

403. A.

Yorkshire Philosophical Society.

ANNUAL REPORT

FOR

MCMIII.



ANNUAL REPORT

OF THE COUNCIL

OF THE

YORKSHIRE

PHILOSOPHICAL SOCIETY

FOR

MCMIII.

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 8th, 1904.



YORK:
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1904.

TRUSTEES
OF
THE YORKSHIRE MUSEUM,
APPOINTED BY ROYAL GRANT.

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Yorkshire Philosophical Society.

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REPORT OF THE COUNCIL
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY.

FEBRUARY 8TH, 1904.

THE year 1903 has been an active and a prosperous one, and it is with feelings of satisfaction that the Council presents the usual annual report.

The number of members of the Society has been more than sustained in spite of a long list of resignations. The question of resignations raises a point that deserves more than passing notice from the members. Your Council has, for some years past, noted with regret that many people have joined the Society simply for the advantages that their families have derived from the use of the gardens, and have withdrawn when for any reason such use could no longer be made. This Society, both from its past and present work, merits better treatment at the hands of the citizens of York, and your Council takes this opportunity of pleading for a higher view of membership. In joining an Institution like this, a member should be moved by feelings of public spirit rather than by those of personal gain. Your Council is well aware that some citizens have for years acted upon this principle, but their number is not nearly so great as it might be.

The financial position of the Society, for the period under review, is good. The income for the year is £1291 17s. od., the expenditure £1288 13s. 1d. This leaves a balance of £3 3s. 11d. to the good. The smallness of this balance is a matter of secondary importance to a Society which has not a dividend to declare. But all friends of the Institution will do well to bear in mind that an increased income means greater

power to do useful work. More space and storage accommodation are urgently needed, and the provision of an improved lecture theatre would be a distinct benefit not only to our own members but also to those kindred Societies which hold their meetings on our premises.

York has been visited by three Antiquarian Societies during the year. First among these in number and importance stands the Royal Archæological Institute of Great Britain and Ireland. This Society, which had not visited York since 1848, held a well attended and successful meeting in July, under the presidency of Sir Henry Howorth. The members of the Institute were entertained in the Museum Gardens by the Society: tea was provided and every effort was made to give our visitors a pleasant afternoon. The President and Council of the Institute gracefully expressed their thanks to the Council of the Yorkshire Philosophical Society for help afforded during the meeting. The visits of the Yorkshire Archæological Society and the East Riding Antiquarian Society (the latter in September under the presidency of Lord Hawkesbury), though on a smaller scale, were equally successful.

It is worthy of remark that these Archæological Societies visited the site of S. Mary's Abbey Church, and each unanimously approved the work done by the Excavation Committee on the foundations of the chancel. And it may be added that M. Camille Enlart, Director of the great Architectural Museum of the Trocadero at Paris and one of the foremost Archæologists in France, expressly commended the plan adopted by your Committee.

The list that follows shows that the standard of our lectures has been fully kept up. The members had the unusual privilege of hearing an account of the great Nile Dam from the Engineer who carried out that magnificent work. Our warmest thanks are due to Sir Benjamin Baker for the lecture, and to one of our vice-presidents for using his personal influence in inducing the famous engineer to come. So greatly was the Council impressed by the importance of this lecture, that it was resolved to engage the Festival Concert Room, and let each member have two free tickets of admission. And although this has resulted in some pecuniary loss to the

Society, the exceptional nature of the case may perhaps stand as an excuse. The thanks of the Society are also due to other gentlemen on the list who kindly volunteered their services as Lecturers without fee, and in some cases even without claiming for expenses.

The lectures delivered on Thursday evenings were as follows:—

Thursday, January 8th.—“Life History of the Salmon” (With Lantern Illustrations). By Chas. E. Elmhirst.

Thursday, Jan. 22nd.—“Clough.” By R. Spence Watson, LL.D.

Thursday, February 5th.—“Dalmatia” (With Lantern Illustrations from Photographs taken by the Lecturer). By S. Wells, F.R.G.S.

Thursday, February 19th.—“Ants in Relation to Flowers” (Illustrated by Lantern Pictures). By J. G. Goodchild, F.G.S. (H.M. Geological Survey).

Thursday, March 5th.—“Southern India” (Illustrated by Lantern Pictures from Photographs taken by the Lecturer). By the Rev. A. Westcott.

Thursday, March 19th.—“The Caucasus” (Illustrated by Lantern Pictures from Photographs taken by the Lecturer). By Hermann Wooley (Member of the Alpine Club).

Thursday, April 2nd.—“Some Yorkshire Lakes and their History” (With Lantern Illustrations). By Professor Percy F. Kendall.

Thursday, April 23rd.—The Members of the Photographic Section gave a Lantern Night.

Thursday, October 22nd.—“Forms of Waves in Sand and Snow” (Illustrated by Lantern Pictures from Photographs taken by the Lecturer in Africa, Canada, &c.) By Vaughan Cornish, D.Sc., F.R.G.S.

Thursday, November 5th.—“With Ice-Axe and Camera in Switzerland” (Illustrated by Lantern Pictures). By W. H. Gover (Member of the Alpine Club).

Thursday, November 19th.—“The Nile Dam at Assouan” (With Lantern Illustrations). By Sir Benjamin Baker, K.C.B., K.C.M.G., LL.D., D.Sc., F.R.S., &c.

Thursday, Dec. 3rd.—“The Monks of Marmoutier” (Illustrated by Lantern Pictures). By the Rev. J. Solloway, M.A.

Thursday, Dec. 17th.—“On the Track of the Moors in Spain” (Illustrated by Lantern Pictures). By Samuel Wells, F.R.G.S.

As in the past your Council has endeavoured to assist the work of other Societies in York, and has granted the use of the Museum premises to the York Medical Society, the York Universities Extension Society, the York Field Naturalists, and the Yorkshire Architectural and York Archæological Society, for meetings.

The Society has lost two honorary members—Professor A. K. von Zittel and Mr. Robert Etheridge—by death. A short account of these two eminent men will be given further on.

The members again had an opportunity of witnessing outdoor representations of plays in the Museum Gardens, on the present occasion by the “Arcadian” Company, under the direction of Miss Tellek. During the course of the year, the York Philharmonic Society gave several performances in the Gardens, and obtained good attendances.

The thanks of the Society are due to the Yorkshire County Committee for kindly handing over the relics found in the excavations at Clifford’s Tower, to be preserved in the Museum.

The question of an invitation to the British Association for the Advancement of Science to visit York again at an early date has been before the Council during the past year, and it is hoped that some further steps may be taken shortly.



ARCHÆOLOGY.—The interest in the antiquities of the city has been greatly stimulated by the visits of the three Antiquarian Societies referred to in the General Report of the Council. It is sincerely to be hoped that this interest will not die out. The visits of the Archæological Institute to several York churches, and especially to the Abbey Church of S. Mary's, were productive of excellent results. M. Enlart, from his extensive knowledge of French mediæval architecture, was able to render much valuable service and to clear up several points hitherto obscure. The visits of the Yorkshire Archæologists and the East Riding Antiquarians were also marked by excellent work: the remarks of Mr. Boyle on York ecclesiastical glass (exclusive of that in the Minster) were very useful and instructive.

The relics discovered in the course of the excavations at Clifford's Tower, have now been formally transferred to this Society. They were fully dealt with in the previous Annual Report.

During the making of a new road (S. Helen's road) at Dringhouses, a portion of the Roman Road was uncovered, and the excavation extended to the edge of a small Roman cemetery. Unfortunately these excavations were very limited in depth and extent. The Rev. J. H. Evans kindly secured for us a Græco-Roman vase of a very interesting type: unhappily it was somewhat broken by the workmen's picks before its nature was discovered. No other discoveries of any special interest have come under the Hon. Curator's notice.

BOTANY.—The Honorary Curator reports that the collections are in good order. The work done in the Department will be found recorded on pp. 33—56.

Specimens of *Crepis taraxacifolia*, Thuil, have been presented by Mr. Arthur Bennett.

GEOLOGY.—Two excellent specimens of Yorkshire Liassic fish have been obtained; one by purchase, and the other (together with several miscellaneous fossils) by an exchange effected with the Council of the Whitby Museum. Specimens have again been lent to various specialists to assist them in

their investigations. Dr. Wheelton Hind has figured specimens of the following species from our collections in his monograph on Carboniferous Lamellibranchiata (Publications of the Palæontographical Society)—*Pterinopecten dumontianus*, *Pt. radiatus*, *Pt. granosus*, *Eumicrotis ovalis*, *Aviculopecten fimbriatus*, *A. Forbesii*, *Crenipecten semicircularis*, *Amusium tenue*; and Mr. H. Woods has figured specimens of the following Cretaceous Lamellibranchiata in the same publications—*Pecten (Neithea) quinquecostatus* and *Velopecten Studeri*.

ORNITHOLOGY.—The usual work of adding separately cased specimens to the British Birds had proceeded steadily; several skins have also been this year incorporated into the collection. The question of the arrangement of the foreign birds has also been actively taken up, and the Hon. Curator obtained the services of Mr. Chubb, an experienced specialist from the British Museum, who spent a week on the examination and identification of birds in the collection. Mr. Chubb will shortly pay us another visit to complete his work, and the way will then be clear for the arrangement of these birds in geographical groups as originally contemplated.

LIBRARY.—A great many books have been acquired during the year; some by purchase, but the great majority as donations. The Governments of the United States and of Norway have treated us with their usual liberality. The Trustees of the British Museum have made most generous donations of works on Natural History, but all publications on Archæology are presented to the Free Library. It certainly seems at first sight very natural that the claims of a public institution should be preferred to those of a semi-private one. But we cannot help thinking that a little enquiry into the matter would have convinced the authorities at Bloomsbury of the greater wisdom of sending reference works on antiquities to the institution in whose custody are kept nearly all the antiquities found in the city—especially as such works are quite as accessible on our shelves to every genuine enquirer as on those of the Free Library.

MINERALOGY.—The collections are in good order. The only accessions during the year are specimens of some of the most important Salts found at the well-known deposits at Stassfurt. For these, we are indebted to the kindness of Mr. H. Richardson.

METEOROLOGY.—*Statistics of Station* :—Longitude $1^{\circ} 5' W.$; Latitude $53^{\circ} 57' N.$; height above mean sea level 56 feet. *Temperature* in 1903 had a range smaller by 4° than that of the previous year, being $7^{\circ} F.$ higher, viz., 48° as against 47.3° . The lowest temperature was recorded on Jan. 14th, when the absolute minimum thermometer read $19^{\circ} F.$, whilst the highest reading was taken on July 9th and 10th, viz., $80^{\circ} F.$ The spring of the year was marked by cold and wet, the summer maintaining the sequence of unfavourable weather, yet two courses combined to raise the mean annual temperature during the last quarter of the year. The heavy rainfall set free a large amount of latent heat, and the general cloudiness of the same quarter checked radiation. Yet such heat cannot be as beneficial as the higher rays of direct sunlight. It is pointed out by medical authorities that the high rainfall acted beneficially on the general health of the community by its direct cleansing of our drains, and also by its purifying the air.

A *Mean Pressure* of 29.863 inches at normal temperature and mean sea-level has been recorded as against 29.947 inches for 1902, March and December being lowest with 29.715 and 29.751 inches respectively, and June and September highest with 30.082 and 30.008 inches respectively. The extreme range of pressure being 1.790 inches as against 2.269 inches in 1893, the highest reading being taken on Jan. 14th, 30.665 inches at 9 a.m., and the lowest being 28.595 inches at 9 p.m. on March 2nd.

Rain or Snow (0.005 inches or over) fell on 218 days, 26 more rainy days than in 1902, the total rainfall being 30.31 inches as against 18.69 inches for 1902, an increase of 11.62 inches for the year, or over 62 per cent. This stamps the year 1903 as a year of excessive rainfall, and the amount is well compared with Mr. J. E. Clark's determination of 24.5 inches as the average fall for the last 60 years. The extra fall occurred in

May, September and October, the total for the 70 years' *average* for the three months being 6·61 inches, whilst the actual fall in 1903 is 14·34 inches, an increase of 7·73 inches, or nearly 117 per cent. No less than *five* months of the year 1903 were wetter than the wettest month of 1902.

The cumulative totals since 1841 are now :—August 168·30 inches, October 171·90 inches, July 160·16 inches, so that October now takes precedence of August as our wettest month, this year 30 days of the month being “rainy.” The observation of winds shows that on 5 days a “gale” has been experienced, whilst the chief air-currents have been S. (178), W. (162), N. (105), S.W. (100), E. (58). Days of “clear” sky reach only 38, as against 31, “overcast” are 125 as against 142, the mean amount of cloud being 6·4 as compared with 6·6.

A complete record of *Sunshine* has been kept for 1903, and shows that we have had 1162·5 hours of bright sunshine, representing 26 per cent. of the year, as against 28 per cent. for 1902.

PHOTOGRAPHIC SECTION.—While the membership of this Section has been maintained, the average attendance at the monthly meetings has not been so large as during the previous years, and an increase in the roll of members is highly desirable. Several competitions have been held during the year, namely, Interiors, Flowers, Reproductions of Prints and other Pictures, Snap Shots at Moving Objects, and pictures illustrative of “Springtime.” Considerable interest was aroused in most of these competitions, and a good number of exhibitors entered their work. Perhaps the main feature of the past year's work was the Photographic Exhibition opened on April 20th. An unexpectedly good muster of work was contributed, and the attendance was all that could be desired. The usual show of Lantern Slides given in the same week was not this year confined to new work, but the pick of members' old work was requisitioned for the occasion. A third feature of the year was an Excursion up the river Derwent given by Mr. Malcolm Spence, in his steam yacht *Ariel*, to all members of the Section who chose to avail themselves of it. This took place early in July on a Saturday, and in beautiful weather,

the starting place being Stamford Bridge and the final landing place Kirkham Abbey. The expedition was greatly enjoyed. The Museum Dark Room, which contains an efficient enlarging apparatus, has recently been refitted and rendered much more comfortable for working in. All members of the Section are free to use it on application, if need be, to Mr. Malcolm Spence or to the Museum Attendant. It is very much to be desired that a considerable accession to the number of members may take place during the coming year.

OBITUARY.—In Mr. Robert Etheridge, F.R.S., whose death has left so conspicuous a vacancy in the Geological world, we lose not only a Geologist of first-rate powers, but one whose work is largely connected with this County. Born at Ross in 1819, Mr. Etheridge began his scientific career as Curator of the Museum of the Bristol Philosophical Society. In 1857, he was appointed Assistant Palæontologist to the Geological Survey, and in addition to survey work undertook the demonstrations in Palæontology at the Royal School of Mines, under Professor Huxley. Shortly after, he was called upon to investigate the nature and position of the Devonian Formation, a matter which the criticisms of Jukes had raised into a burning question. He set the discussion at rest by an exhaustive and masterly work on the subject in 1867, and then turned his attention to Yorkshire geology, examining the coast from the Tees to the Humber with great care. The results of this work are summed up in his edition (3rd) of Phillips' "Geology of Yorkshire," published 1875. In 1881, Mr. Etheridge was transferred from the Geological Survey to the British Museum, where he remained till his retirement doing excellent work on the Stratigraphical section of the Geological Department. Although an indefatigable worker and a voracious reader, Mr. Etheridge was in no sense a book-worm. He was genial and pleasant in his manners, and took keen interest in passing events.

Professor Karl Alfred von Zittel's work has no direct connection with Yorkshire, his election to the honorary membership of this society was a recognition of the great service he had rendered to the science of Palæontology. Von Zittel was

born in 1839, and prepared himself for his Geological career by a course of study at Heidleberg and at Paris. He commenced his work as an Assistant on the Austrian Geological Survey, and in this capacity worked for a couple of years on the Stratigraphy of Dalmatia. He then became an Assistant in the Royal Museum at Vienna. In 1866 he was appointed Professor of Palæontology at Munich, a post which he retained till his death. Probably no man ever had so wide a grasp of Palæontology, while his work on the Sponges entitles him to the foremost place amongst the specialists on that group. In addition to about 60 papers, of great scientific value, Professor von Zittel has published four works of a more general nature, "Pictures of Creation," "History of Geology and Palæontology to the end of the 19th Century," "Principles of Palæontology," and the well-known "Hand-book of Palæontology." Like his English *confrère*, of whom we have just spoken, Professor von Zittel was of a bright and happy disposition, ever welcome to his friends, whether as teacher or companion.



METEOROLOGICAL STATION, YORK.—THE MUSEUM.

Longitude 1° 5' W., Latitude 53° 57' N. Height above Mean Sea Level 56 ft. Gravity Correction + .024 in.

1903.	Mean Pressure at 32° Fahrenheit at height at M. S. Level	Air Temperature.						Humidity.										
		9 a.m.	9 pm.	Mean.	Means of		Absolute Min. and Max.		Depn. of Wet Bulb.		Tension of Vapour.		Percentage.					
					Min.	Max.	Min.	Max.	9 a.m.	9 p.m.	9 a.m.	9 p.m.	9 a.m.	9 p.m.				
		°	°	°	°	°	°	°	°	in.	in.	in.	in.	%	%			
Jan.	29.892	38.7	39.0	38.9	35.2	43.6	19.0	55.0	26th	1.2	1.3	1.3	.212	.212	.212	91	90	91
Feb.	.974	43.6	44.5	44.1	40.0	50.1	32.0	57.0	8, 19	1.7	1.7	1.7	.247	.255	.251	87	87	87
Mar.	.715	43.8	43.7	43.8	39.7	51.7	33.0	65.0	25th	2.4	2.0	2.2	.234	.242	.238	81	85	83
April	.852	44.4	42.2	43.3	36.7	50.5	28.0	60.0	10th	3.1	2.4	2.8	.226	.219	.223	77	83	80
May	29.895	52.0	48.9	50.5	43.7	58.9	32.0	77.0	31st	3.2	2.1	2.7	.305	.296	.301	79	86	83
June	30.082	57.2	53.6	55.4	47.4	63.8	36.0	77.0	27th	3.9	2.5	3.2	.357	.342	.350	76	83	80
July	29.884	60.6	57.7	59.2	52.2	67.4	41.0	80.0	9, 10	3.9	2.3	3.1	.408	.409	.409	78	85	82
Aug.	29.773	58.4	56.6	57.5	50.6	65.2	44.0	70.0	8, 9th	2.9	2.4	2.7	.402	.389	.396	82	84	83
Sept.	30.008	55.4	52.8	54.1	47.7	62.7	35.0	73.0	1st	2.2	1.0	1.6	.377	.372	.375	86	93	90
Oct.	29.540	50.0	49.5	49.8	44.6	55.9	36.0	65.0	1st	1.3	0.7	1.0	.327	.336	.332	91	95	93
Nov.	.994	42.3	42.3	42.3	38.0	48.7	27.0	55.0	3rd, 24th	1.2	1.2	1.2	.244	.244	.244	91	91	91
Dec.	29.751	37.2	38.1	37.7	34.3	41.8	23.0	50.0	22nd	0.7	0.7	0.7	.208	.215	.212	94	94	94
Year	29.863	48.6	47.4	48.0	42.5	55.0	—	—	—	2.3	1.7	2.0	.296	.294	.295	84.4	88.0	86.2

STATION, YORK.—THE MUSEUM.

Heights above Ground :—Barometer, 3 feet; Thermometers, 4 feet; Rain-gauge, 1 foot.

B

1903.	Amount of Cloud.			Rainfall.			Weather, No. of Days of						Wind, No. of Observations of										
	9 a.m.	9 p.m.	Mean	Total.	Max.	Day.	Rain.	Snow.	Hail.	Thunder	Clear	Over-	Gale.	N.	N.E.	E.	S.E.	S.	S.W.	W.	NW.	Calm.	
				ins.	ins.																		
Jan.	6.0	7.9	7.0	1.71	.30	5th	20	4	0	0	2	13	0	7	2	4	7	14	15	12	0	1	
Feb.	7.3	7.0	7.2	1.18	.40	21st	14	3	0	0	0	11	3	4	0	1	0	14	15	19	3	0	
Mar.	7.4	4.3	5.9	2.45	.76	17th	13	2	1	1	3	7	0	3	0	1	0	26	14	15	3	0	
April	5.7	5.7	5.7	1.31	.24	27th	15	1	2	1	1	7	0	18	3	9	2	3	4	12	9	0	
May	7.2	6.2	6.7	4.02	.96	9th	15	0	1	2	5	12	0	11	11	9	4	11	7	5	4	0	
June	6.5	5.7	6.1	1.88	.60	13th	11	0	0	1	3	10	0	22	10	7	2	10	0	6	2	1	
July	7.0	6.0	6.5	3.16	.66	11th	18	0	0	1	2	11	1	9	0	1	3	10	4	26	9	0	
Aug.	7.4	5.2	6.3	2.02	.48	17th	17	0	0	1	3	9	0	4	1	3	3	11	11	25	3	1	
Sept.	4.9	5.3	5.1	3.37	1.07	10th	19	0	0	1	7	8	0	8	1	10	5	15	7	8	6	0	
Oct.	6.4	7.5	7.0	6.95	1.30	8th	30	0	0	2	2	13	1	2	0	2	4	25	13	12	4	0	
Nov.	5.2	6.0	5.6	1.41	.25	2nd	17	0	0	0	8	8	0	11	0	0	0	13	3	21	11	1	
Dec.	7.7	7.1	7.4	0.85	.20	7th	18	1	0	0	2	16	0	6	2	11	8	26	7	1	1	0	
Year	6.6	6.2	6.4	30.31	—	—	207	11	4	10	38	125	5	105	30	58	38	178	100	162	55	4	

RIVER HEIGHT RECORDS REGISTERED BY THE AUTOMATIC RECORDER
AT THE GUILDHALL, YORK, 1903.

Date.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.	
	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.
1	6 p.m.	1 4	1 a.m.	2 9	1 a.m.	5 4	1 a.m.	3 3	noon	0 6	noon	0 2
2	12 p.m.	1 9	"	0 11	12 p.m.	2 9	noon	2 8	10 p.m.	1 5	"	0 2
3	"	7 2	2 p.m.	0 10	4 p.m.	6 1	"	2 7	noon	1 5	"	0 1
4	5 a.m.	7 6	6 p.m.	1 7	1 a.m.	6 0	12 p.m.	2 9	12 p.m.	5 3	"	S.L.
5	1 a.m.	6 4	12 p.m.	3 2	5 p.m.	2 8	4 p.m.	2 10	noon	7 6	"	0 1
6	12 p.m.	8 4	3 a.m.	3 6	4 a.m.	2 9	1 a.m.	1 5	12 p.m.	7 4	"	0 1
7	noon	9 0	1 a.m.	2 10	1 a.m.	2 0	noon	1 3	9 a.m.	7 9	"	0 1
8	1 a.m.	8 5	12 p.m.	4 7	6 p.m.	1 0	"	1 2	1 a.m.	7 0	"	S.L.
9	"	4 9	2 p.m.	6 4	1 a.m.	1 4	1 a.m.	1 1	12 p.m.	4 6	"	S.L.
10	11 p.m.	7 2	1 a.m.	6 0	12 p.m.	1 7	noon	0 8	"	9 3	"	S.L.
11	12 p.m.	4 4	"	2 9	6 a.m.	1 8	"	0 8	noon	9 7	"	S.L.
12	"	1 3	"	1 3	1 a.m.	1 3	"	0 7	1 a.m.	9 0	"	S.L.
13	4 p.m.	1 6	noon	1 5	12 p.m.	0 10	"	0 6	"	6 0	"	S.L.
14	"	1 0	"	1 5	"	2 2	"	0 6	"	3 1	"	S.L.
15	1 a.m.	1 4	"	1 4	"	1 5	"	0 6	"	2 10	"	0 1
16	"	1 0	"	1 4	noon	2 6	"	0 6	noon	2 9	"	0 4
17	"	0 9	"	1 5	12 p.m.	1 9	"	0 6	"	2 8	12 p.m.	0 6
18	noon	0 5	"	1 5	3 p.m.	5 7	"	0 5	"	2 8	noon	0 6
19	"	0 3	"	1 5	9 a.m.	5 4	"	0 4	"	2 7	"	0 4
20	12 p.m.	0 8	12 p.m.	2 10	12 p.m.	11 3	"	0 3	"	2 7	6 p.m.	0 4
21	"	0 11	"	6 6	6 p.m.	12 7	"	0 3	"	2 6	noon	S.L.
22	noon	1 0	4 p.m.	9 3	1 a.m.	12 4	"	0 3	"	2 6	1 a.m.	0 2
23	8 p.m.	2 10	"	8 9	"	10 3	"	0 3	"	2 5	noon	S.L.
24	7 p.m.	1 3	1 a.m.	8 0	"	6 0	"	0 2	"	2 4	12 p.m.	0 1
25	8 a.m.	4 0	11 p.m.	7 8	"	3 3	"	0 2	"	2 3	noon	S.L.
26	noon	4 3	noon	7 9	noon	2 10	"	0 1	"	2 3	"	S.L.
27	12 p.m.	9 2	3 p.m.	5 6	"	2 9	"	S.L.	"	2 2	"	S.L.
28	noon	10 0	4 a.m.	7 0	"	2 9	"	S.L.	"	2 2	1 p.m.	0 6
29	1 a.m.	9 0	"	2 9	"	2 9	"	S.L.	4 p.m.	1 1	1 a.m.	0 5
30	"	4 6	"	2 8	"	2 8	"	S.L.	noon	0 3	noon	0 2
31	noon	2 9	"	4 4	"	4 4	"	S.L.	noon	0 3	noon	0 2

RIVER HEIGHT RECORDS.—Continued.

Date	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.	Time.	Above or below S.L. ft. in.
1	noon	0 1	noon	0 8	5 a.m.	1 5	1 a.m.	1 0	1 a.m.	4 0	1 a.m.	1 4
2	"	S.L.	"	0 7	noon	0 6	12 p.m.	1 1	2 a.m.	3 5	12 p.m.	1 0
3	"	S.L.	1 a.m.	0 7	"	6 0	7 a.m.	1 6	5 p.m.	3 4	"	1 3
4	"	S.L.	noon	0 4	1 a.m.	4 4	8 a.m.	2 11	1 a.m.	3 0	10 p.m.	8 6
5	"	below 0	"	0 5	"	0 9	2 p.m.	1 1	"	2 4	12 p.m.	4 5
6	1 a.m.	0 2	"	0 5	noon	0 4	12 p.m.	1 9	"	1 8	10 p.m.	1 6
7	noon	0 3	"	0 5	"	0 5	6 p.m.	8 0	12 p.m.	1 1	8 a.m.	0 8
8	"	0 3	"	0 5	"	0 2	1 a.m.	7 10	noon	1 3	12 p.m.	5 6
9	"	0 3	"	0 5	"	6 6	12 p.m.	10 6	"	1 4	3 p.m.	8 8
10	"	0 3	"	0 5	12 p.m.	2 3	2 p.m.	11 11	6 p.m.	1 1	12 p.m.	6 2
11	"	0 3	"	0 3	10 p.m.	7 9	1 a.m.	11 6	noon	1 1	"	3 5
12	"	0 3	"	0 4	9 p.m.	7 8	12 p.m.	10 1	2 p.m.	1 7	"	2 2
13	"	0 3	"	0 4	1 a.m.	2 8	2 p.m.	10 6	12 p.m.	2 2	5 p.m.	1 3
14	"	S.L.	"	0 3	"	1 0	1 a.m.	10 5	1 a.m.	2 2	12 p.m.	2 5
15	"	S.L.	"	0 3	noon	0 9	"	9 4	12 p.m.	1 1	"	1 7
16	3 p.m.	above 1	6 p.m.	2 0	12 p.m.	0 9	"	9 4	8 a.m.	1 1	7 p.m.	1 1
17	12 p.m.	1 2	noon	2 0	6 p.m.	0 6	"	9 3	1 a.m.	1 5	12 p.m.	1 3
18	6 a.m.	1 2	9 a.m.	1 4	noon	0 4	"	8 3	11 p.m.	1 6	10 p.m.	1 1
19	1 a.m.	1 2	noon	0 10	"	0 3	"	6 9	1 a.m.	1 6	1 a.m.	1 1
20	noon	0 7	"	0 10	"	0 3	"	4 0	noon	1 3	noon	1 0
21	"	S.L.	"	0 9	8 p.m.	0 6	10 p.m.	4 11	"	1 2	1 a.m.	1 0
22	"	S.L.	"	0 9	1 a.m.	0 6	11 a.m.	4 11	"	1 2	noon	0 10
23	"	0 6	"	0 8	6 p.m.	0 2	1 a.m.	4 0	"	1 2	noon	1 0
24	1 a.m.	0 4	1 a.m.	0 7	8 a.m.	0 1	12 p.m.	4 8	"	1 2	8 p.m.	1 1
25	"	0 4	9 a.m.	1 0	"	S.L.	"	2 5	12 p.m.	2 11	noon	1 2
26	12 p.m.	0 2	noon	0 0	"	S.L.	"	3 7	4 a.m.	3 0	"	1 1
27	"	0 3	"	1 1	1 a.m.	0 2	"	5 1	10 p.m.	1 9	"	1 1
28	"	1 0	12 p.m.	1 4	4 a.m.	0 4	2 a.m.	5 2	1 a.m.	1 9	"	1 1
29	1 a.m.	1 6	2 p.m.	4 0	"	0 4	12 p.m.	9 4	12 p.m.	2 3	"	1 1
30	12 p.m.	1 6	7 p.m.	3 2	"	0 1	noon	9 11	11 a.m.	2 10	"	1 0
31	noon	0 7	1 a.m.	2 9	12 p.m.	1 0	1 a.m.	9 10	1 a.m.	2 9	"	0 11
			12 p.m.	1 4	"	0 6	"	6 9	12 p.m.	2 8	12 p.m.	0 8

HOUSE FLOODS FROM RETURNS TO THE CITY SURVEYOR. COMPARATIVE TABLE, 1903.

Date.	Nidd at Pateley Bridge.		Ure at Middleham Bridge.		Swale at Richmond.		Date.	Nidd at Pateley Bridge.		Ure at Middleham Bridge.		Swale at Richmond.	
	Hour.	Height ft. in.	Hour.	Height ft. in.	Hour.	Height ft. in.		Hour.	Height ft. in.	Hour.	Height ft. in.	Hour.	Height ft. in.
Jan. 2							Aug. 14						
" 3							" 16						
" 6							" 20						
" 7							" 27						
" 10							" 28						
" 24							" 29						
" 25							Sept. 2						
" 26							" 3						
" 27							" 9						
" 28							" 11						
Feb. 5							Oct. 3						
" 7							" 7						
" 8							" 8						
" 9							" 9						
" 20							" 11						
" 21							" 12						
" 22							" 13						
" 25							" 15						
" 27							" 23						
Mar. 3							" 26						
" 19							" 28						
" 20							Nov. 24						
" 21							Dec. 3						
April 4							" 4						
May 6							" 8						
" 10							" 9						
July 15							" 9						

YORK—THE MUSEUM.

1903.	Highest Barometer.	Lowest Barometer.
January	30·665 14th, 9 a.m.	28·975 7th, 9 a.m.
February	·562 16th, 9 p.m.	29·017 27th, 9 a.m.
March	·286 8th, 9 p.m.	28·595 2nd, 9 p.m.
April	·407 17th, 9 p.m.	29·336 29th, 9 a.m.
May	·486 23rd, 9 p.m.	·239 4th, 9 p.m.
June	·462 6th, 9 a.m.	·699 16th, 9 a.m.
July	·297 9th, 9 p.m.	29·518 17th, 9 a.m.
August	·152 7th, 9 a.m.	28·973 15th, 9 a.m.
September	·550 15th, 9 a.m.	29·043 10th, 9 p.m.
October	·074 18th, 9 p.m.	28·900 12th, 9 p.m.
November	·629 5th, 9 a.m.	29·085 28th, 9 a.m.
December	30·281 28th, 9 a.m.	29·045 10th, 9 a.m.
Year	30·665 Jan. 14th, 9 a.m.	28·595 Dec. 2nd, 9 p.m.

YORK (BOOTHAM)—SUNSHINE VALUES.

Month.	Total Hours.		Percentages.	
	1903.	1902.	1903.	1902.
January	32·5	13	13	13
February	37·3	14	14	22
March	91·0	25	25	22
April	138·5	33	33	42
May	? 135·8	? 28	? 28	? 30
June	174·7	35	35	35
July	142·3	28	28	32
August	147·7	33	33	30
September	136·3	36	36	35
October	60·6	19	19	18
November	54·1	22	22	17
December	11·7	5	5	7
Year	1162·5	26	26	28

PHILOSOPHICAL SOCIETY FOR YEAR ENDING 31ST DEC., 1903.

Previous Year,

EXPENDITURE.

Cr.

£ s. d. £ s. d. £ s. d.

	Crown Rent								1 0 0
19	Corporation Rent								18 18 2
	<i>Rates and Taxes :</i>								
42	Property Tax and City Rates					45	8	1	
5	Waterworks Company's Rates					6	4	7	
	Gardeners' Licenses					2	5	0	
	Receipt and Cheque Books Stamping					1	13	2	
						<hr/>			55 10 10
	Insurance								7 5 0
	<i>Salaries and Wages :</i>								
	Mr. Platnauer					150	0	0	
	Mr. Fielden					60	0	0	
	Miss Baines					41	12	0	
	Mr. Guy					30	0	0	
	<i>Attendants at Museum and Hospitium, viz. :</i>								
	Attendant at Museum					72	16	0	
	Female Attendant at Museum... ..					31	4	0	
131	Female Attendant at Hospitium					32	10	0	
						<hr/>			136 10 0
123	Gardeners, including temporary labour and extra duty at gates					129	17	0	
						<hr/>			547 19 0
196	*Yorkshire Insurance Company, Annuity								197 6 8
	<i>General Repairs, Additions, and Expenses :</i>								
13	Museum and Hospitium—General Additions, Repairs, and Expenses					13	6	1	
	<i>Estate :</i>								
	Plumbers, Glaziers, Gasfitters, Smiths, &c.					18	12	4	
	Printing and Paperhanging					27	2	11	
	Bricklayers, Masons, &c.... ..					13	12	8	
	Joiners					0	15	6	
17	Repairing Roadway adjoining Blind School, (part cost)					2	10	0	
						<hr/>			62 13 5
	<i>Gardens :</i>								
	General Additions, Repairs, and Expenses					20	19	1	
20	Repairs to Wire Fencing					11	17	0	
						<hr/>			32 16 1
						<hr/>			108 15 7
7	Music and other outdoor entertainments								9 11 0
23	Library—Books and Binding								23 4 0
39	Lectures								63 7 9
6	Painting and Stationery								6 14 11
11	Printing Communications to Members, and Postage of same								11 4 3
44	Printing Reports and Postage thereof								35 17 6
3	Teas at Monthly Meetings... ..								3 9 7
	<i>Gas, Coal, and Coke :</i>								
27	Museums					27	3	8	
14	Gardens					15	19	11	
21	Estate					21	0	10	
						<hr/>			64 4 5
10	Ornithological Department								24 4 1
	<i>Antiquarian Department :</i>								
18	Purchases					20	7	6	
143	Excavations, etc., at St. Mary's Abbey					45	10	0	
						<hr/>			65 17 6
	Visit of Royal Archæological Institute								4 16 11
18	Meteorological Department								16 4 6
	Catalogues								11 13 4
	Preparation of Photographs for sale								1 7 0
8	Sundry Postages								8 14 6
1	Sundries, including Carriage of Parcels								1 6 7
						<hr/>			1288 13 1
2	Excess of Income over Expenditure								3 3 11
						<hr/>			£1291 17 0
	<i>Balance in hands of the Treasurer, 31st December, 1902</i>								
	Excess of Income over Expenditure, 1903								318 8 0
									3 3 11
						<hr/>			£321 11 11

* Annuity of £201 8s. 0d. payable until October, 1914, inclusive, created to repay an advance of £3500 made by the Yorkshire Insurance Co.
Principal repaid 1722 0 11

Previous
Year.

THE TREASURER IN ACCOUNT WITH THE YORKSHIRE

Dr. INCOME.

						£	s.	d.	£	s.	d.
<i>Subscriptions :</i>											
	Town Members	...	...	...	...	642	0	0			
	Country Members	...	...	...	...	12	0	0			
	Temporary Members...	...	...	...	...	2	0	0			
	Lady Subscribers	...	...	...	...	68	10	0			
	Associates	...	...	...	...	15	0	0			
	Arrears received	...	...	...	...	48	15	0			
852	Keys of Gates...	...	...	...	...	65	18	6			
									854	3	6
<i>Donations towards cost of Excavations, &c., at St. Mary's Abbey :</i>											
	Lady Green, the late (per Executors)	...	...	...	...	5	0	0			
	The Society of Antiquaries (2nd Contribution)...	...	...	...	...	5	5	0			
	The Yorkshire Archæological Society	...	...	...	...	10	0	0			
10	Sundry Members, Freeman's Stray Money	...	...	...	...	1	13	0			
									21	18	0
<i>Rents :</i>											
	Major Allenby, St. Mary's Lodge	...	...	...	...	65	0	0			
	Mr. Hill, Marygate Baths	...	...	...	...	40	0	0			
	York Amateur Rowing Club	...	...	...	...	5	0	0			
	York and District Field Naturalists' Society, less £2 paid to Attendant	...	...	...	...	1	0	0			
	York Waterworks Co., for Shed	...	...	...	...	5	0	0			
	Do. for Light	...	...	...	...	0	1	0			
	Corporation of York	...	...	...	...	2	0	0			
	Yorkshire School for the Blind	...	...	...	...	0	1	0			
	National Telephone Co.	...	...	...	...	1	0	0			
	York University Extension Society	...	...	...	...	2	2	0			
119	York Archæological Society, less £2 paid to Attendant	...	...	...	...	1	0	0			
									122	4	0
	Hire of Tent and Tables	...	...	...	...	33	11	5			
13	Less: Expenses of carriage, fixing, repairs, etc.	...	...	...	...	12	7	7			
									21	3	10
	Whitsuntide Admission Fees	...	...	...	...	9	18	11			
8	Less: Attendants and Police	...	...	5	6	0					
	Wood for Barriers and work of fixing	...	...	1	15	8					
									7	1	8
									2	17	3
10	<i>Meteorological Department :</i>										
	Grant from Corporation of York	...	...	...	...				10	0	0
6	Sale of Catalogues	...	...	...	...				5	11	0
2	Sale of Photographs	...	...	...	...				2	0	0
7	Bank Interest	...	...	...	...				7	13	0
212	Gate Money	...	...	...	...				209	3	1
26	Interest on £918 8s. 9d. India 3% Stock, less Income Tax	...	...	...	...				26	1	4
	Sale of Tickets for Sir Benjamin Baker's lecture	...	...	...	...				9	2	0

£1291 17 0

318 Balance in hands of the Treasurer, 31st December, 1903

321 11 11

£321 11 11

Examined and found correct,

PHILIP L. NEWMAN.

THE TREASURER'S ACCOUNT IN CONNECTION WITH THE FUND FOUNDED BY THE LATE
WM. REED, ESQ., FOR SPECIFIC PURPOSES.

Dr.	INCOME.	£ s. d.	EXPENDITURE.	Cr. £ s. d.
Interest on £600 York Corporation 3% Redeemable Stock, less Income Tax		17 0 6	Books and Binding	18 5 8
Interest on £50 placed on deposit at York City and County Bank		1 5 2		
		£18 5 8		£18 5 8

24

BALANCE SHEET.

	£ s. d.	£ s. d.
Amount of Fund on 31st December, 1903	687 19 2	
Amount invested in York Corporation 3 per cent. Redeemable Stock		600 0 0
Amount placed on deposit at York City and County Bank		50 0 0
Cash at Bankers in General Account		37 19 2
		£687 19 2

£687 19 2

NEW MEMBERS, 1903.

- Anelay, Thos., 6, *Bootham Crescent*.
 Appleton, T. H., 15, *Bootham Terrace*.
 Carson, John, *De Grey Rooms*.
 Dickenson, J. Y., 1, *Bootham*.
 Dodgson, Walter, 14, *Priory Street*.
 Dunsford, G. E., 15, *Sycamore Terrace*.
 Ellison, C. H., 13, *Queen Anne's Road*.
 Gawthrop, Christopher, 5, *Scarbro' Villas*.
 Goode, H. Norman, 8, *S. Leonard's*.
 Gramshaw, F. S., M.D. *S. Leonard's*.
 Grieve, John Coleman, 76, *Bootham*.
 Harding, W. E., *Wigginton Road*.
 Hickman, Mrs., *Coney Street*.
 Holgate, Archibald, "*Hazeldene*," *Marygate*.
 Hutchinson, Rev. R. O., *Marygate*.
 Lambert, C. A., 50, *Queen Anne's Road*.
 Lambert, R. B., 33, *Portland Street*.
 Longden, Alfred, 1, *Queen Anne's Road*.
 Mills, Mrs., 3, *Marlborough Villas*.
 Monkhouse, Miss, 11, *Bootham Terrace*.
 Oman, G. F. W., 38, *Petergate*.
 Pearson, W. A., 19, *Bootham Crescent*.
 Richardson, Wm., 13, *Bootham Crescent*.
 Robertson, Mrs., 23, *Sycamore Terrace*.
 Short, Miss, 75, *Bootham*.
 Storey, Thos., 8, *Queen Anne's Road*.
 Thompson, F. C., 4, *Edinbro' Terrace, Acomb*.
 Wightman, T. P., 16, *Micklegate*.
 York County Hospital.

TEMPORARY MEMBER.

Bedwell, Frank

NEW LADY SUBSCRIBERS.

Baker, Miss, 1, *Friargate*.
Cattley, Miss, 4, *Bootham Terrace*.
Chapman, Miss Annie, *Lendal*.
Iles, Mrs., 23, *Coney Street*.
Mawson, Miss, 48, *Monkgate*.
Newton, Mrs. C. E., *Hetherton Street*.

NEW ASSOCIATES.

Jack, E. M., 1, *Grosvenor Terrace*.
Melrose, John, *Acomb*.
Nelson, C. E., 14, *Queen Anne's Road*.



DONATIONS TO MUSEUM AND LIBRARY.

LIBRARY.

BOOKS PRESENTED.	DONOR.
The Quarterly Journal of the Geological Society of London, Vol. lix., 1903.	The Society.
The Report of the British Association for the Advancement of Science, 1902, Belfast.	The Association.
Proceedings of the Zoological Society of London, Vol. ii., Part 1.	The Society.
Reports of the United States Geological Survey, 22nd Report, Parts 1, 2, 3, 4, and 23rd Report.	The Survey.
Catalogue of Madreporaria, Vol. iv.; Hand List of Birds, vol. iv.; Catalogue of the Lepidoptera Phalænæ, vol. iv. and plates; and 1st Report on Economic Zoology.	The Trustees of the British Museum.
Annual Reports of the Smithsonian Institution for 1900-01 and 1901. 19th Annual Report of the Bureau of American Ethnology, 1897-1898, and Bulletins, 27 and 27.	The Institution.

- Memoirs of the Geological Survey of India, "Palæontologia Indica," Series 9., Vol. iii., Part 2; Memoirs, Vol. xxxii., Part 3; Vol. xxxiii., Part 3; Vol. xxxiv., Parts 2, 3; Vol. xxxv., Parts 1, 2. General Report for 1902-3, and Contents and Index of Vols. xxi.-xxx. } The Indian Survey.
- Report of the Eruptions of the Soufrière, &c. Part 1, by Tempest Anderson, M.D., and J. S. Flett. } Dr. Anderson.
- Volcanic Studies, by Tempest Anderson, M.D. } Dr. Anderson.
- An Account of the Crustacea of Norway, Vol. iv., Parts 11-14, by G. O. Sars. } The Author.
- Memoirs of the Russian Geological Society, Vol. xvi., Parts 1-2; Vol. xvii., Part 3; Vol. xx., Part 1. Nouvelle Serie, Livraison, 1, 2, 4, and Bulletins, Vol. xxi, Nos. 5-10. } The Society.
- Proceedings of the Imperial Mineralogical Society of Russia for 1903. } The Society.
- Transactions and Proceedings of the Royal Society of Edinburgh for 1901-2. } The Society.
- Memoirs of the Geological Survey of the United Kingdom, The Cretaceous Rocks of Britain, Vol. ii. } H.M. Government.
- Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Vol. xlvi., Parts 2-6; Vol. xlvi., Part 1. } The Society.

- The Proceedings of the Royal Institution of Great Britain, Vol. xvii., Part 1, No. 96. } The Institution.
- Transactions of the Leicester Literary and Philosophical Society, Vol. vii., Parts 3-4. } The Society.
- Bulletin of the American Geographical Society, Vol. xxxv., Nos. 1, 2, 3, 4, 5. } The Society.
- Proceedings of the Smithsonian Institution for 1899, and Prehistoric Rock Engravings of the Italian Alps. } Dr. Auden.
- The Transactions of the Northumberland, Durham, and Newcastle-upon-Tyne Natural History Society, Vol. xii., Part 2; Vol. xiv., Parts 1-2. } The Society.
- Proceedings of the Geologists' Association, Vol. xiii., Part 3. } The Association.
- Transactions of the Edinburgh Geological Society, Vol. viii., Part 2, and Special Part. } The Society.
- Journal of the Manchester Geographical Society, Vol. xviii., Nos. 4-12; Vol. xix., Nos. 1-3. } The Society.
- Transactions of the Burton-upon-Trent Natural History and Archæological Society, Vol. v., Part 1. } The Society.
- The 14th Report of the Missouri Botanical Garden, 1903. } The Council.
- Transactions and Proceedings of the Perthshire Society of Natural Science, Vol. iii., Part 5. } The Society.
- Transactions of the Yorkshire Naturalists' Union, Parts 28-29. } The Union.

- Memoirs of the Geological Survey of
New South Wales, No. 3; and
Annual Report of the Department
of Mines for the year 1902. } The Survey.
- Transactions of the Natural History
Society of Glasgow, Vol. vi., Parts
1, 2, 3. } The Society.
- The Bulletin of the Geological Institu-
tion of the University of Upsala,
Vol. v., Part 2, No. 10. } The Institution.
- The Proceedings and Transactions
of the Nova Scotian Institute of
Science, Vol. x., Parts 3-4. }
- Proceedings of the Bath Natural
History and Antiquarian Field Club,
Vol. x., No. 2. } The Club.
- Catalogue of the Collection of London
Antiquities in the Guildhall Museum } The Corporation of
London.
- Annals of the New York Academy of
Sciences, Vol. xv., Part 1. } The Academy.
- Journal of the Northants Natural
History Society, Nos. 89-92. } The Society.
- Proceedings of the Rochester Academy
of Science, 1902-3. } The Academy.
- Bergen Museums Aarbog for 1902-3. } The Council.
- Verhandlungen der Naturforschenden
Gesellschaft in Basel, Vol. xv. } The Society.
- Annalen des K. K. Naturhistorischen
Hofmuseums für, 1902. } The Society.
- Annals of the National Museum of
Montevideo, Vol. ii. } The Council.
- Bulletin of the University of Kansas,
Vol. iii., No. 6-8, } The University.

- Bulletin from the Laboratories of
Natural History of the State Uni-
versity of Iowa, Vol. v., No. 3. } The University.
- Fabric Rolls of York Minster, by John
Browne. } Mr. F. H. Rowntree.
- University of Toronto Studies, Vol. ii.,
Nos. 1, 2, 3, 4. } The University.
- Mitteilungen des Vereins für Erdkunde
zu Leipzig for 1892. } The Society.
- The Geological Survey of Canada,
Vol. i., Mesozoic Fossils. } The Survey.
- Symon's Monthly Meteorological
Magazine. } Mr. G. Crawhall.
- Bulletin of the Geological Institute of
Mexico, No. 16. } The Institute.
- The Bulletin of the University of
Montana, No. 10. } The University.
- A fossiliferous band at the top of the
Lower Greensand, near Leighton
Buzzard, by G. W. Lamplugh and
J. F. Walker. } The Authors.
- The 11th and 12th Annual Directory
of the Scientific Alliance of New
York for 1903. } The Society.
- Bulletin of the Lloyd Library, No. 6,
Series 3. } The Library.
- Bulletin du Jardin botanique de L'Etat,
Brussels, Vol. i. No. 4. } The Society.
- Augustina Library Publications, No. 3. } The Library.
- Transactions of the Hull Scientific and
Field Naturalists' Club, Vol. ii. and
Vol. iii., No. 1, and Hull Museum
Publication, No. 16. } Mr. T. Shepherd.
- The Publications of the Manchester
Museum, Owen's College, No. 41-48. } The Museum.
- The First Annual Report of the Horni-
man Museum. } The Council.
- Meteorological Observations at Stations
of the 2nd Order for 1899, and
Weekly Weather Reports for 1903. } The Meteorological
Society.

GEOLOGICAL DEPARTMENT.

A Series of Carboniferous Fossils. Miss Elsley.

MINERALOGY,

A Piece of Amber containing Insects. Capt. Walker.

A Series of Minerals, chiefly from }
Vesuvius. } Miss Elsley.

ANTIQUITIES.

A Carved Block of Black Marble and }
and Two Old Wrought Iron Gates. } Mr. S. Scruton.

Facsimile of the Solemn League and }
Covenant. } Miss Kirby.

Silver Coins of Elizabeth. Mr. P. Crawhall.

Samples of Old Matches, date 1845. Mr. T. P. Cooper.

Two Old Oak Carved Bosses. Mr. Alec. Rose.

Six Worked Flints from Madras. Mr. Seton Karr.

A Collection of Ethnological Specimens }
from New Guinea. } Mr. E. Lansdown.

ZOOLOGY AND COMPARATIVE ANATOMY.

Skin of Cobra, Clutch of Eggs of Grebe. Mr. C. E. Elmhirst.

A Cream-coloured Rook, mounted. Mr. A. St. C. Carnegy.

An Adult Mute Swan, mounted. Mr. E. Allen.

APPARATUS.

An Instrument for Measuring Specific }
Gravity. } Mr. W. M. Thompson.

CATALOGUE OF BRITISH PLANTS IN THE HERBARIUM

OF THE

YORKSHIRE PHILOSOPHICAL SOCIETY,

PART X.

COMPILED BY HENRY J. WILKINSON, HON. CURATOR, BOTANY.

COMPOSITÆ.

	DATE.	COLLECTOR.	HERBARIUM.
607. Eupatorium cannabinum, Linn.			
<i>Banks of rivers and streams, from Sutherland to Channel Islands.</i>			
<i>Distrib.</i> Europe, N.&W. Asia, N. Africa.			
<i>Sp.</i> Knaresborough, Yorks.	1790	J. Dalton	Rev. J. Dalton
Whalley, Lanes.	1807	S. Hailstone	S. Hailstone
Castle Howard, N. Yorks.	1820	W. Middleton	W. Middleton
Kirkham, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
608. Solidago Virgaurea, Linn.			
<i>Rocky banks, from Sutherland to Channel Islands.</i>			
<i>Distrib.</i> Europe (Arctic), N. Asia, N. America.			
<i>Sp.</i> Near Bradford, Yorks.	1799	S. Hailstone	S. Hailstone
Thorparch ,,	1830	„	„
Ingleborough ,,	1806	J. Dalton	Rev. J. Dalton
Coneysthorpe Bank, N. Yorks.	1796	R. Teesdale	„

	DATE.	COLLECTOR.	HERBARIUM.
609. <i>Bellis perennis</i>, Linn.			
<i>Pastures and meadows, &c., from Shetland to Channel Islands.</i>			
<i>Distrib.</i> Europe (exclusive N. Russia).			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson
610. <i>Aster tripolium</i>, Linn.			
<i>Salt marshes, &c., from Sutherland to Channel Islands.</i>			
<i>Distrib.</i> Europe (Arctic), N. & W. Asia.			
<i>Sp.</i> Coatham, N.E. Yorks.	1799	S. Hailstone	S. Hailstone
Blackpool, Lancs.	1801	"	"
Yarmouth, Norfolk	1843	"	"
Llanfaglan, Carnarvon	1801	"	"
Whitby, N.E. Yorks.	1820	W. Middleton	W. Middleton
Bristol, Glos.	1826	"	"
Coatham, N.E. Yorks.	1820	J. Dalton	Rev. J. Dalton
Skeffling, S.E. ,,	1893	H. J. Wilkinson	H. J. Wilkinson
611. <i>Aster Linosyris</i>, Bernh.			
<i>Limestone cliffs, N. Somerset to Carnarvon.</i>			
<i>Distrib.</i> From Ba'tic, southwards, and N. Africa.			
<i>Sp.</i> Devonshire	(1830)	Dr. Emerson	S. Hailstone
North Wales	(1830)	G. A. Walker-Arnott	"
612. <i>Erigeron canadense</i>, Linn. <i>Alien.</i>			
<i>Waste places. Introd. from America.</i>			
<i>Sp.</i> A little below the bridge, Neath, Glamorgans.	1808	W. Middleton	W. Middleton
613. <i>Erigeron acre</i>, Linn.			
<i>Dry banks, &c. Forfar to Channel Islands.</i>			
<i>Distrib.</i> Europe (Arctic), N. Asia.			
<i>Sp.</i> Bramham, Yorks.	1801	S. Hailstone	S. Hailstone
Heslington Fields, York	1801	"	"
Bootle, Lancs.	1801	"	"
Dullingham, Cambs.	1843	"	"
Knaresborough, Yorks.	1790	J. Dalton	Rev. J. Dalton
Malton & Grimston, Yorks.	1837	R. Spruce	H. J. Wilkinson
Micklefield, Yorks.	1883	H. J. Wilkinson	"

	DATE.	COLLECTOR.	HERBARIUM.
614. Erigeron alpinum, Linn. <i>Alpine rocks. Clova Mts., &c.</i> <i>Distrib.</i> Alps & Arctic regions, Europe, Asia, &c.			
<i>Sp.</i> Canlochen, Glen, Scotland	1848	J. Backhouse, Jr.	S. Hailstone
Clova Mts., Forfars.... ..	1809	J. Dalton	Rev. J. Dalton
Glen Isla ,,	1833	Dr. Balfour	S. Hailstone
615. Filago germanica, Linn. <i>Dry pastures and banks. Ross to Channel Islands.</i> <i>Distrib.</i> Gothland, southwards, N. & W. Asia.			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Heslington ,,	1806	W. Middleton	W. Middleton
Esher, Surrey	1848	H. C. Watson	S. Hailstone
Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
616. Filago spathulata, Presl. <i>Dry Places. Lincoln, Dorset, Kent, &c.</i>			
<i>Sp.</i> Walton, Surrey	1848	H. C. Watson	S. Hailstone
617. Filago minima, Fries. <i>Dry sandy places. Ross to Channel Islands.</i> <i>Distrib.</i> Europe, N. Africa, N. Asia.			
<i>Sp.</i> Ulverstone, Lancs.	1804	S. Hailstone	S. Hailstone
Baildon Moor, Yorks... ..	1810	„	„
Trumpington, Cambs.	1839	„	„
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
618. Filago gallica, Linn. <i>Alien.</i> <i>Sandy fields. Essex, &c.</i> <i>Distrib.</i> Denmark, southw'ds, N. Africa.			
<i>Sp.</i> Cornfields, Berechurch, Essex	1849	E. G. Varenne	S. Hailstone
619. Antennaria margaritacea, Br. Alien. <i>Moist meadows, &c.</i> <i>Distrib.</i> N. America.			
<i>Sp.</i> From the side of the river Rumney, 1½ mile from Caerphilly Castle, Glamorgans.	1808	W. Middleton	W. Middleton
Swanson, Glamorgans.	1820	J. Dalton	Rev. J. Dalton
Fields, near Shipton, Yorks.... ..	1840	J. Tatham	Walker

620. Antennaria dioica, R.Br.

Heaths and pastures, from Shetland to Channel Islands.

Distrib. Europe, N. Asia, N. America.

Sp. Plentifully on the hills near Hebden Bridge, Yorks.

Thorparch ,,

Near Tadcaster, Yorks.

Windermere

Widdy Bank, Durham

Cronkley Fell, Yorks.

DATE.

COLLECTOR.

HERBARIUM.

1800

S. Hailstone

S. Hailstone

1848

,,

,,

1840

O. A. Moore

Moore

1806

J. Dalton

Rev. J. Dalton

1883

H. J. Wilkinson

H. J. Wilkinson

1883

,,

,,

621. Gnaphalium uliginosum, Linn.

Wet sandy places. Shetland to Channel Islands.

Distrib. Europe (Arctic), N. America.

Sp. Hastings, Sussex

Langwith, S.E. Yorks.

Copgrove, Yorks.

1834

S. Hailstone

S. Hailstone

1883

H. J. Wilkinson

H. J. Wilkinson

1790

J. Dalton

Rev. J. Dalton

622. Gnaphalium luteo-album, Linn. Alien.

Light sandy fields. Norfolk to Sussex.

Sp. Guernsey

1859

A. M. Norman

H. J. Wilkinson

623. Gnaphalium sylvaticum, Linn.

Woods, heaths, and pastures, from Shetland to Channel Islands.

Distrib. Europe (Arctic), N. & W. Asia.

Sp. Tarn Lane, Giggleswick, Yorks.

Near Melrose, Roxburghs.

Copgrove, Yorks.

Braemar, Aberdeens.... ..

Riccall, S.E. Yorks.

1820

S. Hailstone

S. Hailstone

1829

,,

,,

1790

J. Dalton

Rev. J. Dalton

1842

J. H. Balfour

Walker

1883

H. J. Wilkinson

H. J. Wilkinson

624. Gnaphalium supinum, Linn.

Alpine and sub-alpine rocks. Scotland.

Distrib. Europe, N. America, &c.

Sp. Ben Lawers, Perthshire.... ..

Ben Lawers ,,

Ben Lomond, Sterlings.

Clova Mts., Forfars.

1809

W. J. Hooker

Rev. J. Dalton

1810

J. Dalton

,,

1829

S. Hailstone

S. Hailstone

1842

J. H. Balfour

Walker

625. Inula Helenium, Linn.*Alien.**Moist hilly pastures and river banks.
Ross to Channel Islands.*

	DATE.	COLLECTOR.	HERBARIUM.
<i>Sp.</i> Furness Abbey, Lanes.	1804	S. Hailstone	S. Hailstone
Aber, N. Wales	1808	"	"
Mowthorpe, Castle Howard, Yorks. ...	1883	H. J. Wilkinson	H. J. Wilkinson

626. Inula conyza, D.C.*On calcareous soil. Westmoreland to
Channel Islands.**Distrib.* 'Denmark,' southwards, W. Asia.

<i>Sp.</i> Between Lytham & Blackpool, Lanes.	1808	S. Hailstone	S. Hailstone
Carnarvon, N. Wales	1808	"	"
Arundel Castle, Sussex	(1800)	W. Middleton	W. Middleton
Snailwell, Cambs.	1830	J. Dalton	Rev. J. Dalton
Huddleston Quarry, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

627. Inula crithmoides, Linn.*Maritime marshes and rocks. Essex
to Cornwall.**Distrib.* W. Coast from Belgium, south-
wards.

<i>Sp.</i> Rocks in Kilkenny Bay, Ireland ...	1831	J. Howson	S. Hailstone
Isle of Wight... ..	1826	J. Dalton	Rev. J. Dalton
Isle of Portland	1884	E. M. Holmes	H. J. Wilkinson

**628. Pulicaria dysenterica,
Gærtn.***Moist places. Haddington to Channel
Islands.**Distrib.* Denmark, southw'ds, N. Africa.

<i>Sp.</i> Coatham, N.E. Yorks.	1799	S. Hailstone	S. Hailstone
Blackpool, Lanes.	1799	"	"
Clifton, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

629. Pulicaria vulgaris, Gærtn.*Moist sandy places. Wales, Norfolk,
and Cornwall.**Distrib.* Gothland, southw'ds, N. Africa,
N. & W. Asia.

<i>Sp.</i> Southampton, Hants.	1840	S. Hailstone, Jr.	S. Hailstone
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630. Bidens cernua, Linn.

Watery places, from Dumbarton, southwards.

Distrib. Europe, N. and W. Asia, N. America.

	DATE.	COLLECTOR.	HERBARIUM.
<i>Sp.</i> Ripon, Yorks... ..	1790	J. Dalton	Rev. J. Dalton
Milnthorpe Marshes, Westmoreland...	1804	S. Hailstone	S. Hailstone
Coatham, N.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

631. Bidens tripartita, Linn.

Riversides and moist places. Elgin, southwards.

Distrib. Europe (Arctic), N. Africa.

<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Borobridge ,,	1799	S. Hailstone	S. Hailstone
Skipwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

632. Achillea millefolium, Linn.

Pastures, &c. Shetland to Channel Islands.

Distrib. Europe (Arctic), N. & W. Asia.

<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Thorparch ,,	1830	S. Hailstone	S. Hailstone
Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson

633. Achillea ptarmica, Linn.

Meadows, &c. Shetland, southwards.

Distrib. Europe, Asia Minor, &c.

<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson

634. Diotis maritima, Cass.

Sandy shores. Suffolk, Kent, & Cornwall.

Distrib. Shores of Mediterranean, &c.

<i>Sp.</i> Dunwich, Suffolk	(1800)	D. Turner	Rev. J. Dalton
Dunwich ,,	1830	Prof. Henslow	,,
Dunwich ,,	1846	H. Ibbotson	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
635. Anthemis tinctoria, Linn. <i>Alien.</i>			
In a lane leading out of the public road in Gorleston, Suffolk, nearly opposite to the bridge. (Introduced by Dawson Turner)	(1830)	S. Hailstone	S. Hailstone
Near Ripon, Yorks.	(1800)	W. Brunton	Rev. J. Dalton
636. Anthemis cotula, Linn. <i>Colonist.</i>			
<i>Cultivated fields, &c.</i>			
<i>Distrib.</i> Europe, N. & W. Asia, &c.			
<i>Sp.</i> Knaresborough, Yorks.	1791	J. Dalton	Rev. J. Dalton
Skipwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
637. Anthemis arvensis, Linn. <i>Colonist.</i>			
<i>Fields and waste places.</i>			
<i>Distrib.</i> Europe, N. Africa, W. Asia.			
<i>Sp.</i> Hastings, Sussex	(1840)	Dr. Bromfield	S. Hailstone
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
638. Anthemis nobilis, Linn. <i>A Casual.</i>			
<i>Pastures and dry soils.</i>			
<i>Sp.</i> Adrigole, co. Cork	1894	R. A. Phillips	H. J. Wilkinson
Sankey Green, Warrington, Lanes. ...	1830	J. Dalton	Rev. J. Dalton
639. Chrysanthemum segetum, Linn. <i>Colonist.</i>			
<i>Fields and waste places.</i>			
<i>Sp.</i> Cornfields, Bingley & Keighley, Yorks.	1806	S. Hailstone	S. Hailstone
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Skipwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
640. Chrysanthemum Leucanthemum, Linn.			
<i>Meadows, &c. Shetland to Channel Islands.</i>			
<i>Distrib.</i> Europe (Arctic), N. & W. Asia.			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
641. Chrysanthemum parthenium, Pers.			
<i>A. Denizen.</i>			
<i>Hedge banks, &c.</i>			
<i>Sp.</i> Ripon, Yorks.	1790	J. Dalton	Rev. J. Dalton
Thorparch ,,	1830	S. Hailstone	S. Hailstone
642. Matricaria inodora, Linn.			
<i>Fields, &c., from Shetland to Channel Islands.</i>			
<i>Distrib. Europe (Arctic), N. & W. Asia.</i>			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Riccall, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
<i>(Var. Salina, Bob.)</i>			
<i>Sp.</i> Flamborough, Yorks.... ..	1798	R. Teesdale	Rev. J. Dalton
Between Whitburn & Shields, Durham	1806	J. Dalton	„
Bootle, Lancs.	1799	S. Hailstone	S. Hailstone
Sussex coast	1810	W. Middleton	W. Middleton
643. Matricaria Chamomilla, Linn. Colonist.			
<i>Cultivated fields.</i>			
<i>Sp.</i> Knaresborough, Yorks.	1791	J. Dalton	Rev. J. Dalton
Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
644. Tanacetum vulgare, Linn.			
<i>Waste places, &c., from Shetland to Channel Islands.</i>			
<i>Distrib. Europe (Arctic), N.W. America.</i>			
<i>Sp.</i> Pool, near Otley, Yorks.	1807	S. Hailstone	S. Hailstone
Knottingley, Yorks.	1807	„	„
Copgrove ,,	1790	J. Dalton	Rev. J. Dalton
Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson
645. Artemesia absinthium, Linn.			
<i>Waste places, &c., from Shetland to Channel Islands.</i>			
<i>Distrib. Europe, N. Africa, N. and W. Asia.</i>			
<i>Sp.</i> Aber, N. Wales	1808	S. Hailstone	S. Hailstone
Near Boroughbridge, Yorks.... ..	1790	J. Dalton	Rev. J. Dalton
Knaresborough ,,	1900	H. Fisher	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
646. <i>Artemesia vulgaris</i>, Linn. <i>Hedge banks, &c., from Shetland to Channel Islands.</i> <i>Distrib.</i> Europe (Arctic), N. Africa, N. & W. Asia.			
<i>Sp.</i> Gargrave, near Skipton, Yorks. ...	1800	S. Hailstone	S. Hailstone
Aber, N. Wales	1808	„	„
Burgh Castle, Yarmouth	1843	„	„
Clifton Ings, York.	1883	H. J. Wilkinson	H. J. Wilkinson
647. <i>Artemesia campestris</i>, Linn. <i>Sandy heaths, &c. Norfolk & Suffolk.</i> <i>Distrib.</i> Europe, temporary Asia.			
<i>Sp.</i> Icklingham, Suffolk	(1800)	Sir T. Cullum	Rev. J. Dalton
Thetford	1800	J. Dalton	„
Brandon, Suffolk	1845	B. D. Wardale	S. Hailstone
648. <i>Artemesia maritima</i>, Linn. <i>Salt marshes and ditches. Aberdeen to Channel Islands.</i> <i>Distrib.</i> Coasts of Europe, &c.			
<i>Sp.</i> Coatham, N.E. Yorks.	1800	S. Hailstone	S. Hailstone
Hartlepool, Durham	1820	J. Backhouse	„
Yarmouth, Norfolk	1800	J. Dalton	Rev. J. Dalton
Skeffling, S E. Yorks.	1893	H. J. Wilkinson	H. J. Wilkinson
649. <i>Tussilago Farfara</i>, Linn. <i>Moist clayey banks, from Shetland to Channel Islands.</i> <i>Distrib.</i> Europe (Arctic), N. Africa, &c.			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson
650. <i>Petasites fragrans</i>, Presl. <i>Sp.</i> Naturalized at Edinburgh	1830	J. Dalton	Rev. J. Dalton
651. <i>Petasites vulgaris</i>, Desf. <i>River banks, roadsides, &c. Cornwall to Shetland,</i> <i>Distrib.</i> Europe, N. Africa, N. and W. Asia.			
<i>Sp.</i> Near Tanfield, Yorks.	1791	J. Dalton	Rev. J. Dalton
Banks of the Ure, Ripon, Yorks. ...	(1800)	W. Brunton	S. Hailstone
Clifton Ings, York.	1883	H. J. Wilkinson	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
652. Doronicum Pardalianches, Linn. <i>Naturalized in plantations.</i> Sp. Harrogate, Yorks.	1810	J. Dalton	Rev. J. Dalton
653. Senecio vulgaris, Linn. <i>Wasic places. Shetland to Channel Islands.</i> <i>Distrib. Europe (Arctic), N. Africa.</i> Sp. Poppleton, Yorks. Copgrove ,,	1883 1790	H. J. Wilkinson J. Dalton	H. J. Wilkinson Rev. J. Dalton
654. Senecio sylvaticus, Linn. <i>Dry banks and pastures. Orkney to Channel Islands.</i> <i>Distrib. Europe, Siberia.</i> Sp. Wakefield, Yorks. Bottisham, Cambs. Near Manchester, Lancs. Skipwith, S.E. Yorks. (<i>Var. lividus, Sm.</i>) Sneaton, N.E. Yorks.	1800 1845 1840 1883 1812	S. Hailstone ,, S. Gibson H. J. Wilkinson W. Middleton	S. Hailstone ,, Walker H. J. Wilkinson W. Middleton
655. Senecio viscosus, Linn. <i>Waste ground, &c., from Dumbarton to Kent, &c.</i> <i>Distrib. Europe, Asia Minor.</i> Sp. Between South Shields & Sunderland, Durham Seaton Carew, Durham Yarmouth. (Introduced by Dawson Turner) Pilmcor, Yorks.	(1800) 1824 1843 1891	Mr. Robson J. Backhouse S. Hailstone W. Foggitt	S. Hailstone ,, ,, H. J. Wilkinson
656. Senecio squalidus, Linn. <i>Naturalized on old walls.</i> Sp. Walls of Christ Church College, Oxford Oxford Garden walls opposite the bridge in Gorleston, Suffolk. (Introduced by Dawson Turner)	1800 (1800) 1843	W. Middleton Sir J. E. Smith S. Hailstone	W. Middleton Rev. J. Dalton S. Hailstone

	DATE.	COLLECTOR.	HERBARIUM.
657. Senecio erucifolius, Linn. <i>Roadsides and banks. Lanark, southwards.</i> <i>Distrib.</i> Gothland, southwards, N. Asia.			
<i>Sp.</i> In a lane leading from Bierley to Low Moor, Yorks.	1806	S. Hailstone	S. Hailstone
Bottisham, Cambs.	1843	„	„
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Skipwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
658. Senecio Jacobæa, Linn. <i>Roadsides, &c. Shetland to Channel Islands.</i> <i>Distrib.</i> Europe, N. & W. Asia.			
<i>Sp.</i> Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
659. Senecio aquaticus, Huds. <i>Riversides, ditches, &c. Shetland to Channel Islands.</i> <i>Distrib.</i> Europe, N. Africa, Siberia.			
<i>Sp.</i> Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
660. Senecio saracenicus, Linn. <i>Naturalized by riversides, &c.</i>			
<i>Sp.</i> Ingleton, Yorks. (gathered in the same place as mentioned by Sowerby) ...	(1830)	J. Tatham	S. Hailstone
About Bierley, Yorks. (probably an escape from Dr. Richardson's garden)	(1830)	S. Hailstone	„
661. Senecio paludosus, Linn. <i>Fens in Eastern counties of England.</i> <i>Distrib.</i> Gothland, southwards:			
<i>Sp.</i> Lakenheath Fen, Suffolk	(1800)	J. Dalton	Rev. J. Dalton
Wicken Fen, Cambs.	(1800)	Rev. J. Holme	H. J. Wilkinson
662. Senecio palustris, D.C. <i>Fens in Eastern counties of England.</i> <i>Distrib.</i> Gothland, France, N. Asia.			
<i>Sp.</i> Near Wangford, Suffolk	(1800)	J. Dalton	Rev. J. Dalton

	DATE.	COLLECTOR.	HERBARIUM.
663. Senecio campestris, D.C.			
<i>Chalk downs, &c. Yorks., Cambs., and Dorset.</i>			
<i>Distrib.</i> Europe (Arctic), to France & Italy, N. America, and N. Asia.			
<i>Sp.</i> Devil's Ditch, near the gap upon Newmarket Heath, and abundantly on the Devil's Ditch, near Stetchworth, Cambs.	1845	S. Hailstone	S. Hailstone
Icklingham Heath, Suffolk	1803	J. Dalton	Rev. J. Dalton
Devil's Ditch, Cambs... ..	1786	Relhan	„
Ancaster, Lincs.	1886	H. Fisher	H. J. Wilkinson
664. Carlina vulgaris, Linn.			
<i>Dry fields and sandy places. Arran, southwards.</i>			
<i>Distrib.</i> Europe, N. Africa, N. & W. Asia.			
<i>Sp.</i> Coatham, N.E. Yorks.	1799	S. Hailstone	S. Hailstone
Blackpool, Lancs.	1801	„	„
Between Clapham & Ingleton, Yorks.	1804	„	„
Micklefield, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
665. Arctium majus, Schk.			
<i>Waste places. Yorkshire, southwards.</i>			
<i>Distrib.</i> Europe, N. & W. Asia.			
<i>Sp.</i> Castle Howard, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
666. Arctium minus, Schk.			
<i>Waste places. Orkney to Cornwall.</i>			
<i>Distrib.</i> Europe, &c.			
<i>Sp.</i> Coatham, Redcar, N.E. Yorks.	1826	S. Hailstone	S. Hailstone
Castle Howard, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
667. Arctium intermedium, Lange.			
<i>Waste places. Yorkshire to Cornwall.</i>			
<i>(A. pubens, Bab.)</i>			
<i>Sp.</i> Halnaby, N. Yorks.	1861	J. G. Baker	H. J. Wilkinson

668. Carduus pycnocephalus, Jacq.

Waste sandy places by the sea, from Forfar, southwards.

Distrib. Europe, from Denmark, southwards.

<i>Sp.</i> Saltburn, N.E. Yorks.	1807	S. Hailstone	S. Hailstone
Hastings, Sussex	1834	"	"
Redcar, N.E. Yorks.... ..	1800	J. Dalton	Rev. J. Dalton

(*Sub-nom C. tenuiflorus, Curt.*)

669. Carduus nutans, Linn.

Waste places, from Elgin to Channel Islands.

Distrib. Europe, N. Africa, N. & W. Asia.

<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Borobridge ,,	1813	S. Hailstone	S. Hailstone
Westow, S.E. Yorks... ..	1883	H. J. Wilkinson	H. J. Wilkinson

670. Carduus crispus, Linn.

Hedge banks, &c., from Ross to Channel Islands.

Distrib. Europe (Arctic), N. Asia.

<i>Sp.</i> Bridlington, Yorks.	1820	S. Hailstone	S. Hailstone
Skipton ,,	1839	"	"
Knarborough' ,,	1900	H. Fisher	H. J. Wilkinson

671. Cnicus lanceolatus, Hoffm.

Waste places. Shetland to Channel Islands.

Distrib. Europe, N. Africa.

<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

672. Cnicus eriophorus, Hoffm.

Waste dry places. Durham to Kent.

Distrib. Holland, southwards.

<i>Sp.</i> Copgrove, Yorks.	1791	J. Dalton	Rev. J. Dalton
On the road from Burlington to Kilham Yorks.	1820	S. Hailstone	S. Hailstone
Cayton, Scarborough', Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
673. Cnicus palustris, Hoffm.			
<i>Ditches, wet meadows, &c. Shetland to Channel Islands.</i>			
<i>Distrib.</i> Europe (Arctic), Siberia.			
<i>Sp.</i> Oglethorp Meadow, Boston Spa, Yorks.	1820	S. Hailstone	S. Hailstone
Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
674. Cnicus pratensis, Willd.			
<i>Wet meadows, &c. Yorks., N. Wales, southwards.</i>			
<i>Distrib.</i> Holland, Spain, France.			
<i>Sp.</i> Bog, near Netley Abbey, Hants. ...	1845	S. Hailstone	S. Hailstone
Bottisham Fen, Cambs.	1845	„	„
Yarmouth	(1800)	D. Turner	Rev. J. Dalton
Langwith, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
Askham Bogs, Yorks... ..	1840	H. Baines	Walker
Forest, near Tunbridge Wells, Kent...	1810	W. Middleton	W. Middleton
675. Cnicus heterophyllus, Willd.			
<i>Sub-alpine pastures & rivulets. Caithness, S. Wales, Derbyshire, &c.</i>			
<i>Distrib.</i> N. & Mid. Europe, N. America.			
<i>Sp.</i> In a field near the White Hart public house, above Ripponden, Yorks., on the right of the road from Halifax...	1806	S. Hailstone	S. Hailstone
Malham Tarn, Yorks... ..	1806	„	„
High Force, Teesdale	1822	„	„
Mackershaw Wood, near Ripon, Yorks.	1840	H. Baines	Walker
Bishopthorpe, Yorks... ..	1798	J. Dalton	Rev. J. Dalton
Holwick, Teesdale, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
676. Cnicus acaulis, Hoffm.			
<i>Calcareous pastures, &c. Yorkshire to Devon.</i>			
<i>Distrib.</i> Gothland, southwards, N. and W. Asia.			
<i>Sp.</i> Downs, Clifton, Glos... ..	(1840)	Miss Stovin	S. Hailstone
The Devil's Ditch, towards Stetchworth, abundantly	1839	S. Hailstone	„
Summer Castle, Lincs.	1800	J. Dalton	Rev. J. Dalton
Brighton, Sussex	1810	W. Middleton	W. Middleton
Ancaster, Lincs.	1892	H. Fisher	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
677. Cnicus arvensis, Hoffm. <i>Fields and waste places. Shetland to Channel Islands.</i> <i>Distrib.</i> Europe, N. & W. Asia, N. Africa.			
<i>Sp.</i> Copgrove, Yorks.	1700	J. Dalton	Rev. J. Dalton
(<i>Var. mitis, Koch.</i>)			
Leatherhead, Surrey	1900	W. Whitwell	H. J. Wilkinson
678. Onopordon acanthium, Linn. <i>Alien.</i> <i>Dry waste places.</i>			
<i>Sp.</i> Linton, on the road from Shudy Camps to Cambridge	1843	S. Hailstone	S. Hailstone
Bexley, Kent	1843	E. Edwards	H. J. Wilkinson
679. Silybum marianum, Gærtn. <i>Not native.</i> <i>Waste places near gardens, &c.</i>			
<i>Sp.</i> Near Rillington, Yorks.	(1820)	W. Middleton	W. Middleton
680. Saussurea alpina, D.C. <i>Alpine rocks. N. Wales to Shetland.</i> <i>Distrib.</i> Scandinavia (Arctic), N. Russia, N. Asia, &c.			
<i>Sp.</i> Clogwyn y Garnedd, N. Wales	1820	S. Hailstone	S. Hailstone
Highlands of Scotland	1844	"	"
Clova Mts., Forfars.	1842	J. H. Balfour	Walker
Ben Lomond, Stirlings.	1809	J. Dalton	Rev. J. Dalton
Ben Nevis, Inverness	1810	W. Middleton	W. Middleton
681. Serratula tinctoria, Linn. <i>Dry fields & copses. Dumfries, southwards.</i> <i>Distrib.</i> Europe, W. Siberia.			
<i>Sp.</i> Askham Bogs, Yorks.	1800	S. Hailstone	S. Hailstone
N. Wales	1806	"	"
Coneysthorpe, N. Yorks.	1803	W. Middleton	W. Middleton
Winch Bridge, Yorks.	1822	"	"
Copgrove ,,	1790	J. Dalton	Rev. J. Dalton

	DATE.	COLLECTOR.	HERBARIUM.
682. Centaurea nigra, Linn.			
<i>Meadows, &c. Shetland to Channel Islands.</i>			
<i>Distrib. W. Europe.</i>			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Thorparch ,,	1830	S. Hailstone	S. Hailstone
683. Centaurea Scabiosa, Linn.			
<i>Dry pastures, &c., from Sutherland to Channel Islands.</i>			
<i>Distrib. Europe, Siberia, W. Asia.</i>			
<i>Sp.</i> Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Tadcaster ,,	1806	S. Hailstone	S. Hailstone
Knaresboro' ,,	1900	H. Fisher	H. J. Wilkinson
684. Centaurea Cyanus, Linn.			
<i>Cornfields, &c. Caithness, southwards.</i>			
<i>Distrib. Europe, N. Africa, N.W. India.</i>			
<i>Sp.</i> Near Llangollen, Denbighs.	1808	S. Hailstone	S. Hailstone
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
685. Centaurea Aspera, Linn.			
<i>Guernsey.</i>			
<i>Distrib. W. and S. Europe to Italy.</i>			
<i>Sp.</i> Guernsey	1859	A. M. Norman	H. J. Wilkinson
686. Centaurea calcitrapa,			
Linn. <i>Alien.</i>			
<i>Dry waste places. Norfolk, S. Wales, and Kent.</i>			
<i>Distrib. Holland, southwards, N. Africa.</i>			
<i>Sp.</i> Ramsgate, Kent	1834	S. Hailstone, Jr.	S. Hailstone
Sands End, Whitby, N.E. Yorks. ...	1812	W. Middleton	W. Middleton
687. Centaurea solstitialis,			
Linn. <i>Alien.</i>			
<i>Cultivated fields.</i>			
<i>Sp.</i> Barton, Suffolk	1800	J. Dalton	Rev. J. Dalton

	DATE.	COLLECTOR.	HERBARIUM.
688. Cichorium Intybus, Linn.			
<i>Waste places, &c. England & Channel Islands.</i>			
<i>Distrib.</i> Europe, N. Africa, N.W. India.			
<i>Sp.</i> Heslington Fields, Yorks.	1806	W. Middleton	W. Middleton
Cambridge	1839	S. Hailstone	S. Hailstone
689. Arnoseris pusilla, Gært. n.			
<i>A Colonist.</i>			
<i>Dry pastures, &c. Elgin, East of England, and Dorset.</i>			
<i>Sp.</i> Cornfields, Godalming, Surrey	(1840)	S. Hailstone	S. Hailstone
Bexley Heath, Kent	1843	E. Edwards	H. J. Wilkinson
690. Lapsana communis, Linn.			
<i>Waste ground and fields. Orkney to Channel Islands.</i>			
<i>Distrib.</i> Europe (Arctic), N. Africa, N. and W. Asia.			
<i>Sp.</i> Copgrove, Yorks.	1791	J. Dalton	Rev. J. Dalton
691. Picris hieracioides, Linn.			
<i>Waste places. Roxburgh, southwards.</i>			
<i>Distrib.</i> Europe, Asia, &c.			
<i>Sp.</i> Studley (lime kilns), Yorks.	1800	W. Brunton	Rev. J. Dalton
Bridlington ,,	1820	S. Hailstone	S. Hailstone
Mowthorpe Dale, N. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
St. Vincent Rocks, Bristol	1884	H. Fisher	„
692. Picris echioides, Linn.			
<i>Waste places, dry fields, &c. Durham, southwards.</i>			
<i>Distrib.</i> Holland, southwards, N. Africa.			
<i>Sp.</i> Coatham, N.E. Yorks.	1799	S. Hailstone	S. Hailstone
Redcar ,,	1801	„	„
Grantchester, Cambs.	1839	„	„
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Brighton, Sussex	1810	W. Middleton	W. Middleton

	DATE.	COLLECTOR.	HERBARIUM.
693. <i>Crepis taraxacifolia</i>, Thuill.			
<i>Dry chalky pastures. Yorkshire to Cornwall.</i>			
<i>Distrib.</i> W. Europe, from Belgium, southwards.			
<i>Sp.</i> Walmer to Deal, E. Kent	1900	A. & J. Bennett	H. J. Wilkinson
Cuxton, Kent	1883	W. R. Linton	"
694. <i>Crepis virens</i>, Linn.			
<i>Waste and cultivated ground. Caith- ness, southwards.</i>			
<i>Distrib.</i> Denmark, southwards.			
<i>Sp.</i> Ganthorpe, N. Yorks.	1813	H. Ibbotson	H. J. Wilkinson
(<i>Sub-nom Hypochæris glabra. Linn.</i>)			
695. <i>Crepis biennis</i>, Linn.			
<i>Dry pastures, &c. Yorkshire to Kent. East Aberdeen.</i>			
<i>Distrib.</i> Europe.			
<i>Sp.</i> Rochester, Kent	1830	Prof. Henslow	Rev. J. Dalton
Holling-on-the-Medway	1840	H. Baines	Walker
Pinner, Middlesex	1886	W. R. Linton	H. J. Wilkinson
696. <i>Crepis hieracioides</i>, Wald and Kit.			
<i>Mountain glens, &c. Yorks. to Dum- barton.</i>			
<i>Distrib.</i> Mid Europe to the Caucasus.			
<i>Sp.</i> Near Winch Bridge, Teesdale, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
697. <i>Crepis paludosa</i>, Mœench.			
<i>Mountain woods, copses, and meadows. S. Wales to Caithness.</i>			
<i>Distrib.</i> Europe (Arctic), &c.			
<i>Sp.</i> Hebden Bridge, Yorks.	1805	S. Hailstone	S. Hailstone
In the bog by the brook on the right hand of the road leading from Bol- ton to Manningham, W. Yorks. ...	1806	"	"
Gordale, Yorks.	1806	"	"
Terrington, N. Yorks.	1845	H. Ibbotson	H. J. Wilkinson
Mowthorpe ,,	1883	H. J. Wilkinson	"
Scotton Bank, Knaresboro', Yorks. ...	1900	H. Fisher	"

	DATE.	COLLECTOR.	HERBARIUM.
698. Hieracium pilosella, Linn. <i>Dry banks, &c. Channel Islands to Orkney.</i> <i>Distrib.</i> Europe, N. Africa, N. & W. Asia. <i>Sp.</i> Knavesmire, York	1883	H. J. Wilkinson	H. J. Wilkinson
699. Hieracium melanocephalum (Tausch.) <i>Scotch Mountains. Forfar, Aberdeen.</i> <i>Distrib.</i> Europe (N. & Arctic Zones), Alps of S. Europe. <i>Sp.</i> Clova Mts., Forfars.	1850	J. Backhouse, Jr.	H. J. Wilkinson
700. Hieracium holosericeum, Backh. <i>Scotland and Cumberland.</i> <i>Sp.</i> Clova Mts., Forfars. Glara Mara, Cumberland	1809 1847	J. Dalton J. Backhouse, Jr.	Rev. J. Dalton H. J. Wilkinson
701. Hieracium gracilentum, Backh. <i>Mountains (Scotland).</i> <i>Sp.</i> Loch Na Gar, Aberdeens.	1850	J. Backhouse, Jr.	H. J. Wilkinson
702. Hieracium amplexicaule, Linn. <i>Old Castle Walls. (Introduced.)</i> <i>Sp.</i> Cleish Castle, Kinross	(1840)	Giles Munby	G. Munby
703. Hieracium anglicum, Fries. <i>Mountain districts. Yorks. to Orkney.</i> <i>Distrib.</i> Pyrenees. <i>Sp.</i> Near Cronkley Fell, Teesdale, Yorks. (<i>H. cerinthoides, Backh.</i>) Clova Mts, Forfars.	1883 1850	H. J. Wilkinson J. Backhouse, Jr.	H. J. Wilkinson ,,

	DATE.	COLLECTOR.	HERBARIUM.
704. Hieracium iricum, Fries. <i>Mountain districts. Britain & Ireland.</i>			
Sp. Teesdale, Yorks.	1841	O. A. Moore	O. A. Moore
Winch Bridge, Teesdale, Yorks. ...	1883	H. J. Wilkinson	H. J. Wilkinson
Teesdale, Yorks.	1884	J. Backhouse, Jr.	„
705. Hieracium Gibsoni, Backh. <i>Mountain scars, &c. Yorkshire and Ireland.</i>			
Sp. Ingleton, Yorks.	1893	H. J. Wilkinson	H. J. Wilkinson
Settle „	1840	J. Tatham	S. Hailstone
706. Hieracium murorum, Linn. (pt.)			
Sp. Rocks at the Strid, Yorks.	1810	S. Hailstone	S. Hailstone
Malham Cove „	1810	„	„
Scotton Bank, Knaresboro', Yorks. ...	1900	H. Fisher	H. J. Wilkinson
707. Hieracium vulgatum, Fries. <i>Woods, banks, and rocks.</i>			
Sp. Richmond, Yorks.	1830	J. Dalton	Rev. J. Dalton
Fountains Abbey, Ripon, Yorks. ...	1900	H. Fisher	H. J. Wilkinson
Castle Howard, Yorks.	1883	H. J. Wilkinson	„
708. Hieracium gothicum, Fries. (pt.) <i>Sub-alpine districts. N. Wales, Yorks. Scotland.</i>			
Sp. Holwick, Teesdale, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
709. Hieracium tridentatum, Fries. <i>Dry sandy places. Yorks., Devon, and Kent.</i>			
Sp. Ripon, Yorks.	1790	J. Dalton	Rev. J. Dalton
(<i>Sub-nom Sylvaticum.</i>)			
Holwick, Teesdale, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

	DATE.	COLLECTOR.	HERBARIUM.
710. Hieracium umbellatum, Fries.			
<i>Dry, sandy, and rocky places. Dumfries to Cornwall.</i>			
<i>Distrib.</i> Europe (Arctic), N. & W. Asia.			
<i>Sp.</i> Sand hills between Liverpool & Bootle, Lancs.	1806	S. Hailstone	S. Hailstone
The Trossachs, Scotland	"	"	"
Terrington, N. Yorks.	1843	H. Ibbotson	H. J. Wilkinson
Copgrove, Yorks.	1790	J. Dalton	Rev. J. Dalton
Newark, Notts.	1820	W. Middleton	W. Middleton
Skipwith Common, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
711. Hieracium boreale, Fries.			
<i>Hedge banks, copses, &c. Banff, southwards.</i>			
<i>Distrib.</i> Mid and S. Europe.			
<i>Sp.</i> Strensall, Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
Richmond ,,	1830	J. Dalton	Rev. J. Dalton
Coneysthorpe, N. Yorks.	1843	H. Ibbotson	H. J. Wilkinson
712. Hypochoeris glabra, Linn.			
<i>Dry fields, &c., from Elgin to Devon.</i>			
<i>Distrib.</i> Gothland, southw'ds, N. Africa.			
<i>Sp.</i> Colchester, Essex	1886	W. R. Linton	H. J. Wilkinson
Newark, Notts.	1893	H. Fisher	"
713. Hypochoeris radicata, Linn.			
<i>Meadows and waste places. Orkney to Channel Islands.</i>			
<i>Distrib.</i> Europe, N. Africa.			
<i>Sp.</i> Brafferton, Yorks.	1834	Rev. W. Gray	H. J. Wilkinson
Thorparch ,,	1830	S. Hailstone	S. Hailstone
714. Hypochoeris maculata, Linn.			
<i>Chalk and limestone pastures. Westmoreland, N. Wales, Cambs., &c.</i>			
<i>Distrib.</i> Europe, N. Asia.			
<i>Sp.</i> Gogmagog hills, Cambs.	1830	S. Hailstone	S. Hailstone
Devil's Ditch ,,	(1826)	Prof. Henslow	Rev. J. Dalton

	DATE.	COLLECTOR.	HERBARIUM.
715. <i>Leontodon hirtus</i>, Linn. <i>Gravelly fields. &c. Durham, southwards.</i> <i>Distrib.</i> Gothland, southwards.			
<i>Sp.</i> Coatham, N.E. Yorks.	1800	S. Hailstone	S. Hailstone
Heslington, S.E. ,,	1837	O. A. Moore	O. A. Moore
Withernsea ,, ,,	1893	H. J. Wilkinson	H. J. Wilkinson
716. <i>Leontodon hispidus</i>, Linn. <i>Meadows, &c. Forfar, southwards.</i> <i>Distrib.</i> Europe.			
<i>Sp.</i> Thorparch, Yorks.	1804	S. Hailstone	S. Hailstone
Heslington, S.E. Yorks.	1840	H. Ibbotson	H. J. Wilkinson
Strensall, N.E. ,,	1883	H. J. Wilkinson	,,
717. <i>Leontodon autumnalis</i>, Linn. <i>Pastures and waste places. Shetland to Channel Islands.</i> <i>Distrib.</i> Europe (Arctic), N. & W. Asia.			
<i>Sp.</i> York (<i>Sub-nom Hypochæris glabra.</i>)	1837	O. A. Moore	Moore
Heslington, S.E. Yorks.	(1840)	,,	,,
Skipwith ,, ,,	1883	H. J. Wilkinson	H. J. Wilkinson
(<i>Var. pratensis, Koch.</i>)			
Clova Mt's., Forfars....	1809	J. Dalton	Rev. J. Dalton
Ben Hope, Sutherlands.	(1830)	Giles Munby	Munby
718. <i>Taraxacum officinale</i>, Web. <i>Meadows and waste places. Shetland to Channel Islands.</i> <i>Distrib.</i> Arctic and N. & S. temperate regions.			
<i>Sp.</i> Clifton Ings, York	1883	H. J. Wilkinson	H. J. Wilkinson
(<i>Var. levigatum, D.C.</i>)			
Sussex	(1826)	J. Dalton	Rev. J. Dalton
719. <i>Lactuca virosa</i>, Linn. <i>Hedge banks and waste places. Perth, southwards.</i> <i>Distrib.</i> Belgium, southwards.			
<i>Sp.</i> Furness Abbey, Lanes.	1804	S. Hailstone	S. Hailstone
Bungay, Norfolk	(1806)	J. Dalton	Rev. J. Dalton

	DATE.	COLLECTOR.	HERBARIUM.
720. <i>Lactuca scariola</i>, Linn. <i>Waste places. Twofold, Kent, &c.</i> <i>Distrib.</i> Europe, Siberia, &c. <i>Sp.</i> Wells, Norfolk	(1840)	S. Hailstone	S. Hailstone
721. <i>Lactuca saligna</i>, Linn. <i>Waste ground near the sea. Suffolk, Kent, &c.</i> <i>Distrib.</i> Holland, southwards, N. Africa. <i>Sp.</i> Woolwich, Kent Banks of the Thames, near Cliff, Kent	(1800) July 17th 1827	J. Dalton Prof. Henslow	Rev. J. Dalton „
722. <i>Lactuca muralis</i>, Fresen. <i>Old walls and rocky woods. Perth to Devon.</i> <i>Distrib.</i> Europe, W. Asia. <i>Sp.</i> Knaresboro', Yorks. Whalley, Lanes. Woods, Castle Howard, Yorks	1790 1807 1883	J. Dalton S. Hailstone H. J. Wilkinson	Rev. J. Dalton S. Hailstone H. J. Wilkinson
723. <i>Lactuca alpina</i>, Benth. <i>Alpine rocks. Forfar, &c.</i> <i>Distrib.</i> Arctic and Alpine Europe. <i>Sp.</i> Glen Dole, Clova, Forfars.	1843	Miss Carnegy	S. Hailstone
724. <i>Sonchus oleraceus</i>, Linn. <i>Fields and waste places. Shetland to Cornwall.</i> <i>Distrib.</i> Europe, N. & W. Asia. <i>Sp.</i> Skipwith Common, S.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson
725. <i>Sonchus asper</i>, Hoffm. <i>Fields and waste places. Shetland to Cornwall.</i> <i>Sp.</i> Bottisham, Cambs. Skipwith Common, Yorks.	1845 1883	S. Hailstone H. J. Wilkinson	S. Hailstone H. J. Wilkinson
726. <i>Sonchus arvensis</i>, Linn. <i>Cultivated fields, from Shetland to Channel Islands.</i> <i>Distrib.</i> Europe (Arctic), N. Africa, &c. <i>Sp.</i> Strensall, N.E. Yorks.	1883	H. J. Wilkinson	H. J. Wilkinson

727. *Sonchus palustris*, Linn.*Marshes in S.E. England.**Distrib.* Denmark, southlands.*Sp.* Bottisham Fen. Cambs.*Ibid*, opposite the Knave of Clubs ale
house

Wouldham, Kent

DATE.	COLLECTOR.	HERBARIUM.
1839	S. Hailstone	S. Hailstone
1843	„	„
July 16th		
1827	Prof. Henslow	Rev. J. Dalton

**728. *Tragopogon pratensis*,
Linn.***Meadows and waste places. Caithness
to Cornwall.**Distrib.* Europe, N. & W. Asia.*(T. minor, Fries.)**Sp.* Copgrove, Yorks.

Skipton „

Clifton Ings, York

1790	J. Dalton	Rev. J. Dalton
1832	S. Hailstone	S. Hailstone
1883	H. J. Wilkinson	H. J. Wilkinson

**729. *Tragopogon porrifolius*,
Linn. *Alien.****Wet meadows, &c.**Sp.* Meadow on the Thames below Shorne
in Kent

(1800)	W. Middleton	W. Middleton
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THE MONKS OF MARMOUTIER,

BY THE

REV. J. SOLLOWAY, B.D.,

*Rector of Holy Trinity, York; Secretary of the Yorkshire
Architectural and York Archæological Society.*

IN this utilitarian age it is difficult to realise the life that was lived in England in mediæval times; and in a city like York, where such radical changes have taken place in consequence of men's views on religious questions and also because of the advent of steam power as applied to locomotion, it is impossible to imagine what the York of the olden days was like. There have, of course, been several Yorks: there was the York that the Romans found, the Eboracum that they created, the wondrous ecclesiastical city of the middle ages, and the modern mixed city, such a wonderful conglomeration of ancient mutilated fragments and modern innovations.

The York of mediæval times is particularly difficult to realise, especially from an *ecclesiastical* standpoint. There was such an array of Churches and Religious Houses as, I believe, was not to be found in any other city in the kingdom, London alone excepted. There was the glorious Minster, the magnificent Abbey in whose grounds we are now assembled, with its Church that must have run the Minster very close for loveliness; and, counting all kinds of religious houses,—Abbeys,

Priories, Friaries, Hospitals and Maisons Dieu—there was the surprising total of 53 Religious Houses and 65 Churches. A very interesting pictorial representation of York in the 14th century is to be found in a MS. of Geoffrey of Monmouth now preserved in the British Museum, and recently reproduced by the Rev. Cæsar Caine in his “*Analecta Eboracensia*.” The most magnificent of all the Religious Houses, was, of course, S. Mary’s Abbey, one of the few in the country having a mitred Abbot. S. Mary’s was a Benedictine House, and in the city were two others following the same rule—S. Clement’s Nunnery and the Priory of the Holy Trinity in Micklegate. It is of the latter that I have been asked to give some account in this paper.

But before coming to the history of the Benedictine Priory, I should like to say something about its predecessor of the days before the Conquest. That there was a Saxon Church is absolutely certain, for it is several times mentioned in Domesday Book, sometimes being called Holy Trinity, and sometimes Christ’s Church; and that these were different names for one and the same Church there is not the shadow of a doubt. Equally certain is it that this Church stood on the site of the present Church of Holy Trinity.

Domesday Book gives us no idea of the kind of Church that the Holy Trinity of those days was, but an important document dated 3 years later has come down to us which shows that it was not an ordinary Parish Church, but one that was “formerly adorned with Canons and rents of farms and ecclesiastical ornaments”; that is to say, the Saxon Church was a richly endowed and highly ornamented House of Secular Canons. That is not conjecture but fact, the evidence being the famous Charter of 1089.

Now although Domesday gives us no information about the edifice of Holy Trinity, there is distinct evidence in that Book of its importance. At the time of the Survey there was a Saxon land-owner holding considerable possessions in and around York, called Richard Fitz-Erfast. The Domesday enumeration of his lands is very important in connection with the subject now under consideration. They were these:

Torp, xpi. œccla,
 Mileburg, xpi. œccla,
 Monechutone, xpi. œccla,
 Esdesai and Cnapetun, xpi. œccla, and
 Xpi. œccla, near the city of York.

Now there is no doubt about the identity of the last on the list: it was the Church we are considering, then (and for centuries afterwards) being described as standing in the suburbs of the city of York. But what about the other places? Let me read them again:

Bishopthorpe, Christ's Church,
 Bilborough, Christ's Church,
 (Moor) Monkton, Christ's Church,
 Hessay and Knapton, Christ's Church, and
 Christ's Church itself near the city of York.

But now the Church of Bishopthorpe never was Christ's Church: its present and past dedication was S. Andrew. Bilborough Church was never known as Christ's Church. Its patron saint is not really known, but it has sometimes been called S. Saviour's, sometimes S. James, Lawton says it is unknown; but certainly Christ's Church has never been mentioned in the controversy regarding its dedication. And Moor Monkton Church is now, as it always has been, "All Saints." Hessay and Knapton have no Church, or at least they had not until about four years ago, when a small Mission Church was erected at Hessay, Knapton still remaining Churchless.

Then why in Domesday are these places referred to as Torp, Christ's Church, Mileburg, Christ's Church, Monechutone, Christ's Church, and Hessay and Knapton, Christ's Church? I think there is only one answer to that question: they were in a district known as Christ's Church, a district lying to the west of the city of York, a district which was, or had been, possibly under the jurisdiction of the House of Secular Canons, a district at all events which was named after that Religious House. That Christ's Church was not only the name of the Church but of a district is further corroborated by Domesday Book, for there is another entry respecting Richard Fitz-

Erfast's lands which tells us that "in the Church of Christ, near the city of York, is half a carucate of land and 3 tofts subject to Danegeld. Richard has it, and cultivates it." A carucate was, of course, a variable quantity, anything between 90 and 150 acres. It is quite evident, therefore, that Richard could not have held half a carucate in Christ's Church, if that term only implied a Church. It must have been a district, and if we take half a carucate as meaning 70 acres it is a remarkable coincidence that the land which Richard held in Christ Church near the city of York was just the same size as the present parish of Holy Trinity.

I am anxious that you should understand this matter, for with it is connected another question that has been of great interest to York people for a long time: the meaning of the word "Ainsty." Scarcely a week passes but someone writes to the papers to ask for the derivation and meaning of the term, and all sorts of answers have been given from time to time. The old explanation is that the word was "made in Germany," that it comes from the German word "antossen," which meant "ancient." "Ainsty" is not particularly like "antossen," and unfortunately no one seems to be acquainted with that German word. Another explanation commonly given, and commonly accepted, is that "Ainsty" is "Ancitty," that is "Ancient City." But, to say nothing of the unlikelihood of such an abbreviation, the district now known as the Ainsty never was the Ancient City, and why it should have been called so passes my powers of comprehension. A certain ecclesiastic wrote to the "York Diocesan Magazine" some time ago to suggest that the word was derived from "ain," an oak, and "sty," a place to keep pigs, and that the district was so named because there were a great many wild pigs in it whose chief article of diet was acorns! I rather fancy that explanation was something of a joke.

These are a few of the solutions which have been offered of this local etymological problem at various times. I ventured some time ago, to intervene in the controversy, and I believe I was regarded by some people as the arch-lunatic in the matter, though I was glad to find a number who were convinced that my derivation was the one long sought after.

Let me now return to the point at which we had arrived : that in the west of the city of York was a richly-endowed House of Canons called Christ's Church ; and that it had given its name not only to the Parish, but to a district lying to the west of York, and including such places as Bilbro', Hessay, Monkton, Knapton, and Bishopthorpe.

Now later on the district was known by this name, Christ's Church, under another form. The Rural Deanery was called the "Deanery of Christianity." When I mentioned this some time ago to an ecclesiastical lawyer in York, he smiled and enquired concerning the time of day or night I imagined I had seen such a statement, and I rather fancy he thought the conjecture due to an overdose of intoxicants ; but when I assured him that I was a teetotaller, and that I had positively seen the Deanery so called, though at the time I could not remember where, he said he would believe it when I showed it to him. Well, since then I have come across abundant proof. In the Surtees' Society's publication on the Yorkshire Chantry Survey there are about 60 pages headed "the Deanery of Christianity," and I have at home an extract from the Patent Rolls dated June 1st, 1337, respecting the foundation of a Chantry in the Church of S. Michael, Spurriergate, bearing on this matter. The witnesses include Thomas de Askham, John de Coupmanthorpe, Henry de Bolton, and the Dean of Christianity, all of whom attached their seals to the document. The names should be noticed : Thomas de *Askham*, John de *Copmanthorpe*, and Henry de *Bolton*,—Askham, Copmanthorpe, and Bolton Percy being now in the Deanery of Ainsty. My lawyer friend need not have imagined me dreaming in speaking of the Deanery of Christianity for another reason. It was, and is still, a well-known name for rural deaneries. Lincoln City is now in a "Deanery of Christianity," Leicester also is in a deanery of the same name, and the R. Deanery of Exeter is also called the Deanery of Christianity.

Now, to sum up : In Domesday the district lying to the west of York was called Christ's Church ; later on it was known as Christianity ; now it is called the Ainsty. When was the Deanery first called the Ainsty ? Nobody knows.

And when did it cease to be called the deanery of Christianity ? Again, nobody knows.

My contention is this : that the word Ainsty is a contraction of the word Christianity : that for a long time " Ainsty " was the popular, the colloquial name of the Deanery, and the longer word the one that was used in legal and other formal documents ; and that at some time or other the long name has been dropped, and the shorter one become the commonly recognised name. When I wrote a short article a couple of years ago on this matter, I suggested that " Christianity " would probably be written Xanity ; since then I have come across a confirmation of this conjecture in the parish records of S. Martin's, Coney Street, the rural-dean there signing himself as " Dean of Xanity."

The word Christianity is one easily pronounced, but it is a long one to write, and if you will write it you will see that there was some justification for the Dean and other people abbreviating it in writing ; and I believe that " Ainsty " is simply the latter part of the word Christianity, the Greek X being left out. In Lincoln, Leicester, and Exeter, the deaneries of Christianity remain ; in York it formally existed ; when it disappeared no one knows ; but the Ainsty remains, and it seems to me that the ecclesiastical district lying to the west of York is a Deanery with a legally-recognised nickname. The members, therefore, of the York and Ainsty Hunt, ought to be very grateful to the Church of Holy Trinity, *alias* Christ's Church, for furnishing them with such a respectable name, and the least that they should do would be to send some liberal subscriptions to aid in the restoration of the Church which has given them their name !

What kind of a Church the Saxon Christ's Church was we have no certain means of knowing. That it was a House of Canons is an indisputable fact ; and that it was well-endowed and architecturally ornate are equally certain. But that is all. A *theory* was started about half a century ago, however, by Professor Willis, of Cambridge, (to whom we are indebted for one of the finest accounts of York Minster), which helps us to understand something about the character of the Saxon Church which stood where now Holy Trinity stands. On Sunday, the

23rd April, in the year 741, a monastery was burnt down in York. Until Willis' time this was thought to have been York Minster, but Willis showed that it could not possibly have been the Minster, and that, consequently, the *rebuilding* that took place of a magnificent Basilica by Alcuin and Egbert, must also have referred to some other Church, and not the Minster. He concluded that the Church was Christ's Church, the House of Secular Canons. If that were so, and there seems to me to be everything in favour of the theory, then we know a great deal about the Church that gave its name to the Ainsty. In a wonderful Latin poem Alcuin gives a glowing description of the Church, showing it to have been one of the finest, probably *the* finest, Saxon Church ever erected :

“ This lofty edifice,” says Alcuin, “ supported on solid columns, from which curved arches spring, is resplendent within, with admirable ceilings and windows, and shines in its beauty surrounded by many porticoes, having numerous chambers under different roofs, which contain 30 altars with various ornaments.”

The first *certain* date, then, for the Church of Holy Trinity is Domesday, 1086 ; the first conjectural date, furnished by Professor Willis, is 741. When the Church which was then burnt down was erected, we have, of course, no means of knowing, but a tradition has come down through the centuries that the Church stands on Roman foundations, a tradition that has been given a place in the “ British Encyclopædia,” and some weight surely is given to the conjecture by the fact that one of the finest Roman monuments of which this Society can boast, the “ Standard Bearer,” was found in the Priory gardens.

We know exactly the bounds of the monastic Close, stretching from Micklegate to Bishophill, a district which according to the late Canon Raine received its name in all probability from its having been the residence of the early Bishops of York. The first of these Bishops of whom we have any record was Eborius who went to the Council of Arles in 314, 3½ centuries before York Minster was dreamed of. That Bishop, I take it,

lived in the neighbourhood of Bishophill, his Church being the House of Canons close by, called by the name of Christ, and giving its name to the district in York where the civil population lived, and for many miles around.

This may cause some people to smile, but I believe the day will come when this theory will have passed out of the region of conjecture into that of certainty. At any rate, there is going to be placed in the restored Church of Holy Trinity a fine stained-glass window by Kempe of three lights, one containing a figure of Eborius, another that of S. Helen who, I fancy, lived not far away, possibly on Toft Green, her Church being of course Christ's Church, and the third containing a figure of Alcuin who, according to Willis, built the great Basilica, Christ's Church, and wrote in such eloquent verses about its beauty and magnificence.

This, then, is the Church which in 1086 is mentioned in Domesday as belonging to Richard Fitz-Erfast. Three years later it had changed hands, for it was in the year 1089 that Ralph Pagnell issued his famous charter in favour of Holy Trinity, in which the Church is clearly seen to have been at that time one of his many possessions. Ralph Pagnell was one of the Norman Barons of William the Conqueror. He gave his name to several places in various parts of the country, —Hooton Pagnell, Yorks., Boothby Pagnell, Lincs., Newport Pagnell, Bucks., and lived, in all probability, at Hooton Pagnell in our own county, his old baronial mansion now being in the course of restoration in consequence of the great interest taken in it by its present owner, Mrs. Warde-Aldam.

For his services in the Conquest, Ralph had been amply rewarded by the receipt of the whole of the possessions of the Saxon Merleswain. This consisted of 10 lordships in Devonshire, 5 in Somersetshire, 15 in Lincolnshire, and 15 in Yorkshire, one of the latter evidently including the possessions of Richard Fitz-Erfast. This was a considerable property to come into, and Ralph soon showed his gratitude by devoting part of it to the service of the Church. His principal gift, though by no means the only one, was the re-establishment and re-endowment of the desecrated House of Canons that had come into his hands. The Church itself and the properties

formerly belonging to it he resolved to restore. Let me quote his own words :

“ I Ralph, surnamed Pagnell, inflamed by the fire of divine love, desiring to treasure up in heaven what I can after this life receive hundredfold, having at the city of York of the fief of the King of the English a certain Church constructed in honour of the Holy Trinity, formerly adorned with canons and rents of farms and ecclesiastical ornaments, but now by sins, which cry for vengeance, almost reduced to nothing, in the desire of re-establishing in it the service of God, which has been abandoned, I have delivered it to Blessed Martin of Marmoutier and to his monks to be in their possession for ever.”

Then follows a long list of churches, advowsons, tithes and lands with which he endowed the Benedictine House. The properties so given were doubtless those which had before belonged to the Canons, and Ralph's endowment was simply a re-endowment and re-establishment of the great Church which had played so conspicuous a part in the history of York and neighbourhood, but now changed from a House of Canons to an alien Benedictine Priory.

Right in the heart of the city of Tours there are the ruins of the Abbey of S. Martin. Of the five towers that this great Abbey Church formerly had two are still standing in a ruinous condition, a very busy street running between them. A dense population has sprung up around this once beautiful old abbey, and on the site of it are now to be found buildings of all descriptions. Some years ago the Tomb of S. Martin was discovered close by, and over it there has been built in recent years a lovely modern Basilica which up to the present time has cost over £80,000, in the crypt of which the Tomb of the great Saint of Tours may be seen, surrounded by all kinds of *ex voto* offerings.

But splendid though this monastery must have been in the ancient days, it was not by any means the most important Religious House in that part of France. On the other side of the Loire, about $1\frac{1}{2}$ miles further up the river, was a much

more renowned and a much larger Abbey. S. Martin retired from the city of Tours in order to escape the distractions caused by the multitudes who thronged him to see the wonderful works he performed, and for many years he lived in the rocks and caves near the Loire, half a league from the Cathedral city. On the spot which he so inhabited grew up a magnificent monastery, which in the course of time attained to such great dimensions and importance that it became known as *Majus Monasterium*—the Greater Monastery—of France. “*Majus Monasterium*” has been contracted into “Marmoutier,” and that was the mediæval, as it is the modern, name of the Abbey, in which the great Saint of Tours spent his last years.

Through the French Revolution and other religious disturbances the Abbey lies now in a more pitiably ruinous condition than many of our English monasteries. The old 13th century Abbey Gateway still remains; a portion of the north transept of the Abbey Church may still be seen; part of the Prior’s House is yet standing; the caves and grottoes, cut out in the solid rock in which S. Martin used to live, are still there, and several chapels, dedicated to other saints who lived there after the time of S. Martin, and hewn out of the natural rocks, are still shown to visitors, but that is all. The monks are gone, and on the site is now a modern School for Girls, conducted by a number of the Sisters of the *Sacré Cœur*, with a beautiful modern chapel attached; but their tenure seems at the present time, alas, very insecure, in consequence of the recent legislation with respect to religious Associations in France.

This was the place on which in mediæval days there stood the greatest and most important of all the French Monasteries, and it was to the Abbot and Convent of this House that Ralph Pagnell gave Holy Trinity in the year 1089.

I do not know whether Ralph knew of the former connection between York and Tours. If not, it was a remarkable coincidence that Holy Trinity should have been made a Cell, that is a dependent House, of Marmoutier; for, 3 centuries before, Alcuin the York boy and the pupil of Archbishop Albert, had built the House of Secular Canons to which frequent reference

has been already made. Then he was called away from York to Tours by Charlemagne, and he became the great educational light of France, Tours being the city where he resided, founding a great School there, with its splendid library on the model of the one he had left behind in his native city of York. Alcuin would be well acquainted with Marmoutier, and would doubtless spend much of his time at that great Religious House, even if it were not the place of his abode, which may have been the case.

But whether Ralph Pagnell knew of all this or not, there can be no doubt that the Monks of Marmoutier would be acquainted with the facts, and it must have been with the greatest joy that a colony of them came over to York, to carry on in the native city of Alcuin a branch of their work at Marmoutier.

This French Abbey, like S. Mary's here, was a Benedictine House, and so, naturally, was Holy Trinity, its cell. The Priory has sometimes been erroneously called a Cluniac House. It had; however, nothing to do with the Cluniacs. All Cluniac Houses in England were Alien Priories, but all Alien Priories were not Cluniac, and Holy Trinity was one of these Alien Houses not under the jurisdiction of the Abbot of Clugny. They owned allegiance to the Abbot of Marmoutier alone, and were not even under the jurisdiction of the Archbishop in whose diocese they lived and worked.

It would be impossible to describe at length the Order to which the Monks of Marmoutier in York belonged. Their habit was a black gown of stuff which reached right down to their feet, with a hood of the same material, and a scapulary. Under this gown they had a white habit of flannel for indoor use, and they wore boots or sandals. Because of the colour of their habit they were sometimes called Black Monks.

I have already stated that the Priory of Holy Trinity was not under the jurisdiction of the Archbishop of York, and one consequence of this is that not nearly so much is known of the monks as otherwise would have been, for they are rarely mentioned in the Archiepiscopal Registers. For instance, until eight years ago, the names of about a dozen only of the Priors were known, those given by the "*Monasticon Anglicanum*," and I

have had to go to all sorts of places in order to obtain information. I am glad to be able to say that from various sources I have procured what must be almost a complete list. At Selby the names of 36 abbots are known; at Fountains, 39; at S. Mary's, 30. Here is the list of 35 of the Holy Trinity Priors I have been able to collect:

No.	Name.	Date.	Source of Information.
1	Hermarus or Hicmarus ..	occurs 1100-1104	French Archives
2	Martin	ante 1122..	Stapleton
3	Robert	occurs 1130	Stapleton and Tanner....
4	Helias Pagnell	resigned 1143	Selby Coucher Book
5	Philip.....	occurs 1154-1175	French Records
6	Robert	occurs 1200-1210	Monasticon Anglm.
7	William	occurs 1218	Notitia Monastica
8	Stephen	admitted 1231	Mon. Ang.....
9	W.	occurs "custos" 1248..	Archbp. Gray's Register..
10	Geoffrey	occurs 1252-1254	Close Rolls, Ed. III.
11	Roger Pepyn.....	occurs 1258-1264	Monastic Notes, Baildon..
12	William Wenge	occurs 1263	Monastic Notes
13	Hamo	occurs 1265-1273	Notitia Monastica
14	Bartholomew	ante 1274	Papal Letters
15	Theobald	occurs 1273 (?).....	Monastic Notes
16	Geoffrey de Bello Monte..	occurs 1276; died 1281	Notitia Monastica
17	John	occurs 1283-1304	Patent Rolls
18	Oliver de Bages	occurs 1307, 1308.....	Archbp. Grenefield's Reg.
19	Geoffrey	occurs 1318-1323	Close Rolls
20	Hugh Aubyn.....	occurs 1327-1331	Patent Rolls
21	John	occurs 1338-1341	Year Books, 15 Ed. III...
22	Hugh or Eudo	occurs 1341	Year Books, 15 Ed. III...
23	John de Chesiaco.....	occurs 1356-1363	Mon. Ang... ..
24	Peter	occurs 1369	Monastic Notes
25	Walter Skirlaw("custos")	occurs 1388	Stapleton and Baildon ..
26	Robert	uncertain: post 1341 ..	Stapleton
27	John de Castello	appointed 1383; oc. 1414	Patent Rolls
28	John	occurs 1435	De Banco Rolls
29	John Burn.....	occurs 1449-1454	Monasticon Ang.....
30	William Pykton	occurs 1455	Monastic Notes
31	John Parke	occurs 1455-1467	Davies' Walks
32	Thomas Darnton	occurs 1464-1473	Davies' Walks
33	Robert Huby	occurs 1472	Patent Rolls
34	Robert Hallowes	occurs 1478-1503	Surtees Soc. Corpus Xti..
35	Richard Speght	occurs 1531; surrender'd 1538	Mon. Ang.....

These Priors were elected, not by the monks of Holy Trinity, but by the mother Abbey at Marmoutier. At S. Mary's here, when an abbot died, the monks elected his successor, but at Holy Trinity they had to procure their new Prior from the Abbey on the banks of the Loire. This arrangement worked very well at first, when many of the monks themselves were also from France, but as the time passed there got to be a

greater proportion of English monks in the Priory, and friction was then sometimes caused, when a complete stranger and foreigner was appointed over their heads. As you will see from the list of names many of them had a distinctly foreign ring about them: "Geoffrey de Bello Monte," "Oliver de Bages," "John de Chesiaco," "John de Castello," and so on.

The Charter of 1089 gave to Holy Trinity churches, lands, and other possessions in Yorkshire and Lincolnshire, and some of these churches were places to be proud of. The Parish Church of Leeds, for instance, was one. When we look at Holy Trinity now, and then see the great Church of S. Peter's, Leeds, with its services surpassing those of some of our Cathedrals, and furnishing more Bishops than any other Church in the kingdom, it is hard to realise that the greater Church was once under the jurisdiction of the less, and that for nearly 5 centuries the Vicars of Leeds were sent from Holy Trinity.

Then there were 2 of the finest architectural gems in the County of York belonging to the Priory: Barton-le-Street, near Malton, and Adel, near Leeds. All antiquarians know the Church of Adel. Its lovely Norman porch on the south side is unsurpassed, with its 5 orders and its beautifully decorated pediment. Its Chancel Arch also is very much admired. This Church may have been built by the Trinity monks, it is certain that they *re*-built it about the middle of the 12th century, using up the old masonry where they could, preserving the lovely South Porch and Chancel Arch; and this building quite shows us their splendid architectural instincts and skill.

The Church of Barton-le-Street is quite as fine a specimen of beautiful Norman architecture, and for one reason more interesting to those connected with Holy Trinity, for a tradition has been handed down that the Norman Porch of this Church was brought from the Priory Church at York. The Rector of Barton first told me of this tradition, and showed me some book, I now forget what, containing a statement to that effect.

In Yorkshire, besides these Churches of Leeds, Adel, and Barton-le-Street, there were a number of others given to the Priory by the Charter of Ralph Pagnell: the Church of

S. Helen, Fishergate, which in later times was joined to S. Lawrence's Church, Newton-upon-Ouse, Monkton, that is to say Moor Monkton, Hooton Pagnell, S. Helen, Thurnscoe, and a mediety of the Church at Crambe; in Lincolnshire there was the Church of Irnham, of West Rasen, of Burton-upon-Stather, and of Roxby. In addition to these churches, there were many other possessions conferred upon the Priory by Ralph's Charter. Two-thirds of the tithes in Ashby, a similar proportion of the tithe of Scawby, and also of Tealby. Then in Yorkshire there was at Drax one fishery and the tithe of the rest of the fisheries. There was the whole of the tithe of Sturton Grange, near Leeds, of Arthington and the adjacent villages—Cookridge, Eccup, and Burdonhead—and also the tithe of Fadmoor in the parish of Kirkby Moorside. It should be noticed also that whenever a Church was given there was also an additional clause to the effect that the gift included the tithe, the land, and whatever belonged to the Church.

Altogether this donation of Ralph Pagnell's was a munificent and princely gift, and the monks who came from Marmoutier, with Hermarus at their head, had certainly an excellent start. But with much to begin, they acquired much more as the time sped away. Benefactors sprang up on all sides, descendants of the founder, kings, popes, bishops, archbishops, and private persons, all contributing to the support of the House, and a very promising future seemed to lie before the monks of Marmoutier in York.

Even to mention the various places where the monks obtained property would take up more time than we have at our disposal. Two of these places should be referred to, however, because they became the absolute property of the Priory—Coneysthorpe and Sturton Grange. In the Charter conferring the former place—Coneysthorpe—there is mention of the wood, the plains, the fields, the waters, the pastures, the moors, and the mill. Though the Charter was written about 1125, the description might almost have been penned yesterday. We all know the wood, the lovely one at Castle Howard, five miles long; the plains, the fields, the waters, the pastures, and the remnants of the

moors are still there, and though the mill is gone the mill-lane exists, a name, however, which nobody seemed to be able to explain.

The other place, Sturton Grange, also became the property of the Priory in every part of it. In one of the valuations made of the Priory possessions, there is a curious reference to this place. It mentions the value of the land, and then says that the sum is not great because the land was so rocky—"petrosa." In late years the rocky nature of the land has been a fortune to its modern possessors, for on it are the valuable quarries, where the Huddleston stone comes from, and at the present time the Church of Holy Trinity, its former owner, is being restored with this identical stone obtained at considerable cost.

Of the possessions acquired subsequent to the date of the foundation charter, perhaps the earliest was the gift of the chapel of S. Martin at Allerton Mauleverer, about the year 1100. At first this was intended to be a small religious House under the Priory of Holy Trinity, but afterwards, about 1110, the founder increased his original gift, and when he was a guest at Marmoutier, Allerton was made an independent Priory, subject only to Marmoutier, but no longer subordinate to Holy Trinity, of which House it had been a cell for the short period of 10 years.

About this time another important gift was made to the Priory, a place called Hedley in the wood of Bramham. Here was built a Church dedicated to S. Mary, and then it was converted into a dependent Priory of Holy Trinity, the cell of Hedley, which remained under the jurisdiction of the Alien Benedictines at York until the suppression in 1414. But though suppressed as a Religious House, the property still continued to belong to the Priory at York right down to the dissolution in the time of Henry VIII.

Very little is known of the monks of Marmoutier either at Allerton or Hedley. I have gathered together a list of 6 of the Priors of Allerton, but not *one* of Hedley have I been able to find, and only a possible name of one monk, Adam de Heddeley, who afterwards was appointed to the Rectory of Moor Monkton in 1338.

Perhaps Hedley Priory is most interesting to York people for the fact that St. Robert of Knaresborough,—who was a York boy, and whose father was twice Mayor of York, and his younger brother once,—retired to Hedley for quiet. He had become so popular in Knaresborough that he fled to Spofforth, but even there he was oppressed and distracted by the crowds who followed him, until at last he yielded to the invitation of the monks of Hedley and went to live with them. He was not there long, however, for dissatisfied with the conversation of the monks, he returned to his former retreat at Knaresborough, where he lived and died. Hedley Priory is now a farm-house, and known as Hedley Hall; there are some fragments left of the old religious House, built-up buttresses and windows, which for generations had puzzled the tenants, who had not the slightest notion that the house had ever been anything other than a farm or private dwelling-house.

I have already taken up too much time in connection with the possessions of the Priory, but it makes one green with envy and fills one with vain regrets to remember that at one time about 350 acres of land in Leeds belonged to poor Trinity, that at Sturton we possessed about 850 acres, and at Coneysthorpe probably some thousands of acres, besides lands and churches all over the counties of York and Lincoln.

When I get upon this topic among my own people at Holy Trinity they sometimes indulge in a kindly smile, and I will say no more now about it, except just to mention several other York Churches that came in one way and another into the possession of the Priory. There was S. Cuthbert's in Layerthorpe, S. Gregory's in Micklegate that stood on the site of the houses now in Barker Lane and those fronting Micklegate, All Saints', North Street, S. James' Chapel on the Mount, the Chapel of S. Helen, Dringhouses, the free Chapel of Bilbrough, and a Chapel at Knapton by Acomb.

You may have noticed that in connection with the Churches belonging to the Priory there has been frequent mention of the dedication, S. Helen. I wonder why the Priory authorities were so fond of this dedication. There were S. Helen, Fishergate, S. Helen, Dringhouses, S. Helen, Thurnscoe, and S.

Helen, Holbeck, Leeds. All these belonged to Holy Trinity, surely a large proportion with this dedication.

I have sometimes thought that a tradition must have come down that S. Helen was in some way connected with the first Church which, as we have seen, was burnt down in 741. Did she live in the Palace where the old station now stands? It is possible, and perhaps she used to attend Divine service at Holy Trinity! At all events she afterwards left York, and we all, I suppose, know the story of her discovery of the True Cross. Perhaps not so many are aware that she also is said to have located the ancient Well of Sychar, and near it caused a Christian Church to be built. S. Helen's Wells are common all over the country: Jacob's Wells are rarer. Is it possible that in memory of S. Helen's discovery of the Well of Sychar, the interesting house in Trinity Lane, formerly the residence of two Chantry Priests of Holy Trinity, received its name, "Jacob's Well," the public house that ended its career as an Inn last April, and is destined, I trust, to be converted into "Jacob's Well" Parish Room?

I should like to say before leaving S. Helen that I hope the present Vicar of Dringhouses will do all he can to remedy the mistake made when the present Church was built in 1849. At that time the old dedication was not known, and the new Church was called S. Edward the Confessor. But I have incontrovertible evidence that the old Church was named after our local saint. The late Canon Raine was very strong on this subject of lost dedications. He said that in any case where the old dedication was lost, and afterwards discovered, it ought to be restored, unless there were some legal difficulty in the way. Unfortunately at Dringhouses the new name was given at the consecration of the present Church, but I believe that difficulty could be surmounted, and I hope it will, or at least that the old dedication will be joined on to the new, if it cannot be made to take its place. York used to be proud of her local Saint of Roman times, and she cannot afford to lose her. S. Helen's, Fishergate, has gone; S. Helen's-on-the-Walls is no more; S. Helen's, Dringhouses, has had to make way for a more modern Saint; S. Helen's, Stonegate, is the only one that remains, and attempts have been made at various

times to destroy that Church. I hope, if ever they are repeated, that this Society will lead the way in protesting against the vandalism.

I have already referred to the fact that my parishioners regard me as omnivorous with reference to churches and other properties connected at any time with the Priory. Now I do not in the least plead guilty of the charge, and I trust I never claim anything for which I have not clear proof. There is one Church said to have belonged to the Priory that I will not have at any price—because it never existed! That was the Church of S. Bridget, York. It was one of York's so-called "ancient churches" according to all published lists. It is mentioned by Drake, by Sir Thomas Widdrington, Lawton, and everybody who has written on the ecclesiastical antiquities of York; but unfortunately all they say about it is that its site even is unknown, and nothing whatever is recorded of it except that it was in Micklegate.

Now I was very anxious to know something of this mysterious Church, and determined to run it to earth if it were possible. I found out the papal bull in which it was mentioned, and on the authority of which Drake and others included it among York's ancient Churches, and there in the "bull" it was—"ecclesia S. Brig." This document puzzled me in another way, for it did not refer to the Church of S. Gregory in Micklegate, which did undoubtedly belong to Holy Trinity at that time. "How was it" I asked myself, "that it mentioned S. Bridget's, never before heard of, and did not refer to S. Gregory's which was one of the Priory possessions? Could they be two names for one and the same Church?" I had a correspondence with the Bodleian Library in Oxford, with the British Museum, and with the Records Office to see if I could learn anything of the original of the papal bull, or of the copy that Dodsworth made, and at last I discovered, not the original, and not Dodsworth's copy, but the one that he made his copy from, and this was what I found: It was the Church of "Sancti Brig." that the bull mentioned, *Sancti* notice, genitive, *masculine*. Evidently "Brig." was the name of a masculine saint, and it could not therefore have been Bridget. The rest was plain. Everybody

who knows mediæval penmanship is aware of the similarity between the capitals B and G, and how common are the errors of transcription through the confusion of these two letters on the part of copyists. In the list of Heads of Holy Trinity given on page 68, the 18th Prior is Oliver de Bages. This Prior has been known for a couple of centuries, but he has always gone by the name of Oliver de Gages. The sole authority for his being put on the list of Priors is the Register of Archbishop Grenfield, where there is a single entry respecting him. But his name there is certainly Oliver de Bages, the transcriber misreading and writing him down as Oliver de Gages, by which name he has ever since been known until about a year ago.

In the document partly reproduced in Plate xviii. occur the words "Garnet," "Gaudendum," and "Guidonis." The words would ordinarily be read as "Barnet," "Baudendum," and "Buidonis"; but there is no doubt that the initial letter in each case is a G and not a B, Leonard Garnet and Guy Marshall being well known persons in connection with the old Jacob's Well Inn, and the word "Gaudendum" being the last of the usual legal triplet: "to have, to hold, and to enjoy."

Just as in these two instances there has been a copyist's error through the confusion of the two letters under consideration, so a similar mistake must have been made in connection with the Church of S. Gregory.

I think there can be no doubt that some one in making a copy of the papal bull committed an error of transcription and wrote B instead of G, and if ever the original bull of Pope Alex. III. comes to light it will be found that he confirmed to the Priory of Holy Trinity as one of its Churches, not Sancti Brig., but Sancti Greg.—S. Gregory's. I think, therefore, that in our copies of Drake and other books containing lists of York Churches, after the brief account of S. Bridget's we may write *R.I.P.*

The palmy days of the Monks of Marmoutier in our city were those of the 12th century. As we have seen, they had a splendid commencement from a worldly point of view, and they soon increased their riches. But after a while their

possessions began to dwindle from manifold causes. They had to send money to Rome, they had to make annual payments to the parent Abbey at Marmoutier, frequent calls were made upon them to carry on the wars with Scotland, with France, and with English rebels; in the time of a quarrel with France the Priory was invariably seized by the king, who would appoint a guardian for the time being, and then when it was restored to the Prior it was often on condition of an annual payment being made to the Exchequer; on one or two occasions they had to contribute pretty freely to the expenses connected with royal marriages; and waste was sometimes caused by misrule and extravagance. Frequent journeys were made by some of the Priors "beyond seas," and sometimes, in the long absences, the monastic emoluments suffered considerably. Then, naturally, Holy Trinity was occasionally placed in a very unenviable position when we were at war with France; and the unpopularity of a Priory belonging to an abbey in the enemy's country, and sending supplies across the Channel, would not help to mitigate their pecuniary embarrassments.

In the year 1258, there was considerable disturbance at the Priory. For some reason or other a number of men had made an assault upon the House, doing great damage, breaking into the Priory, carrying off the doors and windows, and abusing the monks. It looks as if it were because of some temporary unpopularity of the Monastery. A trial ensued which lasted 5 years, but what was the issue we do not know. The disturbance may have been caused by the fact that at this time there was friction in the Priory itself, rival Priors claiming to rule. Some were appointed by the Abbot of Marmoutier, and others were irregularly appointed, being backed by the King, and by the Archbishop of York, who would naturally be glad to be called upon to exercise jurisdiction over this Alien House, which must have been something of a thorn in his side.

This was the first quarrel with Marmoutier, but it was by no means the last, and the unrest and unpopularity caused from time to time by the fact that Holy Trinity was an alien House must have contributed towards the impoverishment of the Priory. In the year 1292, however, notwithstanding the

waste brought about by manifold causes, the revenue of the House, according to Pope Nicholas' taxation, was £60 10s. 5d., and that should be multiplied by at least 12 to get at its present day value.

About this time there were two cases of excommunication at the Priory, in 1294 and 1307, when in each instance it was the Prior who suffered the penalty—two successive Priors—showing that there was at this period much friction between Bishopthorpe and Holy Trinity.

In spite, however, of all this unrest at the Priory, and the unpopularity of the aliens, there were times when the Monks of Marmoutier played a prominent part in the history of the city and country. In the year 1319, for example, the Trinity Monks were conspicuous in the later stages of the Scotch war. It was on the 4th September of that year that Archbishop Melton wrote to the Abbot of S. Mary's and other Church dignitaries asking them to meet him the following Friday at Holy Trinity.

Notice that it was on a Friday. On this day, I fear, the monks would not have their usual excellent dinner of fish, which monks generally are credited with having. The well-known picture in the possession of the Liverpool Corporation representing "Friday at a Monastery" may be very interesting, but like most others dealing with this subject there is a good deal of the fanciful in it. The monks were by no means given to much eating and drinking, at least if one is to judge from present day monasteries. I have stayed at one for several days, and though they treated me well, they had little themselves, and I fear I rather hurt the abbot's feelings by saying afterwards jokingly that they seemed to have more grace than meat, the grace lasting about 5 minutes, and including *Miserere mei*, Ps. 51!

Well, on this particular Friday, Archbp. Melton asked a number of Church magnates to meet him at the Priory of Holy Trinity, Micklegate, to join in a solemn procession, with its customary Litany of supplication, for the success of the royal forces against the Scots. The war at that time, however, must have been a forlorn hope, and while Edward II. was attempting to recover Berwick-upon-Tweed, a Scotch

army slipped into England, ravaged Yorkshire, nearly caught the Queen at York, and strewed the field of Mitton-by-the-Swale with the cloven tonsures and bloody surplices of 300 warlike monks, some of them doubtless being Benedictines from S. Mary's, and others the aliens of Holy Trinity.

In the middle of the 14th century we find the Priory heavily burdened with debt, and very much put to it some of the Priors must have been. It was in 1379 that Richard II. ordered an enquiry to be made concerning the revenues of the House, when the jurors found the income to be £189 16s. od., and the outgoings £168 11s. 0½d., leaving a balance of £21 4s. 11½d. Shortly after this the Priory was in the hands of the King, and a custodian placed over it, none less than Bishop Walter Skirlaw, who had been Bishop of Bath and Wells, and was just now translated to Durham.

In the year 1399 the Alien Priories, including Holy Trinity, were restored to the Monastic authorities. One of them in Buckinghamshire, Tickford Priory, which hitherto had been a cell of Marmoutier, was made independent of that Abbey, and placed under the jurisdiction of Holy Trinity, with which it remained connected, its Priors being sent from York, until the time of Henry VIII.

A few years later came the general suppression of the Alien Priories, except those that were conventual, and among these latter was Holy Trinity. It had its own Convent Seal, and used to exercise powers in many respects as if it had been an Abbey or independent Priory, having nothing to do with any foreign House. It attached the Common Seal of the Convent to all documents, and was in every sense of the term "conventual."

In this emergency the Prior displayed great astuteness in the evidence he brought before the Royal Council, showing that two of the Bishops of Rome had issued bulls to the Prior and Convent, and he also produced Charters from Kings and Archbishops addressed to the Prior and Convent. This evidence was regarded as sufficient, and whilst great numbers of Alien Houses, all over the country, were suppressed, among them being Allerton Mauleverer and Hedley, Holy Trinity was spared. The Prior and Convent, however, must have

felt their tenure anything but secure, and, oppressed with debts as they were, it is no wonder that they grew tired of being tied to a foreign Abbey, paying to them yearly subsidies, and rendering themselves unpopular with the English among whom they lived. We are not surprised, therefore, that they made a petition to Parliament asking that they might be loosed from their union with Marmoutier, and be regarded as an independent English Priory. This was granted, and in 1426 the Monks of Marmoutier at York were naturalized, and their House was thenceforth practically an Abbey, the Heads being no longer appointed abroad, but elected by the monks themselves, just as was the case at S. Mary's Abbey. This denization was confirmed by Ed. IV. in 1466, and the monks were allowed to enjoy all such liberties, franchises, immunities, and privileges as the Abbot of S. Mary's and the Dean and Chapter of the Minster had. To all intents and purposes Holy Trinity was, for the last century of its existence as a religious House, practically an Abbey, and that perhaps explains the fact that in many of the wills of the 15th century we find frequent reference to "Trinity Abbey."

During this period the Priory had become more important through its connection with the Corpus Christi Guild. The annual procession of the Guild was a magnificent pageant, the great event of the year for the city and neighbourhood. The headquarters of the Guild were at S. Thomas' Hospital, standing at the corner of Nunnery Lane, and the procession always started from the Priory Gateway, going on to the Minster, and thence to S. Leonard's Hospital where the Host was left.

Towards the end of the 15th century there was a Prior called Thomas Darnton, who was evidently a sort of ne'er-do-weel, and did the Priory a great deal of harm. He received on one occasion the royal pardon, for what crime we do not know; at another time he was turned out of office at the Priory; on another occasion he was arrested for rioting and brought before the King in Chancery to answer for the riots. This was in 1465; seven years later he had another turn, and simply played havoc at the Priory. He was charged with "having gathered together certain evil-doers and gone to the

monastery, entered into divers of its possessions, wasted the issues, goods and jewels, imprisoned some of the monks and threatened the others.”

No wonder that in 1478, after a time of this kind, the Prior and Convent had to plead their poverty before the Duke of Gloucester, asking for his help on account of their “great penury, poverty and trouble, with many other great and intolerable hurts and mischiefs done and committed against the weal of the Priory by Darnton late called Prior of the same.”

Darnton was evidently a really turbulent sort of fellow, and attained to an unenviable notoriety. He seems to have been one of the best known of the Trinity Priors, though one of whom the Convent could never be proud. There was, however, one happy consequence of his riotous conduct: through the trials recorded concerning him there has come down to us a splendid testimony of the excellent character borne by the Trinity monks generally; for when Thomas Wrangwish, an alderman of the City, the City M.P., and twice its Lord Mayor, pleaded the cause of the monks before the Duke of Gloucester, these words formed part of his speech,—a splendid tribute to the good character of the House and its religious usefulness in the City; and they form a sort of counterblast to that disgraceful and, I believe, untruthful report made by the Ministers of Henry VIII., when he went a monk-hunting. These are Wrangwish’s words:

“Remembering the great honour had and kept by the Priors thereof in times past, as well in maintaining of Divine Service, said guiding of their religion, nurture, and welfare, as in all other things concerning the pleasure of God, and good rule of religion and worship of the city.”

A striking contrast this to the hurried report of 1538, when the Priory was surrendered by the Prior and ten Priests, its value at that time being £196 17s. 2d., and Richard Speght, its last Prior, receiving an annual pension of £22.

This paper would be incomplete if I did not say a few words about the fabric of the Church. The domestic part of the

Priory is quite gone except traces of the Close walls adjoining Bishophill and near the City ramparts, and only a fragment of the Church is left. As I have said, the first Church was burnt down in the year 741, the second was consecrated in 782, the third was built between 1089 and 1137 when it was again destroyed by fire, and the fourth, of which a portion of the nave remains, was erected between 1137 and 1200 in various stages. The plan was cruciform, having a nave, with aisles and transepts, a central tower called a Campanile, and a choir somewhat longer than the nave.

The west front must have been a very fine one with a good Early English doorway and lancets. A portion of the central tower remains, and one bay of the north aisle, together with the triforium and clerestory of the westernmost bay of the north side. The nave arcading still exists, though on the north side built up, and filled with so-called decorated windows, and shorn of the triforium and clerestory, but yet as fine a specimen of Transitional Norman as York can boast of.

On the pier on the south side of the present chancel arch a peculiar monument is to be seen. That is the memorial tablet to Dr. John Burton, the author of "*Monasticon Eboracense*," and the reputed prototype of "Dr. Slop" in "*Tristram Shandy*." Two volumes stand above the scroll-shaped marble. To write these two books he took forty-five years. The first one was published—the top one in the picture—the second one was never published, and you notice it has its back turned to the wall. On the upper volume is inscribed "*Mon. Ebor. vol. 1.*," and of course you see the pathos of the position of the other. Poor old Burton! he died nearly broken-hearted through many troubles, this one perhaps the greatest, and before his death he wrote to a friend to say that if after forty-five years' toil there was no place in the world for his work, the MS. should be burnt, a resolution which was fortunately frustrated. It is now in the hands of a Yorkshire nobleman, and I trust will be published before long. I am glad to learn that the monument is to be repaired and done up by the York Medical Society.

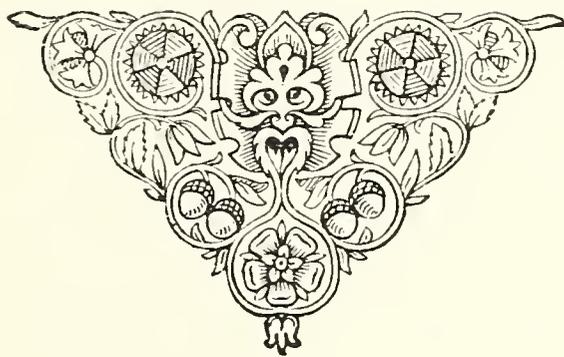
The present tower is a great curiosity, being really the tower of another Church, the Parish Church of S. Nicholas, Bishop,

which stood in front of the Priory Church, where the pathway and the stocks now are. The four kirk-maisters of this Church in 1453 got permission to rebuild their steeple of S. Nicholas, which had evidently come to grief, on the west bay of the north aisle of the Priory Church. The parapet line of the old aisle wall can be seen distinctly on the west side of this tower. The bases of the choir piers are still in existence about six feet down in the Rectory garden, five of which I saw some years ago, during an excavation, and a part of the south wall of the choir is standing twelve feet high, and used as a yard wall for some of the cottages in Trinity Lane. The site of the Lady Chapel has just ceased to be used as a public-house skittle-alley, and quoits ground. In 1551 the central tower fell in a storm, in 1732 a flat underdrawn ceiling was erected, in 1793 a butcher's slaughter-house was built over the only remaining lancet in the tower, a hay-loft having been previously built over the other tower lancet; round the tower five domestic offices had been built for the accommodation of the houses in Micklegate; and in 1829 an ugly and useless gallery was erected, the principal use of which has been to encourage ghosts, and afford sitting accommodation for those who wished to study ghostly phenomena. The slaughter-house has been purchased and is being taken down; the hay-loft has already gone, and the hidden lancet can once more be seen; the other excrescences round the tower have been removed, the ruined west bay which for three centuries has been a rubbish heap is being restored with a faithful reproduction of the west front of the Church, as far as the present scheme goes. The flat-ceiling is to be removed, the west gallery to be taken down, the built-up arcade of the tower to be opened out, and the floor to be restored to its old level. And this work is not being undertaken before time, as one may see from the ruinous condition of the Church which is apparent on the north side of the triforium.

This scheme is to cost over £4,000, and since the work commenced, through the generosity of several members of the congregation, some stained-glass windows have been promised in which will be depicted a number of scenes connected with the history of the Church and parish. A beautiful ancient

Piscina is to be restored, which was found in the ruins some years ago, evidently of about the same date as the finely-worked stone recently dug up. Another stone has been inserted in the wall which says that Walterus Flos lies there, who may have been the brother of the local saint already alluded to—S. Robert of Knaresborough, whose surname was “Flower,” the son of Tok Fleur.

We may surely hope, after all the care that has been taken to make the Church more worthy of its former self, that that restless visitor that used to haunt the Church—the triple ghost of Trinity—will now be able to rest in peace, and then the £5,000 will not have been spent in vain!



A Description of the Ground Excavated

IN LAYING THE WATER-MAINS

AT

EAST AND WEST AYTON, NEAR SCARBOROUGH.

BY THE REV. W. C HEY, M.A.

IN the spring of 1901, the long-talked of scheme for bringing a water supply to the villages of East and West Ayton was carried out.

Visitors to Forge Valley will be familiar with certain cottages in the ravine, where refreshments are provided, and have probably noticed an old stone trough not many paces from them, into which a stream of water gushes through an orifice, known locally as "The Old Man's Head." It is from the same springs which feed this trough that the Ayton water supply has been derived.

About half-way up the side of the ravine, deep trenches were driven into the slope and abundance of water found, which is collected in the first instance in a globular receptacle, and thence conveyed by metal pipes to the road below, and so carried by the side of the river for about a mile to the point where a narrow rocky gill enters Forge Valley from the east. The pipes climb the south bank of this gill almost perpendicularly, and discharge the water into a large dome-crowned reservoir, which is excavated in a knoll of glacial sand and gravel which are here piled up to a depth of nine feet. The excavation was altogether about sixteen feet deep, and entered seven foot of brashy corallian rocks below the glacial beds. A very fine section of sand and gravel was here exhibited, but no regular succession could be made out, sand and gravel

alternating, and dovetailing into each other in a hopeless confusion.

From the Reservoir the pipes pass down a sloping field. A branch is thrown off to Lonsdale Farm, but the main enters East Ayton by the street called Castlegate. The trench was dug at a uniform depth of three foot six inches.

The Castlegate pipe is laid throughout in a solid white oolite, which was only blasted with great labour. The corallian rocks here occupy the surface of the ground, and the houses are built immediately upon them. The rock seems to have ended very abruptly near the south end of Castlegate, and a slope of made soil conducts the road gently down to join the highway. The pipes here branch eastward along the principal street of East Ayton. All through the street, the ground was heavy and wet, often quite clayey. A very large number of boulders were encountered—some sandstone, but the greater part were whinstone. Near "the Farm" five or six large masses of whinstone occurred close together. I saw no other kind of rocks here. When the church was reached, the soil became light, dry, and sandy, with more or less gravel. The pipe bifurcates at the end of East Ayton Street—a short branch goes up past the "Strawberry gardens," laid in a light loam, and a larger branch descends to the Low Mill. The soil beneath the top spit is sandy, and full of large angular masses of the local oolite. In places it almost consists of such fragments. There are also a few boulders, but how these large unworn rock fragments accumulated here in such quantities is to me a puzzle.

Returning to the point where the pipe from Castlegate enters the high road, and proceeding westward, we find ourselves in made soil. At a depth of about three feet, the men struck a solid floor which they all were of opinion, and I think correctly, was the old cobbled road descending to the ford over the Derwent. I believe the present bridge is more than a hundred years old, and before that was built, the old people say there was only a foot-bridge for passengers and a "wath" (the Yorkshire word for "ford") for vehicular traffic.

The pipe crosses the river by the Bridge, being laid under the flagged footpath, and on reaching the other side enters

pure sand—evidently a natural river deposit; not made soil as on the other side. A few yards further a hard floor was encountered composed of stones cemented together by water charged with iron. This gave the workmen immense trouble to break through. It extended westward beyond the Forge Valley Hotel, and is, I believe, a good example of a geological “pan.”

The pipes do not follow the lane by the river, but turn up the next road leading north. A few yards after leaving the high road, the trench entered a mass of unctuous black peat with a strong smell. The low lying ground at this point has evidently been a riverside marsh, the black soil occupying the space as far as the point where a rise commences. This black soil yielded wood and twigs, bones of fish (perhaps pike), and Bos and Ovis. Directly the ground begins to rise, very coarse glacial gravels were encountered, and the pipes are laid in these gravels up to the point where they terminate a little above the school. There is little doubt that these gravels were deposited by a powerful stream flowing through Forge Valley and making its way to “Lake Pickering,” between the hill and the flank of the glacier of the North Sea. It was here that far the greatest variety of boulders was found, including many blocks of granite of various composition. The largest of these has been taken to my garden. A strong man was just able to fetch it in a barrow. It is a very fine-grained granite, of a greyish colour. Some of the granite was very full of iron pyrites, and the men were seized with the usual conviction that they had found gold.

A short arm leaves this pipe at a little distance from the point where the ground begins to rise, and takes a downward course in the direction of Derwent Mills, terminating at my own house. At first it passed through gravel with many small boulders, of great variety, and then struck brashy coralline rock, and on reaching the wide road-space near the river, entered what must once have been an elbow of the stream—low, sandy ground, crowded with bones of Bos and Ovis. I expect the carcasses had been carried down by floods and deposited here. Near my own house, it is made ground. A coin of William III. and a Nuremburg token were found at some depth in the mixed detritus.

The pipes turn southward from the high road, and run down the road to the station, the trenches being cut in a deep loamy soil up to the railway line. Beyond this they passed through a coarse ground which did not vary much till it approached the river, where the gravel died out into pure sand. A great number of boulders were turned up weighing a few stone apiece. I remarked only one boulder bigger than a man could carry, and it was of whinstone.

The pipes also pass down the street of West Ayton past the Post Office. I was unable to see the trench, but there was sufficient evidence to show the ground was of a gravelly nature. An old footpath lay at a depth of almost a foot below the present one.

Subsequently the water has been conveyed from Lonsdale Farm across the fields to Betton Farm—a distance of about half a mile. The coralline rock was found close under the top spit all the way. I expected this, as I had been told that the plough sometimes struck the rock, so shallow is the soil.

None of the boulders turned up show any signs of ice polish or ice scratches, and in this respect present a great contrast with those found in their boulder clay of the coast. Attrition in water has doubtless rubbed off all ice marks.

These works indicate then four periods in the development of the district.

1. *A Picture of the Oolitic Age.*

Coral reefs are forming in a warm sea. Huge Phasianellæ and elegant Delphinulæ crawl upon the rocks; Oysters and Pectens and Limas form beds; now and again a big Ammonite drifts by. Exquisitely beautiful sea-urchins abound, and the pools are enlivened by fishes and crustaceans. The trench in Castlegate indicates this period.

2. *A Picture of the Great Ice Age.* Millions of years have gone by. The chalk has been formed at the bottom of the sea and raised into the wolds. The tertiary period has come and gone, and left no trace. Then the temperature lowers, and eventually a huge glacier towering to the height of 400 feet pushes in between the chalk wolds and the oolitic hills, driving back the drainage of the district, and compelling it to force

itself a way into the Vale of York. This glacier advanced as far as Wykeham. The hill which forms the park of Wykeham Abbey is its terminal moraine. The drainage from the north comes through Forge Valley and is deflected by the glacier sharply to the west, and deposits on the hill sides the gravels which the trench cuts as it rises up the slope by the Infant School of West Ayton.

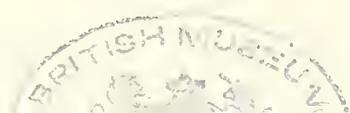
3. *A Prehistoric Period.*

The temperature has risen again. The glacier is gone, leaving behind it the clay and the boulders found in East Ayton street. The River Derwent has more or less taken shape, but it is fringed with marshes and great floods are frequent, bringing down quantities of sand and spreading these sands far beyond the river's limits. These floods often surprised the flocks and herds of the neolithic men, whose burial places and flint weapons are so common on the moors and their carcasses were deposited in elbows of the torrent (as near Derwent Mills). Fragments of a very coarse early pottery indicated the presence of man at this period.

4. *A Historic Period.*

The church at East Ayton has been built, is perhaps growing rather old, with its Norman font and beak-head doorway. Lord Evers has erected his massive castle upon a gravel terrace of the hill slope, and availed himself of the watery character of the low ground to guard it with a double moat. There is a road now from Pickering to Scarborough, but traffic, except of foot passengers and pack horses, is so small, that no bridge except a footbridge is necessary over the Derwent. Only a cobbled way is laid across the river, which in summer (owing to the absence of dams) no doubt dwindled to a mere thread, and in winter was often an impassable torrent. Careless people dropped their money now and then, just as they do now.

Such is a brief account of the trenches dug at East and West Ayton, and of the past conditions they seem to indicate. I believe my observations have been correct, and I hope the conclusions I have drawn are fairly well supported by those observations.



RECENT VOLCANIC ERUPTIONS

IN THE

WEST INDIES,

BY DR. TEMPEST ANDERSON.

(Reprinted by permission from the 'Geographical Journal' of March, 1903.)

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The author and his colleague received much assistance, information, and hospitality from friends too numerous to particularize, but among them they cannot refrain from mentioning—

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At Martinique, M. L'Heurre, the acting governor, and Professor Lacroix.

At St. Lucia, Colonel and Mrs. Dalrymple-Hay, Mr. Okell, and Major Hodder, R.E.

At Dominica, the Hon. Hesketh Bell, Dr. Nicholls, Mr. Sowray and Mr. Naish.

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17, Stonegate,
York.

It will be in the remembrance of every one present that in May, 1902, severe volcanic eruptions took place in St. Vincent and Martinique, both of which islands form part of the chain of the lesser Antilles in the West Indies. The Royal Society appointed a committee to investigate the eruptions, by whom I had the honour of being nominated along with Dr. J. S. Flett, Petrologist to the Geological Survey, to proceed to the scene of the eruptions and report to them. In our report, read before the Royal Society on November 20, we have already entered fully into the description and discussion of the phenomena observed; it will be better, therefore, in this paper to content myself with a résumé of the chief points, with special references to the geographical changes produced.

The islands of the lesser Antilles, from Saba on the north to Grenada on the south, form the summits of a chain of mountains about two-thirds submerged; for while their highest peaks reach elevations

* Read at the Royal Geographical Society, January 12, 1903. Maps, p. 282. The description of the plates will be found at the end of the paper.

of barely 5,000 feet above sea-level, the depth of the Caribbean sea to the west is over 10,000 feet. They occupy the summit of a great fold of the Earth's crust, and are almost entirely volcanic, the chief exception being Antigua and a small portion of the eastern part of Guadeloupe, which, with Barbados, appears to form part of another fold more to the east, which is not volcanic. Other volcanoes occur on the mainland to the west of the Caribbean sea, one of which in Guatemala has also recently been in eruption. Earthquakes had taken place in the region surrounding the Caribbean sea during some months previously, and it has been concluded that the readjustments of the Earth's crusts which gave rise to these have also been connected with the eruptions in St. Vincent and Martinique.

The island of St. Vincent is oval, the long diameter being nearly north and south. It is about 18 miles long and 11 miles wide. A mountain chain stretches along the main axis of the island, and reaches to a height varying from 2000 to 4000 feet, the highest point being just over 4000. It is entirely composed of volcanic materials, the beds dipping away from the central mass in all directions towards the sea. They consist chiefly of tuffs and agglomerates—in fact, fragmentary materials resembling those discharged from the Soufrière during the recent eruptions. Among them are many ejected blocks of enormous size, even as much as 20 or 30 feet in diameter, showing that some of the former eruptions must have been explosive like the late one, but on a grander scale. Lava-flows are comparatively few, but not entirely absent, and dykes are rare.

In the southern part of the island volcanic action has long been extinct or dormant, and we did not see any remains of craters, all such having apparently been removed by denudation. Towards the northern part of the island, however, is the great mass of the Soufrière mountain, in the summit of which is a crater of an almost circular form, about a mile in diameter. This, which is called the old crater, appears to have been the chief, if not the only, site of the recent eruption. On the north-east of the old crater, and only separated from it by a narrow ridge, is the so-called new crater, which was active in 1812. It is only about one-third of a mile in diameter, and it is doubtful whether it took any part in the last eruption. To the north of these craters, and partly encircling them, is an old crater-ring, which bears the same relation to them as Somma does to Vesuvius. The name Morne Garu was formerly applied indiscriminately to all this mountain range, but now has become restricted to a peak some distance to the south of the main crater, while the name Soufrière appears to be always given to the active cone.

To the south of the main craters, and between them and Morne Garu, a great depression or system of valleys extends right across the island. The eastern side of this is occupied by the Rabaka Dry river and

its tributaries, which drain into the sea on the windward coast north of George Town. The western, which is rather more extensive, is much eroded into deep valleys and ravines, often with almost precipitous sides, in which flow the rivers and torrents, which are often dry, and go by the names of Wallibu, Wallibu Dry river, Rozeau, Morne Ronde, and Larikai. The rocks of which this part of the mountain is composed are almost entirely tuffs and agglomerates formed of fragmentary material, similar to that ejected from the volcanoes during the recent eruption. We saw a few beds of lava, but they were chiefly exposed in the deeper parts of ravines, and were obviously of much older date than the more superficial portions. This great transverse valley, and especially its western portion, the valleys of the Wallibu, received the greater part of the products of the eruption, amongst which we saw no lava, and do not believe any was erupted. A considerable number of ejected blocks* were noticed, but the great bulk of the material consisted of fine sand and ashes—in fact, lava blown to pieces by the sudden expansion of its imprisoned gases. The trade-wind blows steadily from the east or north-east, and a certain amount of the finer particles would be caught by the wind and deposited in the Wallibu valley. A considerable amount was also driven directly upwards so violently as to go through the whole thickness of the trade-wind and get caught by an upper current in the reverse direction, by which it was carried to the east as far as Barbados and the surrounding sea. A certain quantity fell on the north slopes of the volcano beyond the Somma ridge and along the east coast as far as to beyond George Town, but the greatest deposit which we saw, and in comparison with which all the others were trivial, was in the Rabaka and Wallibu valleys.

The tropical rains have cut deeply into the soft strata which form the cone of the Soufrière and the slopes at its foot, and have produced a series of branching valleys with steep or almost precipitous sides, and separated by the narrowest of ridges—in fact, often mere knife-edges. The whole, before the eruption, was clothed with the most luxuriant tropical vegetation. Into this series of valleys was discharged from the Soufrière a black cloud, so heavily laden with incandescent dust that it might most fitly be described as an incandescent avalanche. The mechanism of its production is discussed below, but its immediate geographical effect was to fill the Rabaka and Wallibu valleys and some of their tributaries to a depth in some places as great as 200 feet. The motion of the mass was sufficient to prevent any large amount of hot sand being deposited on the ridges, while the hollows received the greater part, and the whole was smoothed over by the blast, and lay in rolling masses like drifted snow. Thus in the course of a single

*The nature of these will form the subject of a special report to the Royal Society by my colleague, Dr. Flett.

day, or probably much less, the whole of the vegetation on this part of the mountain was utterly devastated, and the valleys were filled up with a deep new deposit of incandescent sand. This was the first and most obvious geographical alteration.

When we arrived on the scene a month later, secondary changes had taken place to a very marked extent. The wet season had set in in earnest, and as much as 5 inches of rain had been registered in one period of twenty-four hours. Denudation was taking place on a prodigious scale. The surface was everywhere scored with rain-furrows, which joined together in a sort of feather-pattern into larger streams, which had cut deep channels into the soft material; and these again united to form rivers, which in some cases had re-excavated the old channels, but in others had cut new and quite independent ones. The amount of denudation that had been accomplished in this short space of time seemed incredible to one accustomed to the leisurely rate of change in temperate climates. The Wallibu had excavated a new bed in the hot ash nearly 80 feet deep, and had left in places as many as five or six terraces to mark successive stages of its excavation, and the Rabaka on the east side had cut a corresponding gorge. Nor were the changes yet complete; we were fortunate in seeing them still in progress, and obtaining photographs of many of the most striking phenomena. When the weather was fine little change was to be seen, though the ash was still smoking, and hot enough in places even on the surface to burn the bare feet of our porters. Most of the river-beds were then also dry, but a brisk shower of rain changed all this. The water came down the river in torrents and undermined the steep banks. This started landslides of hot ash, which fell into the river, and explosions of steam on an enormous scale took place. Showers of hot mud were thrown up to a height of perhaps 150 feet like great geysirs, and great clouds of steam, laden with brown dust, rose to a height of many hundred feet, and were carried away to sea by the trade-winds. Nor was this all: the fallen ashes often dammed the streams, and when the water at last overcame the obstruction it descended no longer as water, but as a gush of boiling-hot mud, which made the river-bed temporarily impassable, and built up alluvial fans at the mouth of the river. One day when we ascended the Soufrière, we crossed dry river-beds without difficulty in the morning when the weather was fine, but on returning in the afternoon, heavy rains having fallen in the mean time, a small river was full of boiling mud, and we were only able to cross it by the aid of a bridge which our men constructed of trees killed by the eruption, and this we saw carried away by a great gush of boiling mud soon after we had got over.

The spots from which these explosions had taken place, when sufficiently cooled to be approached safely, were also interesting. They formed bowls or funnels from perhaps 10 feet to 30 feet in diameter,

which, however, were seldom perfect, as one side had generally been removed by the stream as it cut its way deeper, and left the remains of the bowl standing as a depression in its bank. Surrounding the bowl was a low cone of *débris*, consisting of the stones and larger fragments which had been thrown up and fallen down around it, while the lighter sand was carried away by the wind. These new valleys, with their details—the terraces and steam-bowls and the associated fans and deltas—constitute another geographical change.

The shore deposits deserve a separate mention. On the windward coast especially, the amount of sand brought down by the streams had been so great that for 2 or 3 miles a new beach had been formed by the mud carried along the coast by the waves, where formerly the sea reached the foot of the cliffs; but this will no doubt eventually be washed away again.

We looked carefully for signs of general upheaval or depression of land, but without finding any. The rise and fall of the tide amounts to only about 2 feet, and the sea has made very definite marks along the face of the cliffs where they happen to be composed of lava or hard tuff. We were satisfied that no alteration of level more than a few inches could have taken place, and our boatmen, who knew the place well, were of the same opinion. There was, however, one very remarkable instance of a local subsidence which deserves notice.

At the mouth of the Wallibu valley, on the leeward side, extending from Richmond village on the south to Morne Ronde on the north, a distance of above a mile, there was formerly a low foreshore, along which ran the main road. It was described to us as having been covered with palm trees and luxuriant tropical growth, and studded with numerous picturesque villages, which nestled in beautiful little bays. Similar places still exist just outside the devastated area at Chateau Belair, Rose Bank, Barruali, and Layu.* Behind the foreshore the land rose in steep bluffs composed of fragmentary volcanic deposits like the rest of the Wallibu district. On the day of the great eruption the whole of this foreshore subsided into deep water, and as submarine slopes here are very steep, it is probable that the earthquakes connected with the eruption set up landslides, with the above results. It is possible that there may have previously been a fault along the line of the foot of the bluff, which determined the actual slip, and if this be so it might account for hot water rising here, which gave the name of Hot-waters to one spot; but, whatever be the exact cause, this subsidence is a geographical change worth mention.

The next geographical change noted was that the crater has been somewhat enlarged, especially at its southern lip, but not to any conspicuous extent; it has lost its clothing of vegetation, but this will

*The last beyond the map.

soon be renewed, and its contained lake has been discharged, but it is already beginning to fill again. Any one who knew it before and visited it now would notice a considerable change, but, if he deferred his visit for a few years, would probably see no marked difference.

Another curious little secondary result deserves notice. Water will hold more mud in suspension when it is flowing down a steep slope. The water in the steeper upper parts of the valleys was charged with mud to the utmost, but where it descended on to more gentle slopes, and consequently moved more slowly, it could not carry so much, and deposited part, especially where it moved slowly at the side of the stream. We saw two places where dams had thus been formed across the mouths of small lateral valleys, and small lakes or large ponds had been produced. As the dams were only soft mud, these may only be temporary; but I have seen a permanent lake of several acres formed in this way in Iceland, by a bank of shingle brought down by a rapid glacial river. Dr. Flett thinks, and I agree that the explanation is feasible, that these lateral dams are the remains of the avalanche which filled the valley during the eruption, and that the centre part only has since been washed away.

A watercourse formerly existed which supplied all the plantations in the Carib country on the east or windward slope of the mountain with water taken from the Rabaka river high up. The river has now changed its course, and no water enters the conduit, which, moreover, in places is blocked up with ashes. This, however, can doubtless be remedied, but, as far as it goes, is a geographical change. The plantation buildings were not of sufficient size for their destruction to be of geographical importance, and the black population will, according to all previous experience, return after the cessation of the eruptions.

On the whole, the permanent geographical changes in St. Vincent are comparatively small. It remains to discuss the mechanism of the eruption; but this will be better considered along with that of Mont Pelée.

Turning now to the consideration of Martinique, I may remark that our instructions were to proceed first to St. Vincent and devote our chief attention to that island. This we did, but later on we went also to Martinique, for the purpose of making such an examination as would enable us to compare the phenomena of the two volcanoes.

There is remarkable similarity between the islands of St. Vincent and Martinique. Both are roughly oval in form, with the long axis almost north and south. The north-west portion of each is occupied by a volcano, the Soufrière and Mont Pelée, more strictly called Montagne Pelée, which have many points in common. Both volcanoes show a single or practically single vent, a remarkable absence of parasitic cones, and a scarcity of dykes. In both a transverse valley exists to the south of the volcanoes, and the main discharge of ejecta during

the recent eruptions, which have often been nearly synchronous, has been into this depression, and especially into its westerly portion. In both islands the recent eruptions have been characterized by paroxysmal discharges of incandescent ashes, with comparatively few larger fragments and a complete absence of lava.

There are, however, a few points of difference. The eruptions of St. Vincent have been altogether on a much larger scale than those in Martinique. The area devastated was considerably larger, the amount of ashes ejected probably ten times as great, and if the loss of life was not so large, this is accounted for by the absence of a populous city at the foot of the mountain. If such a city had existed at the mouth of the Wallibu river in St. Vincent in the position corresponding with that of St. Pierre, there can be no doubt that it would have been as completely destroyed as that unfortunate city. While both volcanoes show practically a single vent, this is much more marked in the case of St. Vincent, where excepting the new crater, which is really part of the old or main one, there is not a single parasitic one. We saw no fumaroles, no hot springs, nor any trace of radial cracks and fissures.

On Mont Pelée, it is true, the main activity is confined to a restricted area about the summit of the mountain, and the top of the great fissure which extends or extended from this down in the direction of the Rivière Blanche; and there are no parasitic cones comparable, for instance, to those which are so numerous on Etna; but there are many fumaroles, which Prof. Lacroix and his colleagues speak of as emitting gases hot enough to melt lead, though not copper wire. A telegraph cable has been three times broken at about the same place, and the broken ends on one occasion, at any rate, showed marks of fusion of the insulating medium. There are also several hot springs. Judging from these and other indications, it is most probable that radial cracks entered deeply through the substance of the mountain, and penetrated even the submarine portion of its cone.

Flows of mud have also played a much more conspicuous part on Mont Pelée than in St. Vincent. Quite early in the eruption a great flow of this kind came down the Rivière Blanche and overwhelmed the Usine Guérin, which stood near its mouth, so that now nothing remains visible but the upper part of the chimney stack. It is probable that some at least of these mud-flows may have been due to the discharge of the small crater lake which existed before the eruption, or to heavy rains, the water in either case behaving in a manner comparable to what we saw in the Wallibu; but, at any rate, they occupy a more prominent part in the descriptions of these eruptions than in those of the Soufrière.

Not only has the amount of erupted material been much less, but its distribution has been much more local than in St. Vincent, and this is

accounted for by the great fissure at the top of the valley of the Rivière Blanche, which communicated with the main pipe of the volcano, and out of which the eruptions took place. This fissure, which was mentioned as existing in the eruption of 1851, pointed almost directly towards St. Pierre, and as the erupted material flowed out almost like a fluid, it was directed straight down on the doomed city. The lowest portion of the lip of the crater of the Soufrière was much broader and more even, so the incandescent avalanche which descended from it was spread much more widely.

The latest accounts from Prof. Lacroix indicate that the recent small eruptions of Mont Pelée have filled up the highest part of the fissure and formed a cone, which covers up most of the former crater. In any further eruption, therefore, the avalanche of incandescent sand will not be confined to the district of the Rivière Blanche, but may descend on any side of the mountain.

Coming now to more strictly geographical details, it is wonderful how small have been the changes produced, smaller than even those in St. Vincent.

The north end of St. Pierre is completely buried in dust or levelled with the ground, so that nothing remains visible of the ruins of the houses except in certain protected situations, and the plateau rising to the north of the town towards the foot of the mountain is also covered. It is difficult to state the exact depth, but it is certainly inconsiderable in comparison with the 200 feet in the Rabaka, or even the 80 feet in the Wallibu. Further to the south, in the centre of the city of St. Pierre, the amount of ashes was much less; a great deal has been already washed away, but I doubt if it ever was more than 2 or 3 feet thick on an average, and on Morne d'Orange, at the south end, it was quite insignificant—only a few inches. The destruction of St. Pierre itself by the incandescent avalanche, and the hot blast and attendant conflagration, is an event of intense human interest as being attended by the sudden death of over 30,000 persons, but from the point of view of the physical geographer can hardly be called considerable, neither can the carrying away of a few small bridges, nor the formation of a small mud delta at the mouth of the Rivière Blanche.

It remains now to discuss the nature of these peculiar eruptions. They belong to a type which have hitherto been imperfectly, if at all, described, and we were fortunate enough to witness at a distance, at least as close as was safe, one of the characteristic eruptions of Mont Pelée, and thereby to confirm the views which we had previously formed by observation of the effects of those of the Soufrière.

On arrival at Fort de France we found that the devastated area to the north of the island was still almost entirely unoccupied. The greater part of the inhabitants of St. Pierre and the neighbourhood had been killed by the eruption: and the few survivors were only returning

by slow degrees. It was therefore impracticable to make our base of operations on land near the scene of eruption. Fort de France was too far away to be available, except at a ruinous expenditure of time and money in going to and fro. It was therefore determined to engage a sloop, provision it, and live on board, moving by day to any point where landing was desirable, and retiring at night to some safe anchorage within reasonable distance. We devoted our first duty to an examination of the ruins of St. Pierre, and in the evening we moved about 2 miles south along the coast and spent the night at anchor off Carbet, just at the limit of the area of devastation, at a spot commanding a full view of the mountain. Next morning we returned to St. Pierre, and moored the sloop to one of the buoys at the north end of the town. Dr. Flett landed and further examined the ruins, while I remained on board and took photographs of the magnificent cauliflower masses of dust and steam which were frequently ejected from the great triangular fissure above mentioned. Later in the afternoon we sailed further north along the coast, still taking photographs of Mont Pelée, which was clearer that day than we ever saw it before or after, and showed to great perfection the deeply eroded valleys with which its slopes are scored. They much resemble those in corresponding position on the slopes of the Soufrière in St. Vincent, and appear to be formed in the same way in strata of similar composition, viz. fragmentary ejecta from the volcano which had consolidated to form soft tuffs, and had subsequently been eroded into their present forms by ordinary atmospheric agencies.

I have ventured thus to write in narrative form as leading up to the occurrence of that memorable evening. We returned and sailed slowly south past the base of the volcano, witnessing and photographing many small explosions and their cauliflower clouds of dust, and thus twice crossing the track of the eruption which took place later. We anchored as before off Carbet, and watched the sun set behind the clouds of ashes ejected by the volcano. When approaching the horizon and thus viewed, the sun appeared a sickly yellowish-green, and so pale that it could be looked at with the naked eye without discomfort. Later on, after sunset, the gorgeous after-glow appeared, and the thin clouds in the western sky were lit up with most brilliant red, beginning perhaps 30° or 40° from the horizon, while the part below still remained yellowish-green. Later still, as the sun sank further below the horizon, the yellowish-green area sank also, and only the reds remained, till they too sank out of sight, and gave place to the light of a brilliant three-days-old moon. We had sat on deck absorbed in watching this superb spectacle, and were just going to begin supper, when one of us, looking towards Pelée, said, "That cloud is different to the others. It's quite black, and I'm sure it's coming this way." A few moments' examination confirmed this, and, the captain's attention being called to it,

we all, passengers and crew, heaved up the anchor as quickly as possible, and set all sail. The black cloud had meanwhile rolled down the side of the mountain on to the sea, and came quickly towards us. We had not moved a moment too soon. The upper slopes of the mountain cleared somewhat, and some big red-hot stones were thrown out; then I saw the triangular crack become red, and out of it poured a surging mass of incandescent material, reminding me of nothing so much as a big snow-avalanche in the Alps, but at a vastly different temperature. It was perfectly well defined, did not at all tend to rise like the previous cauliflowers, but flowed rapidly down the valley in the side of the mountain which had clearly been the track of previous eruptions, till in certainly less than two minutes it reached the sea, and was there lost to view behind the remains of the first black cloud, with which it appeared to coalesce. There and on the slopes of the mountain were doubtless deposited the greater part of the incandescent ash, while the steam and gases, with a certain portion of still entangled stones and ash, came forward in our direction as a black cloud, but with much greater rapidity than before. The sailors were now alarmed, nay, panic-stricken, got out the oars and pulled for their lives. Meanwhile the cloud came nearer and nearer; it was well defined, black, and opaque, formed of surging masses of the cauliflower type, each lobe rolling forward, but not all with one uniform rotation; bright scintillations appeared, seen in the cloud itself, and some like little flashes of light vertically between the cloud and the sea on which it rested. These were clearly the phenomena described by the survivors in the St. Vincent eruption as "fire on the sea," occurring in the black cloud which overwhelmed the windward side of that island. We examined them carefully, and are quite clear that they were electric discharges. The scintillations in the body of the cloud became less numerous and more defined, and gradually took the form of vivid flashes of forked lightning darting from one part of the cloud to another. The cloud rapidly gained on us. When it had got within perhaps half a mile or a mile—for it is difficult to estimate distances at sea and in a bad light—we could see small material falling out of it in sheets and festoons into the sea, while the onward motion seemed to be chiefly confined to the upper part, which then came over our heads and spread out in advance and around us, but left a layer of clear air in our immediate neighbourhood. It was ablaze all the time with electric discharges.

As soon as it got overhead stones began to fall on deck, some as big as a walnut, and we were relieved to find that they had parted with their heat and were quite cold. Then came small ashes and some little rain. Eventually we gained the harbour of Fort de France unhurt, and the proposed ascent of Mont Pelée next day, for which men had already been engaged, was abandoned. The cloud was also noticed at Fort de France. It was described as like those in the previous eruptions, but

two unbiassed observers, who had seen it and that of May, declared this was the larger of the two.

Our limited time was now coming to an end, but on leaving for Dominica two days later we were able, from the deck of a steamer, to make some examination of the slopes of the mountain down which we had seen the incandescent avalanche descend. The whole district from just beyond St. Pierre to near Prêcheur, a distance of about 4 miles, was covered with a deposit of light grey ash of varying thickness, perhaps averaging a few inches, but evidently much deeper in the valleys of the Rivière Blanche and Rivière Seche, which descend from the mountain about 2 miles beyond St. Pierre, and drain the slopes below the large fissure out of which we saw the eruption descend. The water of these rivers was boiling as it fell into the sea—in fact, it was reproducing on a small scale the phenomena of boiling mud which are described above in the cases of the Wallibu and Rabaka rivers in St. Vincent, though how far up the mountain these Wallibu effects extend, and where they give place to true volcanic discharges, it is difficult to describe as yet; we must wait further observations by M. Lacroix and his colleagues.

Returning now to the mechanism of the hot blast and the source of the power which propelled it, both my colleague and I are convinced of the inadequacy of previous explanations, such as electricity, vortices, or explosions in passages pointing laterally and downwards, or explosions confined and directed down by the weight of the air above. Such passages into the mountain, which, to be effective, would require to be caverns closed above, and not mere open ravines, do not exist in the case of the Soufrière, and we are not aware that they have been observed in Mont Pelée; and as to the weight of the air, this did not prevent the explosions in the pipe of the Soufrière from projecting sand and ashes right through the whole thickness of the trade-winds till they were caught by the anti-trade current above and carried to Barbados. Moreover, the black cloud, as we saw it emerge from Mont Pelée, seemed to balance itself at the top of the mountain, start slowly to descend, and gather speed in its course, and the second incandescent discharge followed the same rule. We believe that the motive power for the descent was gravity, as in the case of any ordinary avalanche.

The accepted mechanism of a volcanic eruption is that a molten magma rises in the volcano chimney. It consists of fusible silicates and other more or less refractory minerals, sometimes already partly crystallized, and the whole highly charged with water and gases, which are kept absorbed in the liquid, partly by the immense pressure to which they are subjected. When the mass rises nearer the surface and the pressure is diminished, the water and gases expand into vapour and blow a certain portion of the more or less solidified materials to powder, or, short of this, form pumice stone, which is really solidified froth

and they are violently discharged from the crater. When the greater part of the steam and gases has been discharged, the lava, still rising, finds a vent either over the lip of the crater, or often through a lateral fissure, and flows quietly down the side of the mountain.

It is quite recognised that these phenomena may occur in various relative proportions. The explosive phase may predominate, in which case only sand, pumice, and fragmentary material are discharged, with perhaps ejected blocks torn from the sides of the chimney, and in this case an ordinary ash or cinder cone is built up. On the other hand, the magma may contain little vapour, and the lava may be discharged quietly and spread out widely as a sheet over the surrounding country. The Snake river basalts in Western North America are of this class, and though they cover an area larger than England and France combined, no eruptive cones or craters have been found on them, and it is supposed that none ever existed, but that the lava welled out quietly through fissures. Such fissures I have seen in Iceland, studded with a row of quite small craters only. We believe that in these Pelean eruptions an intermediate phase occurs. The lava which rises in the chimney is charged with steam and gases, which explode as usual, but some of the explosions happen to have only just sufficient force to blow the mass to atoms and lift the greater part of it over the lip of the crater without distributing the whole widely in the air. The mixture of solid particles and incandescent gas behaves like a heavy liquid, and before these particles have time to subside the whole rolls down the side of the mountain under the influence of gravity, and consequently gathers speed and momentum as it goes. The heavy solid particles are gradually deposited, and the remaining steam and gases, thus relieved of their burden, are free to ascend, as was the case with the black cloud which rose over our heads on July 9.

We had concluded, from our examination of the Soufrière, that something of this sort must occur, but the explanation was obvious when we saw the eruption of Mount Pelée. Dr. Flett remembers my saying while the eruption continued, "That's an avalanche," and among my notes made while in the Indies are the following: "The cloud of incandescent material, as we saw it welling out of the great fissure, reminded us of nothing so much as a snow-avalanche as seen in the Alps. It rolled rapidly from the mountain side in well-defined billows, giving the impression of a vast volume of separate small particles mixed with a certain quantity of air or vapour, and, as in the case of Alpine avalanches, entangling more air in its progress, and setting up a blast sufficient to overturn large objects in its course."

This effect of avalanches in compressing the air before them and setting up a powerful blast, the effects of which extend beyond the area covered by the fallen material, has long been recognized. Plate 13 shows a group of large trees overthrown by the blast of the great

avalanche from the Altels on Gemmi pass in 1895; all lay prostrate in directions radiating away from the place where the avalanche came down.

The only difficulty which we felt as to the sufficiency of the above explanation was the fact that these discharges descended slopes of 10° and 12° , which are less than the angle of repose for such material—for instance, not so steep as the side of an ordinary railway embankment; but we thought that the entangled gases and steam might be sufficient to account for the extra mobility of the mass. When we brought this explanation before the Royal Society, it was accepted as satisfactory by the physicists present. Prof. Sylvanus Thompson, F.R.S., mentioned as confirmatory his having noticed that small particles of silica, when heated to redness, move about the crucible like a liquid; and Dr. Edward Divers, F.R.S., in a letter to *Nature*,* not only confirms this statement, but points out that the liquid-like behaviour of powders at a red heat is most marked in cases where gases or vapours are being given off in minute quantities by the incandescent particles, which are thus kept surrounded each by a thin envelope of mobile gas, and this exactly meets the case of the volcanic particles in question.

**Nature*, December 11, 1902, p. 126.

PRESENTED

29 APR. 1904



PLATE I.

TROPICAL VEGETATION. CHATEAU BELAIR, ST. VINCENT.

This view, taken about 2 miles beyond the southern boundary of the devastated area, shows the luxuriant character of the tropical vegetation which formerly covered the whole district. The hut is of the usual type occupied by negroes, the descendants of liberated slaves. It consists of wooden uprights, walls of wattles, now generally giving place to boards, and a "trash" roof.

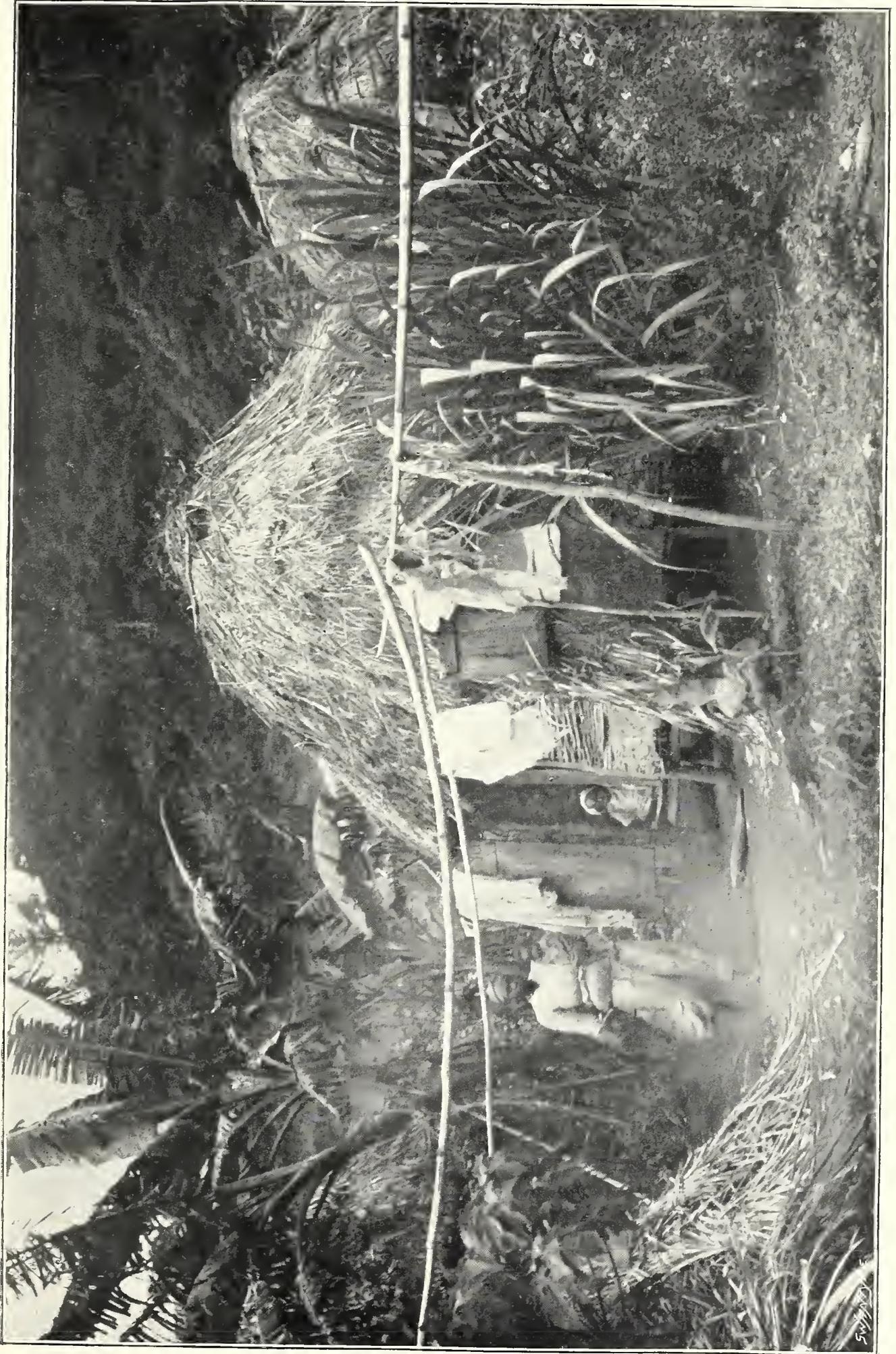


PLATE I.—TROPICAL VEGETATION. CHATEAU BELAIR, ST. VINCENT.

PLATE II.

THE WALLIBU DISTRICT FROM THE SEA.

In the distance is Morne Garu ; in the middle distance the hot sand deposited by the eruption. The rolling, rounded character of the surface is shown, also the furrows and gullies already cut by the rain. The foreshore which formerly existed here has sunk into deep water, and the waves are cutting into the bluffs behind, and have exposed a section of the new ash resting on the old beds of fragmentary volcanic material. A new beach is in process of formation.

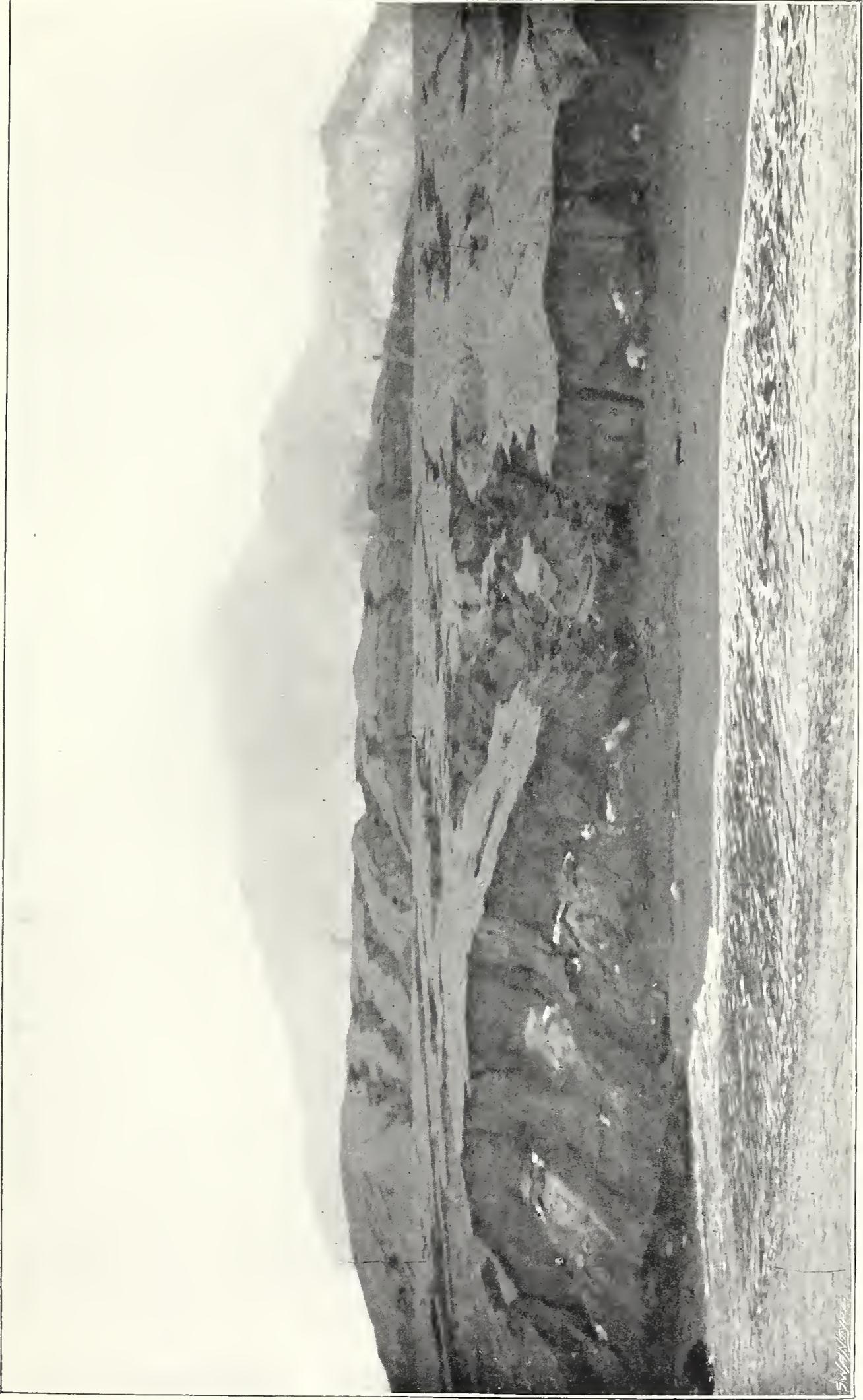


PLATE II.—THE, WALLIBU DISTRICT FROM THE SEA.

PLATE III.

IN THE WALLIBU VALLEY.

In the distance are the slopes of Morne Garu, with trees killed by the eruption ; in the foreground terraces of hot sand, marking the level to which the valley was originally filled, and some of the successive stages of its re-excavation. The hot sand is still steaming wherever water comes in contact with it.



PLATE III.—IN THE WALLIBU VALLEY.

PLATE IV.

STEAM AND ASH EXPLOSIONS, WALLIBU.

This photograph was taken from above Chateau Belair, a distance of about 2 miles across the bay. In the foreground are the two ridges which saved the village during the eruption. Beyond them are seen the great clouds of steam and ash or sand, which were only visible after rain. The Soufrière mountain would be visible were it not concealed by the clouds.

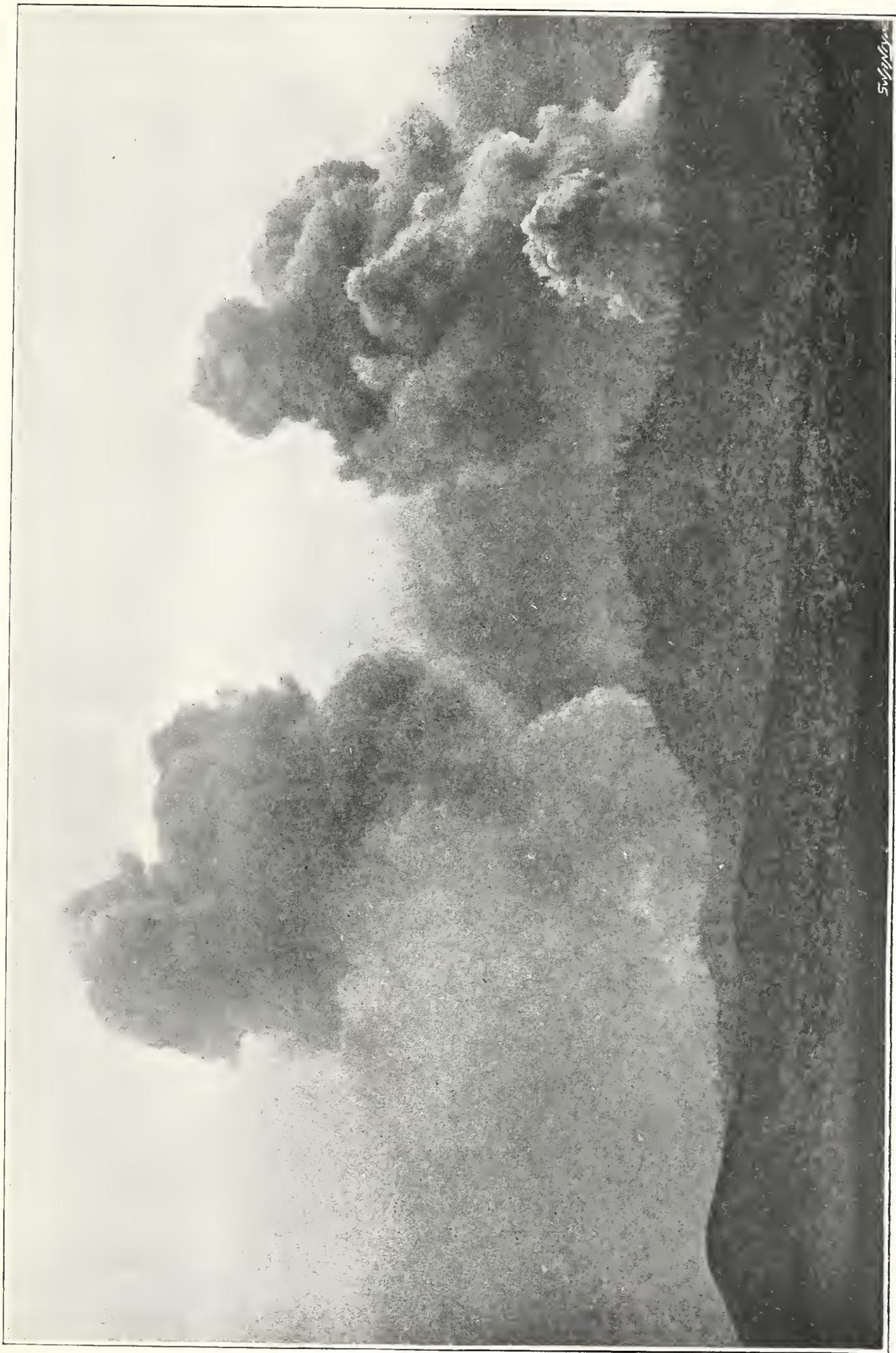


PLATE IV.—STEAM AND ASH EXPLOSIONS, WALLIBU.

5/2/1904

PLATE V.

ROZEAU DRY RIVER FLOWING WITH BOILING MUD.

In the background are beds of new hot sand only a few feet thick, and already much washed into furrows by the rain, which is even cutting into the old banks. In the foreground, extending to just below the bridge, is a gush of hot mud as described on p. 268.

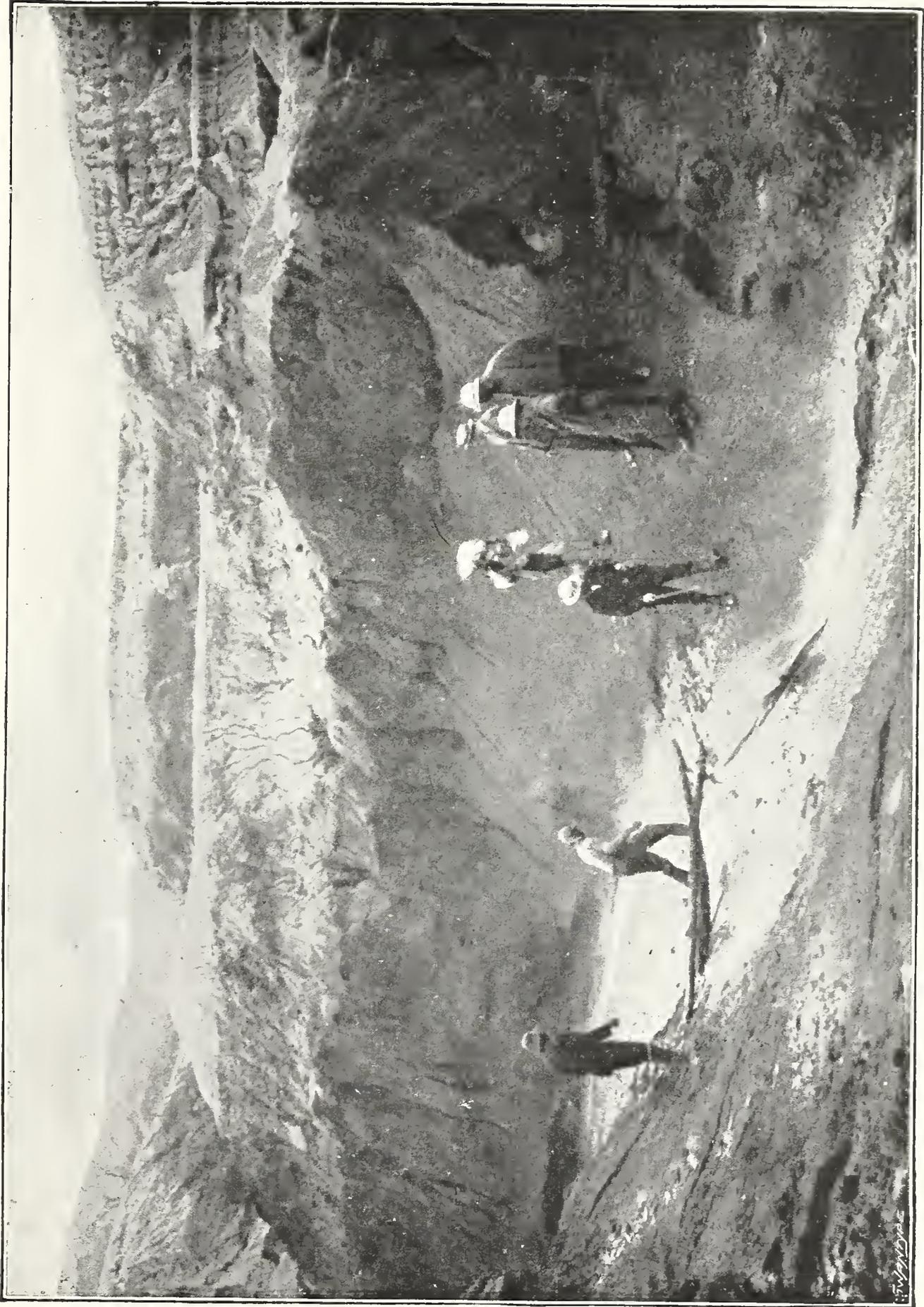


PLATE V.—ROZEAU DRY RIVER FLOWING WITH BOILING MUD.

PLATE VI.

THE MOUTH OF THE WALLIBU FROM THE SEA.

Morne Garu is seen in the distance, and in the foreground the new alluvial fan of sand brought down by the river; in the middle distance is a small steam explosion.

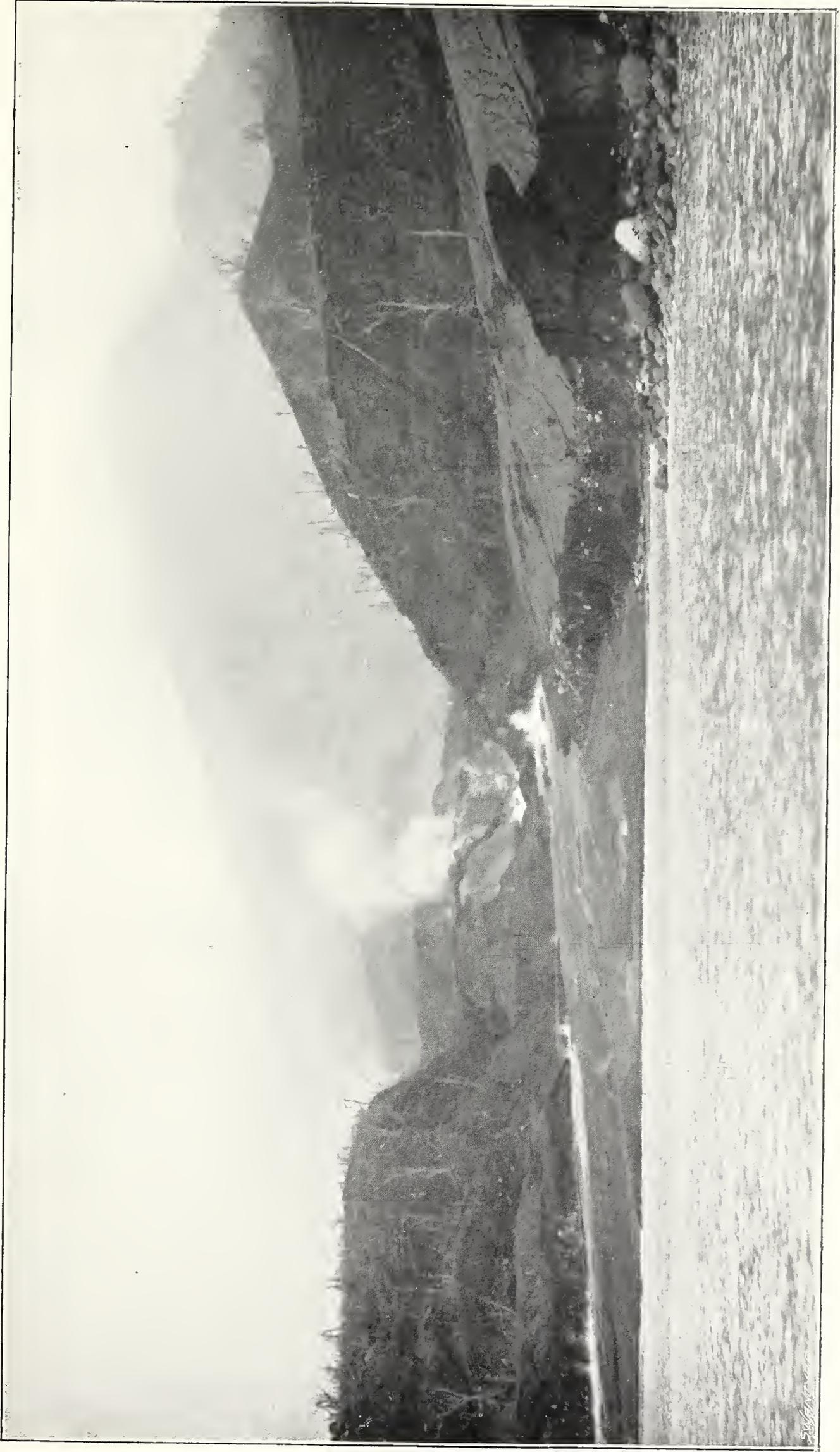


PLATE VI.—THE MOUTH OF THE WALLIBU FROM THE SEA.

PLATE VII.

THE SITE OF THE WALLIBU SUBSIDENCE.

The low cliffs in the middle distance consist of old tuffs with a capping of several feet of fresh sand, the product of this eruption. On the top are seen the ruins of the Wallibu factory, and at the foot was formerly a foreshore, perhaps 200 yards wide, on which were the high-road and a number of negro huts standing among luxuriant vegetation. The whole subsided on the day of the eruption. The new beach in the foreground has been formed since that time (in about a month) of material washed from the cliffs and brought down by the rivers. The Soufrière is seen in the extreme distance to the left.

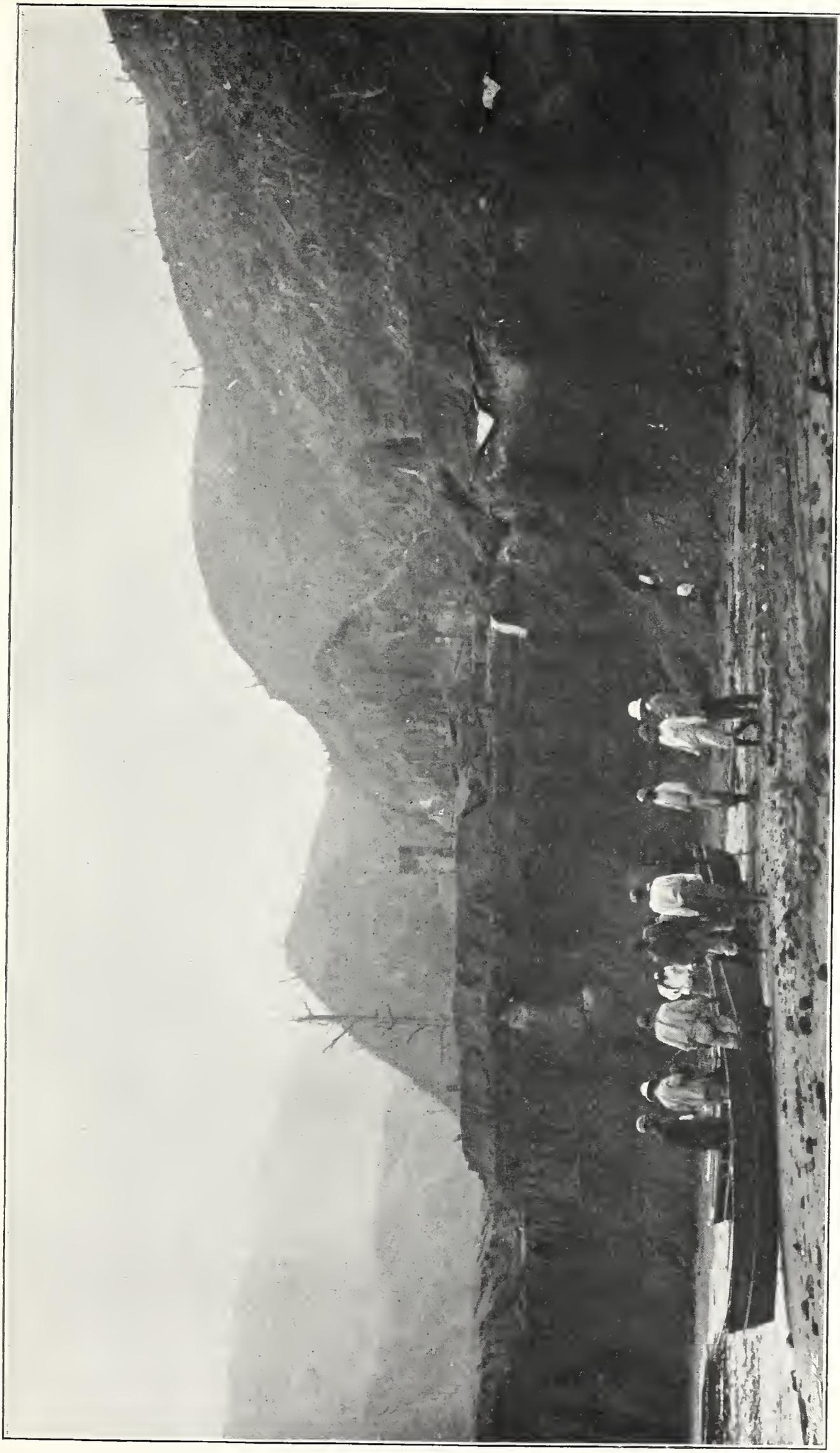


PLATE VII.—THE SITE OF THE WALLIBU SUBSIDENCE.

PLATE VIII.

A BEACH OUTSIDE THE DEVASTATED AREA.

This is introduced for the purpose of comparison, to show the sort of place that existed before the eruption on the site of the last photograph.

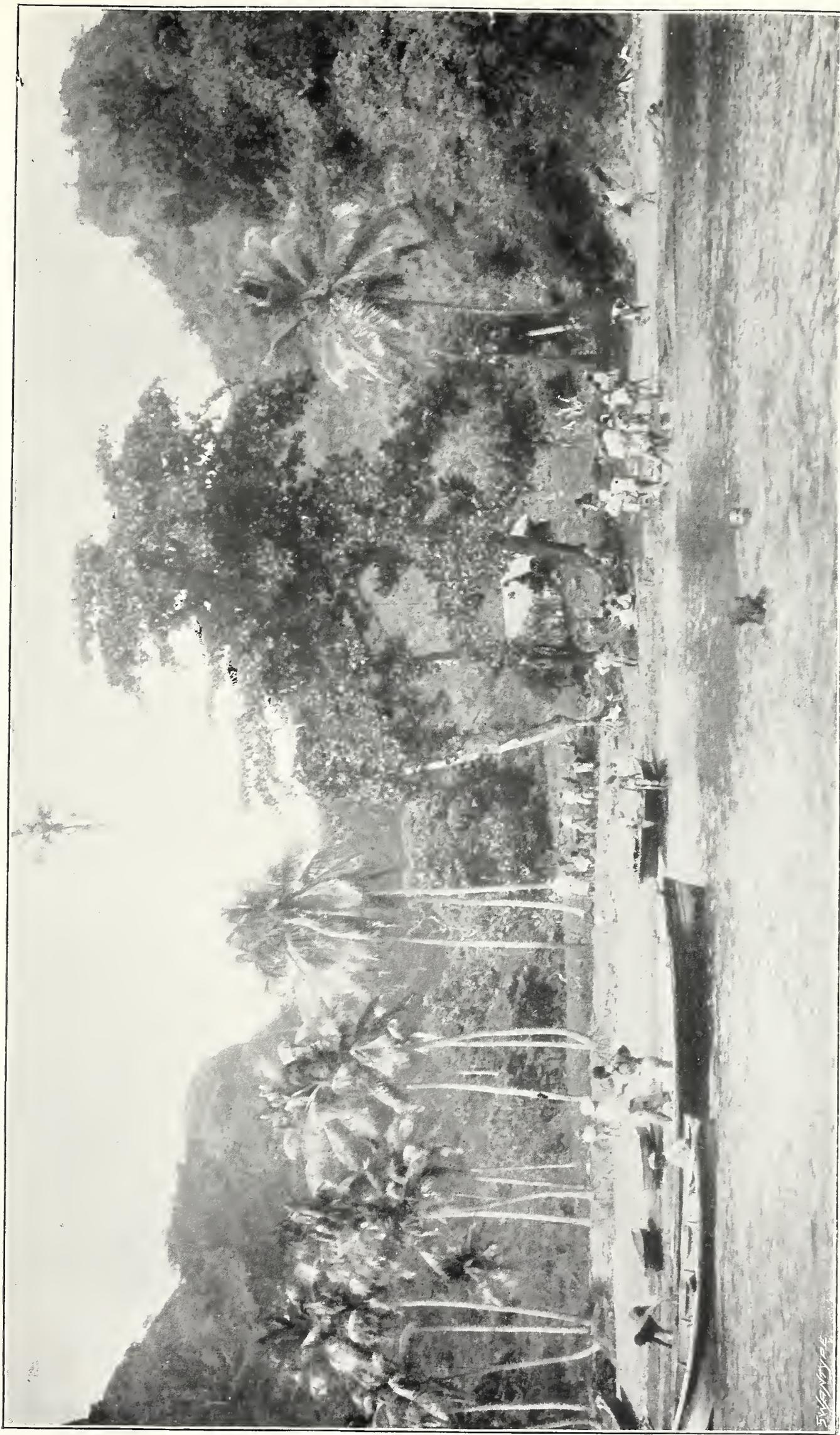


PLATE VIII.—A BEACH OUTSIDE THE DEVASTATED AREA.

SWANSON

PLATE IX.

RIDGES ON THE SOUFRIÈRE.

This plate shows the ridges of tuff on the lower slopes of the mountain on the windward side above Lot 14. Those on the leeward side are similar. Higher up the slopes become steeper, the ridges narrower, and the gullies between them deeper. The whole was formerly covered with luxuriant vegetation, of which a few charred remnants are seen. In the distance are the hills above George Town, and in front of them the Rabaka Dry River, with one of its branches in the foreground to the right.

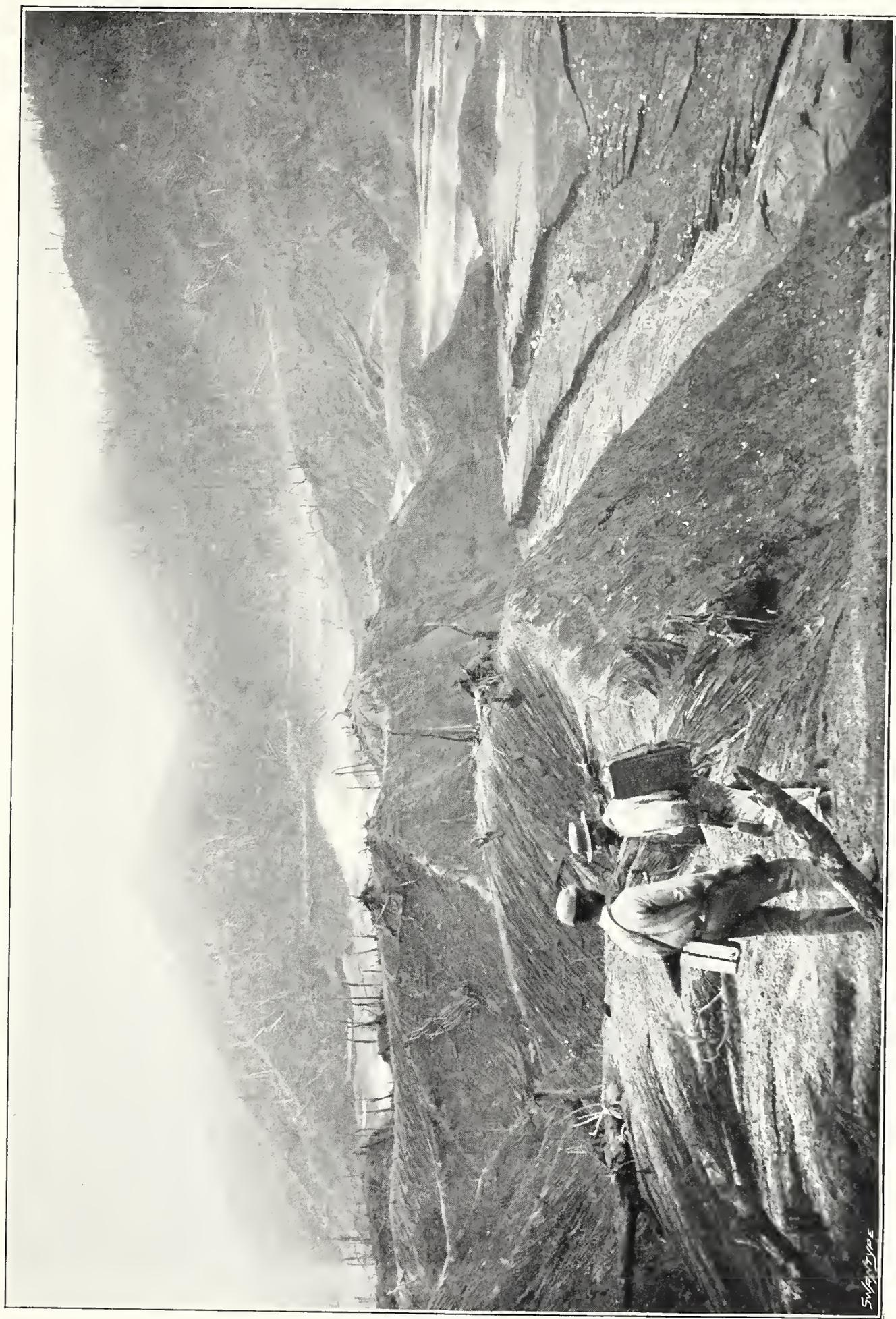


PLATE IX.—RIDGES ON THE SOUFRIÈRE.

SWANWICK

PLATE X.

LOT 14. A DEVASTATED PLANTATION.

This was the highest plantation on the windward side along the old Carib track which led to the summit of the Soufrière. The trees are charred and stripped of their leaves. The factory is unroofed, the machinery wrecked, and the watershed damaged. Much sand is about.

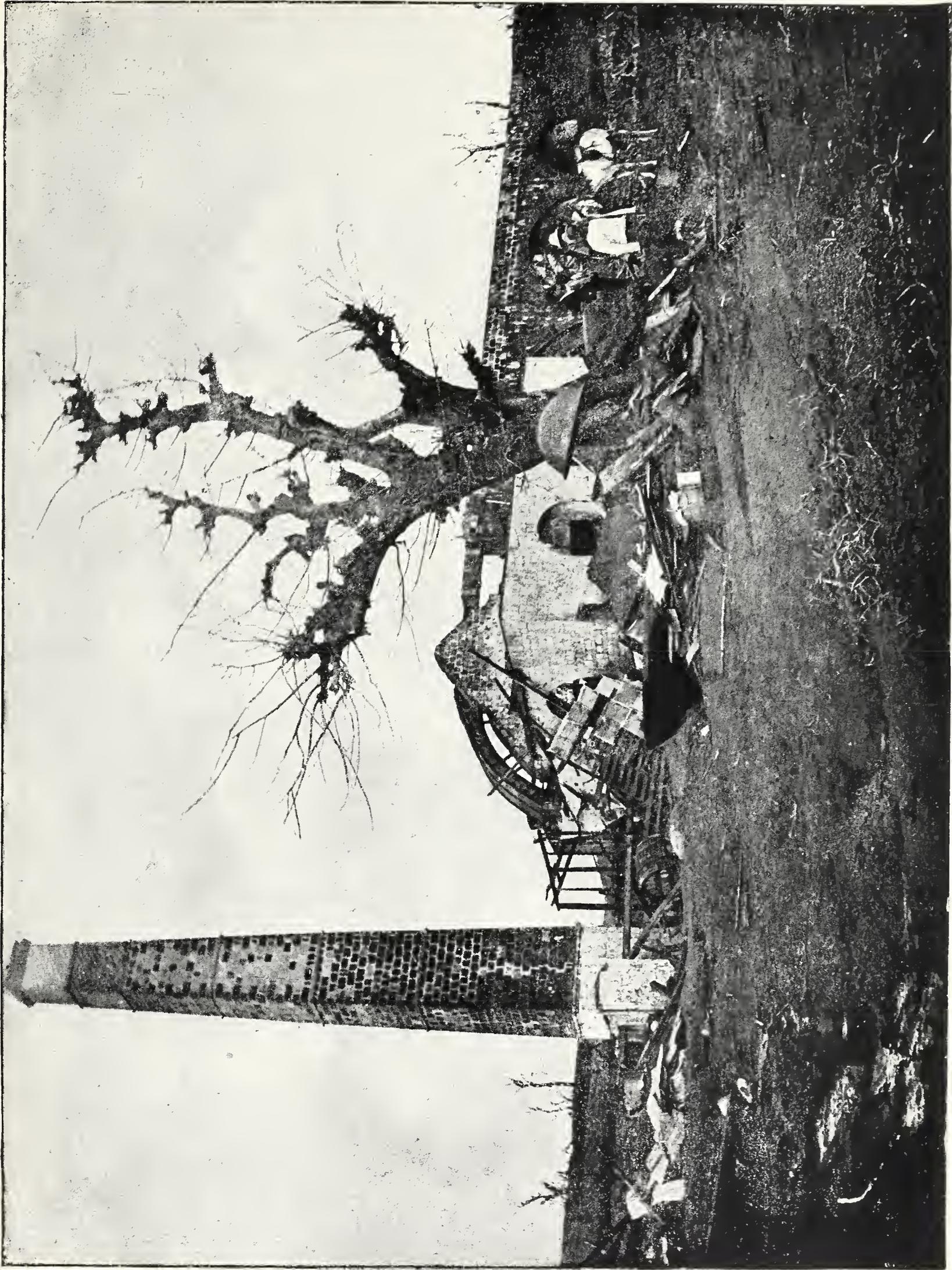
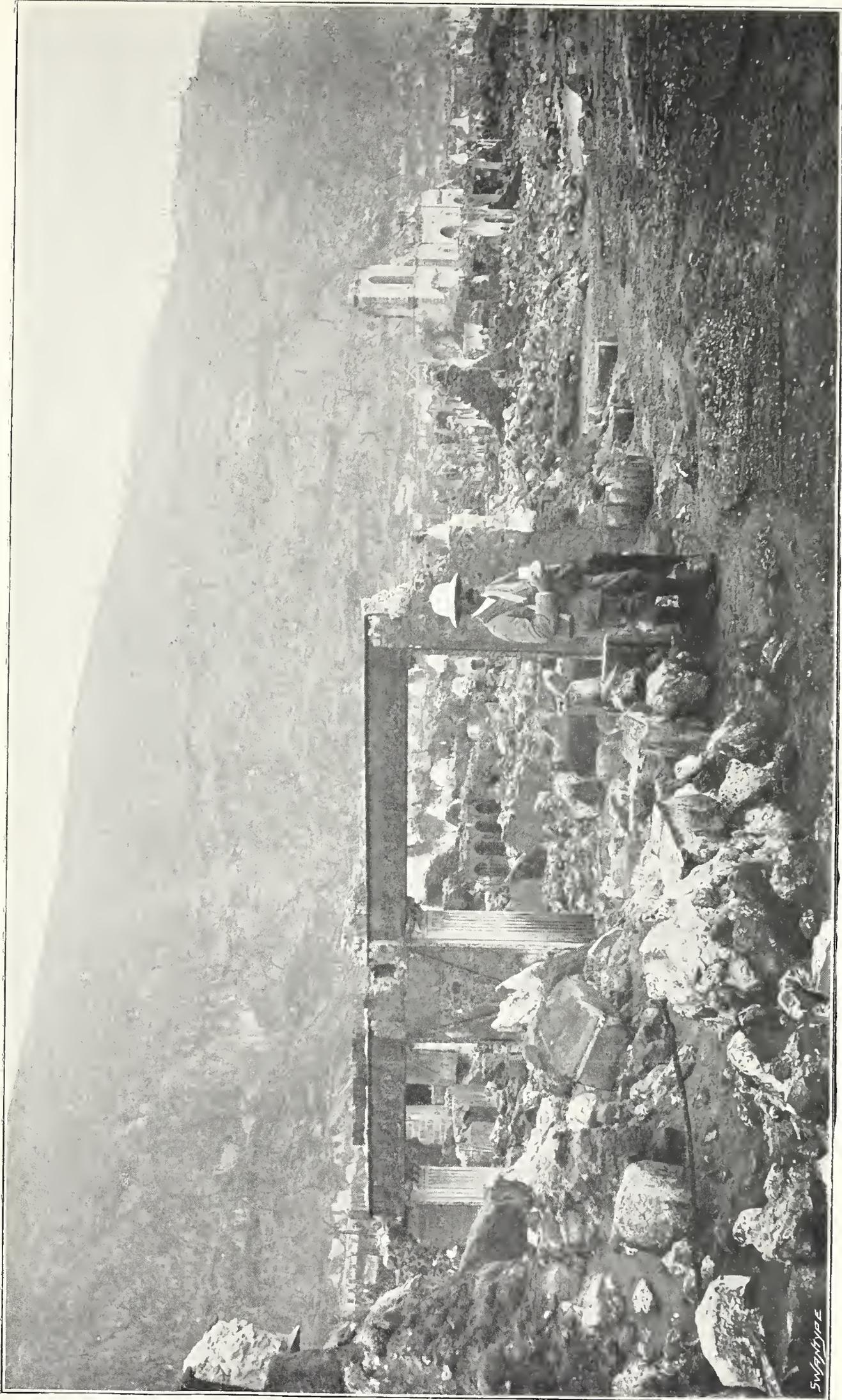


PLATE X.—LOT 14. A DEVASTATED PLANTATION.

PLATE XI.

THE MAIN STREET OF ST. PIERRE.

This photograph shows the condition of St. Pierre on July 8, about two months after the main eruption. The iron beam and masonry columns is all that remains of one of the principal shops. In the distance is part of the north tower of the cathedral still standing; the main part of the building is destroyed.



SWANTYPE

PLATE XI.—THE MAIN STREET OF ST. PIERRE.

PLATE XII.

MONT PELEE IN ERUPTION.

This photograph, taken on the afternoon of July 9, gives an excellent idea of the great black cloud which so nearly overtook us later in the evening, and which I was unable to photograph from absence of light.



PLATE XII.—MONT PELÉE IN ERUPTION.

PLATE XIII.

TREES OVERTHROWN BY THE BLAST OF AN AVALANCHE.

A great avalanche descended from the Altels mountain on the Gemmi pass, in Switzerland, in September 1895. At the end of an unusually long hot summer, a large portion of the Altels glacier and snow-field slid down bodily, and carried with it a quantity of stones and *débris*. The avalanche covered an area of above a square kilometre, and killed several men and above 100 cattle. The Altels is beyond the right of the plate, and the trees which were outside the area covered by the avalanche itself were overthrown by the blast of air which accompanied it. They all point radially away from the Altels. A few to the left were protected by the hillock, and escaped.

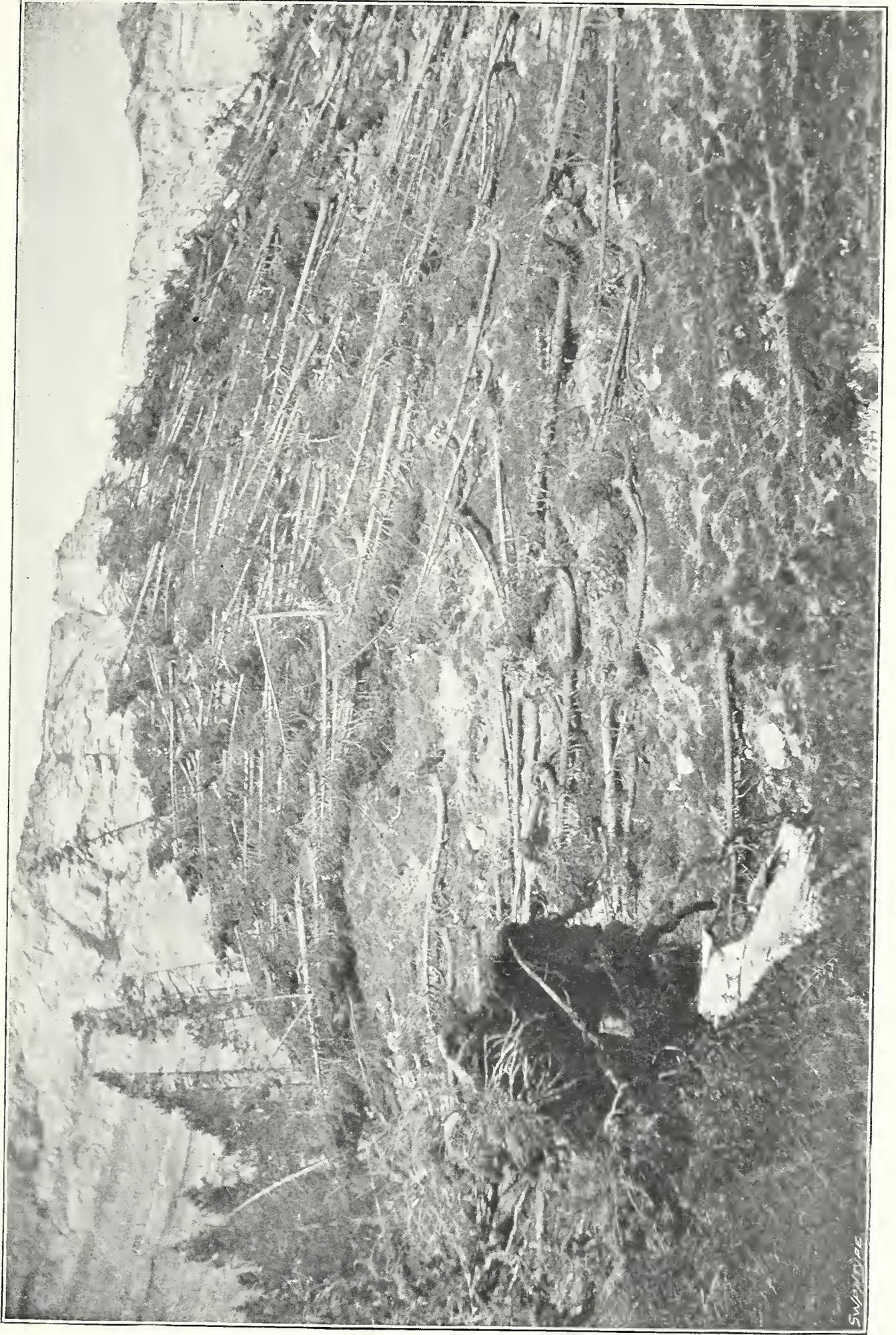
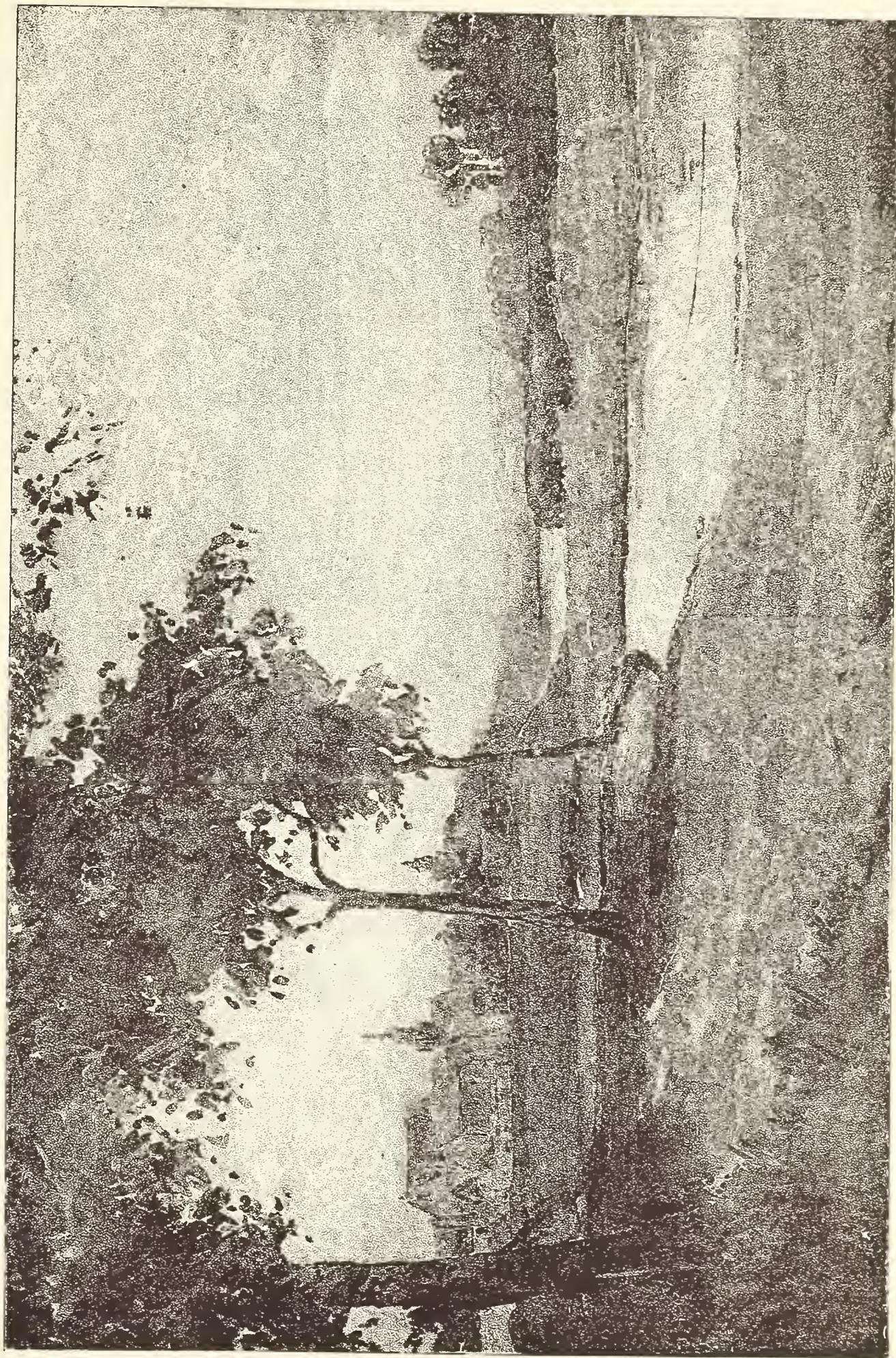


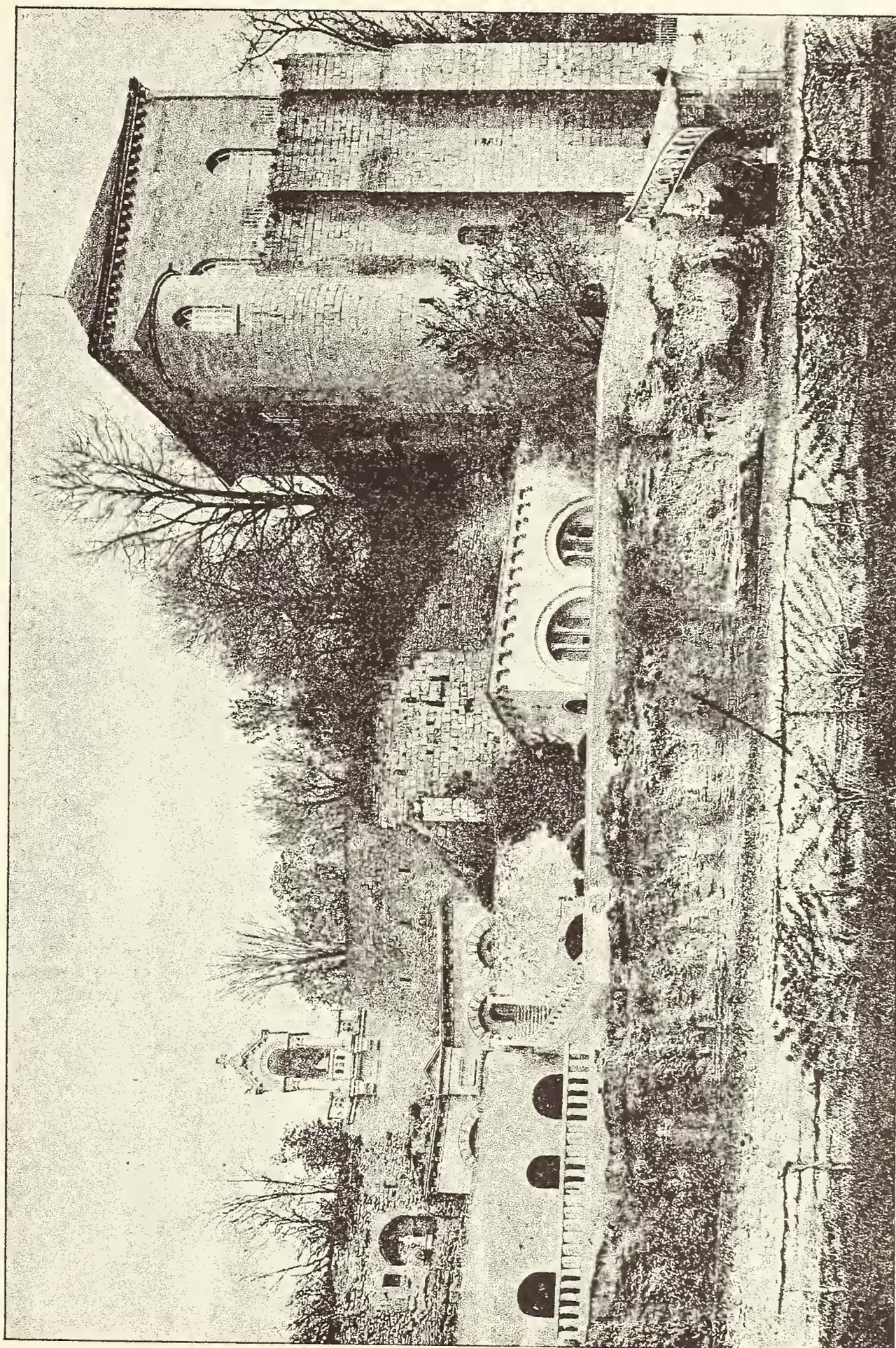
PLATE XIII.—TREES OVERTHROWN BY THE BLAST OF AN AVALANCHE.

SWANSON



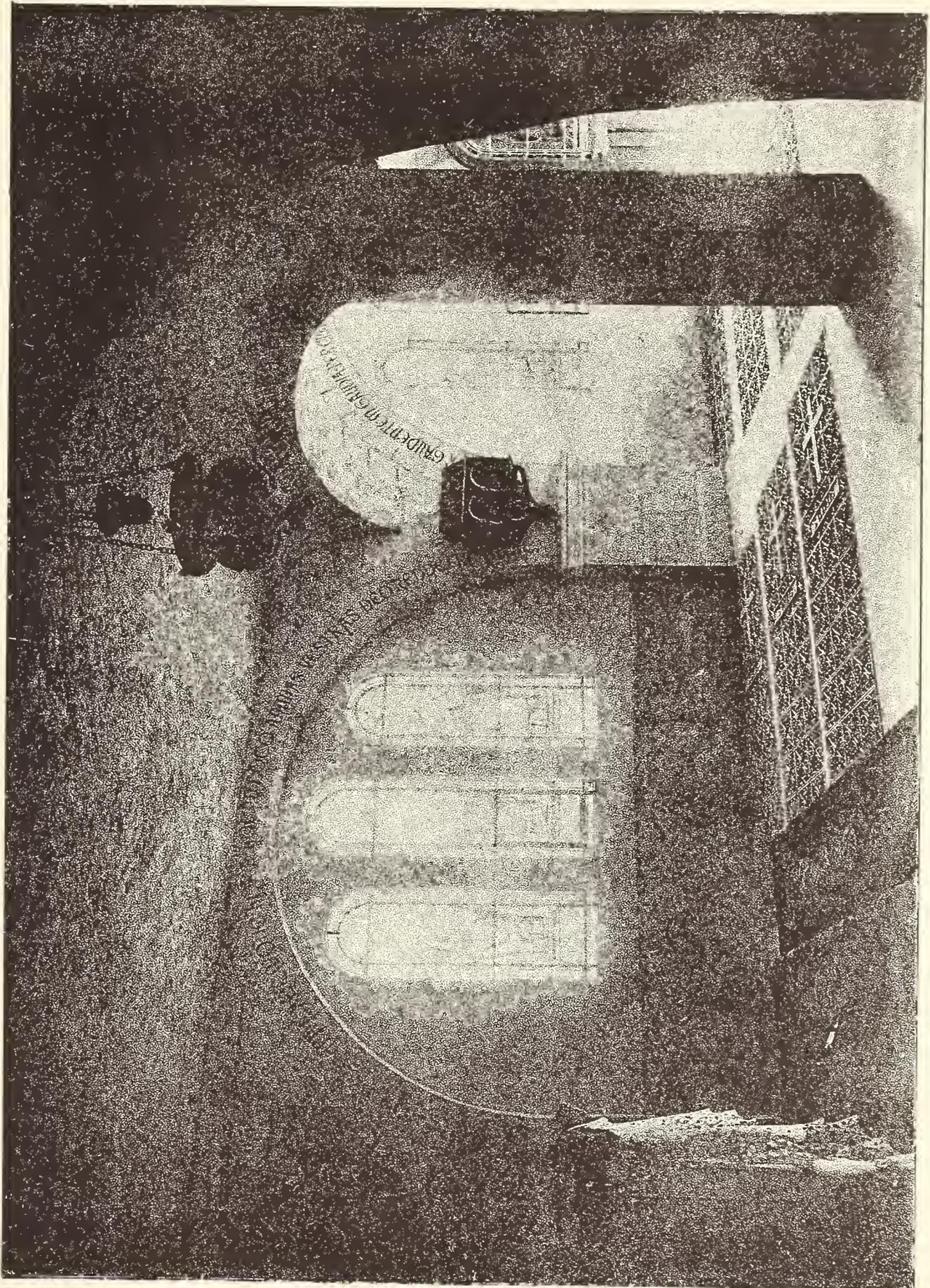
MARMOUTIER.

Photograph of a Drawing by Miss F. Middleton.



INK-PHOTO SPRAGUE & CO. LONDON

MARMOUTIER: CELLS.



INK PHOTO SPRAGUE & CO. LONDON

MARMOUTIER: CHAPEL OF THE SEVEN SLEEPERS.

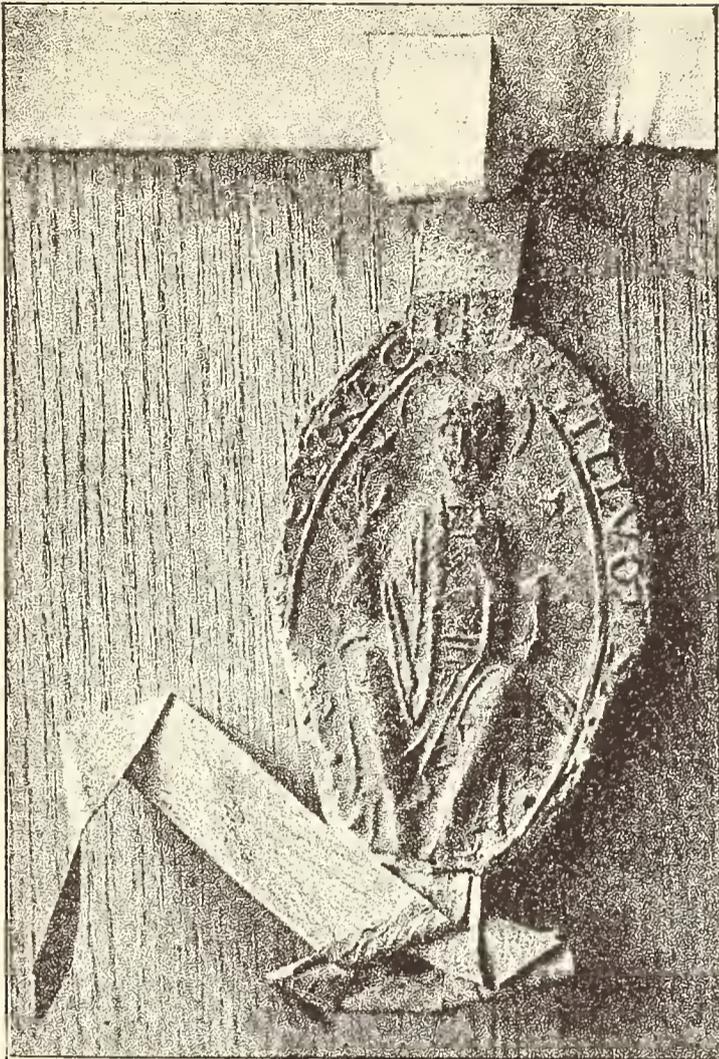


Fig. 1.

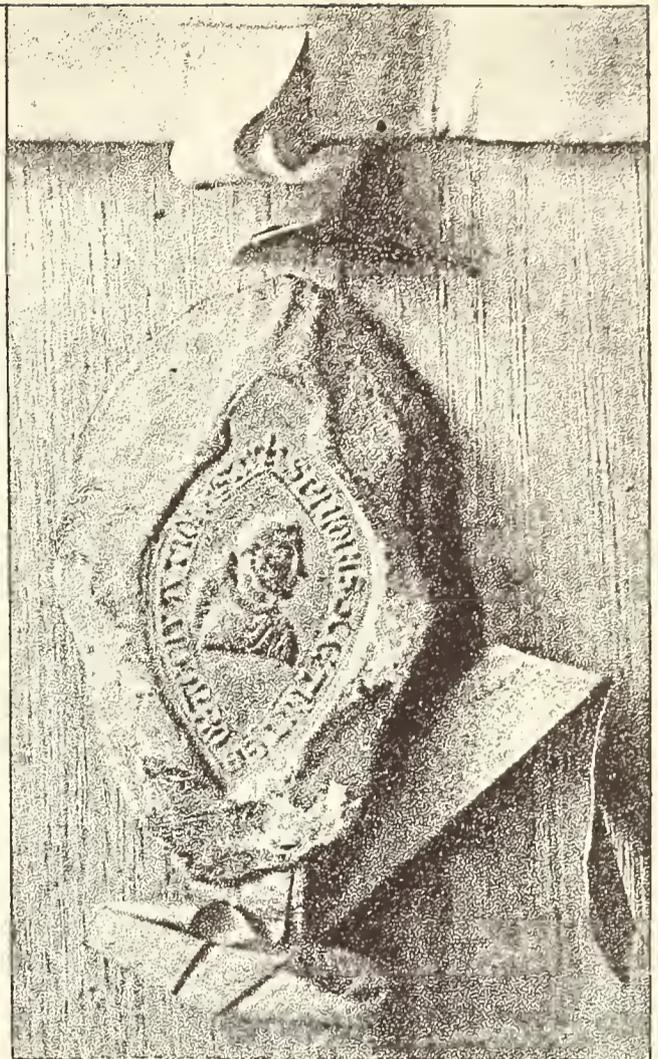


Fig. 1a.

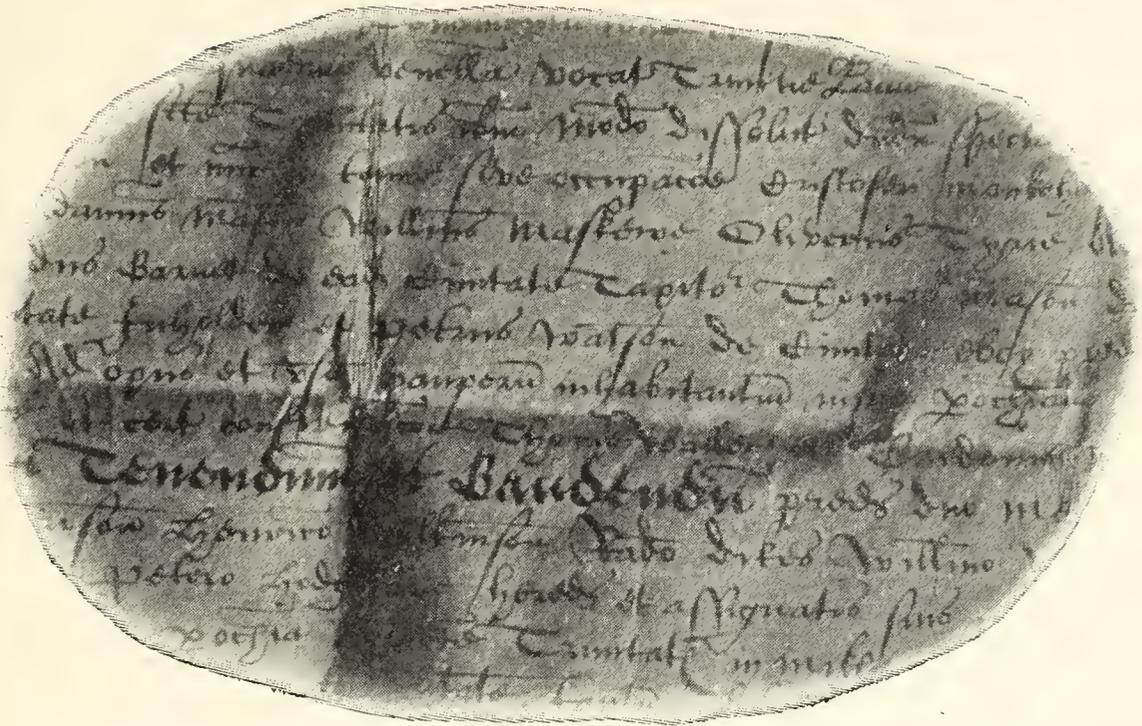


Fig. 2.

FIGS. 1 & 1A. SEAL OF TRINITY PRIORY.
From an Impression in the Dean and Chapter Library, York.

FIG. 2. SEAL OF TRINITY PRIORY.

PLATE XVIII.



TRANSCRIPTION OF THE ABOVE DEED.

.....quadam venella vocat. Trinitie Lane.....
scte. Trinitatis ibm. modo dissolut. dudu. spectan.....
 ...on et nup. in tenur. sive occupacoe. Cristoferi Monkeho...
damus Mason Willms. Maskewe Oliverus Tyrie A.....
dus Garnet de ead. Civitate Taxito. Thomas mason d....
 ...tate Inholder et Petrus Watson de Civitate ebor. pred...
 ...Ad opus et usu. pauperu. inhabitantiu. infra pochiam...
et cert. confirmacoe. Thome Waller et Guidonis.....
m **Tenendum de Gaudendu.** pred. duo me.....
rison Henrico Wilkinson Rado Dikes Willmo.....
Petero Hodgesone hereds. et assignatis suis.....
pochia. Scte Trinitat. in Mikel.....
fidelitate tantu.....

