.	do.	do.	do.	Iroquois (run-of-mine, 3 cars).	do.	S. B.	75984.	1	2,800	8.12	.68
Do.	do.	do.	do.	Sabine (mine samples).	Beckley.	S. B.	75904-02.	3	2,850	4.71	.88
Do.	do.	do.	do.	Sabine (run-of-mine, tippie sample).	do.	S. B.	75918.	1	2,890	10.17	.72
Do.	do.	do.	do.	Trace Fork (mine samples).	Pocahontas No. 3.	S. B.	75861-63.	3	2,940	6.67	.72
Do.	do.	do.	do.	Trace Fork (run-of-mine, 6 cars).	do.	S. B.	78338.	1	2,840	12.27	.94
Do.	do.	do.	do.	Barker's Creek No. 2 (mine samples).	Pocahontas No. 6.	S. B.	76014-15.	2	2,480	5.63	.53
Do.	do.	do.	do.	Barker's Creek No. 2 (run-of-mine, 1 car).	do.	S. B.	78675.	1	2,510	6.38	.51
Do.	do.	do.	do.	Trace No. 2 (mine samples).	Pocahontas No. 3.	S. B.	76017-19.	3	2,900	5.53	.64
Do.	do.	do.	do.	Trace No. 2 (run-of-mine, 9 cars).	do.	S. B.	75690.	1	2,620	7.93	.67
Do.	do.	do.	do.	Wyco (mine samples).	do.	S. B.	76293-97.	5	2,940	7.41	.63
Do.	do.	do.	do.	Wyco (run-of-mine, tippie sample).	do.	S. B.	75920.	1	2,910	8.39	.70

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